Willingboro
Public Schools

"Where Excellence is the Expectation"

Willingboro Public Schools
Grade 3 Science

Revised June, 2022
Jennifer Brandon - Supervisor of Science

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SCIENCE CURRICULUM AND INSTRUCTION:

The Willingboro Public Schools Science program is dedicated to delivering our students an innovative hands-on science program. Our program supports the State's vision that scientifically literate students will gain the knowledge and understanding of scientific concepts as required for personal decision-making, participation in civic and cultural affairs, and economic productivity.

Students are encouraged to ask questions about the world around them and practice science skills.

- Students' science experiences teach them to connect science concepts to their experience, see how human nature influences science, and explore how science and technology affects their lives.
- The science classes include activities that engage students in applying their science skills and understandings to examine social issues, solve real problems and make decisions.
- Students have the opportunity to use a variety of equipment and technology in their scientific investigations.
- Students learn how to find out and make up their own minds by experimenting and investigating how the world works rather than just memorizing facts.
- Students are learning how to conduct scientific inquiry and use data to explain their conclusions.
- The process of investigation and explanation is just as important as knowing "the" answer.

Teachers plan instruction that builds on what students know and think to increase students' scientific understanding.

- Teachers use the New Jersey Student Learning Standards in Science to plan lessons that are challenging, engaging and age appropriate.
- There are resources and opportunities for students to do at-home science activities like participating in the STEM Conference.

Course Sequence/Table of Contents:

Click here for the Grade 3 Science Pacing Guide.

Within each unit, please find:

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Overview	**Content Standards - Arranged by Disciplinary Core Idea (DCI)** *Students who demonstrate understanding can:*	**Unit Focus**
ESS Unit: **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.] ● **3-ESS2-2** Obtain and combine information to describe climates in different regions of the world.	Water and Climate is a full year course that is designed to enable students to engage in science and engineering practices while investigating water, weather, and climate, and explore the crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; and systems and system models. They are introduced to the nature of science, how science affects everyday life, and the influence of engineering, technology, and science on society and the natural world. This comprehensive curriculum guide meets the requirements of the New Jersey Student Learning Standards for Science Grade 3, along with the Career Ready Practice standards for 21st Century Life and Careers.
Suggested Open Educational Resources	● FOSS Next Generation Science Curriculum Resources ○ Think Link ○ Student Resource Books ● Generation Genius	
PS Unit: **Motion and Matter**	**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. Qualitative and conceptual, but not quantitative addition of forces, are used at this level. [Assessment Boundary: Assessment is limited to one variable at a time: number, size, or direction of forces. Assessment does not include quantitative force size, only qualitative and relative. Assessment is limited to gravity being addressed as a force that pulls objects down.] ● **3-PS2-2** Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. [Clarification Statement: Examples of motion with a predictable pattern could include a child	Throughout the Motion and Matter Module, students engage in science and engineering practices to collect data to answer questions, and to define problems in order to develop solutions. Students reflect on their own use of these practices and find out about how others use these practices in science and engineering careers. designed to enable students to build a basic understanding of Newton's Three Laws of Motion. There are mini-lessons that teach physical science-specific vocabulary terms, five hands-on lessons, one personalized learning pathway and an assessment piece. This comprehensive curriculum guide meets the requirements of the New Jersey Student Learning Standards for Science grade 3, along with the Career Ready Practice standards for 21st Century Life and Career. The unit is specifically designed with a young child's desire and motivation to learn through movement and physical activity. It incorporates sports such as running, basketball and soccer into the

Overview	Content Standards - Arranged by Disciplinary Core Idea (DCI) *Students who demonstrate understanding can:*	Unit Focus
	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.] ● **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.] ● **3-PS2-4** Define a simple design problem that can be solved by applying scientific ideas about magnets. [Clarification Statement: Examples of problems could include constructing a latch to keep a door shut and creating a device to keep two moving objects from touching each other.]	science curriculum. Through the activities, students will apply what they have learned about forces, friction, mass and speed. The integration of reading, writing, and diagramming in a science notebook is the backbone of each lesson. The personalized learning approach is integrated as students work independently on their pathway. This pathway includes reading, writing, explorations and technology as choices for students to make connections to the learning they have done in class.
Suggested Open Educational Resources	● FOSS Next Generation Science Curriculum Resources ○ Think Link ○ Student Resource Books ● Generation Genius	

Overview	**Content Standards - Arranged by Disciplinary Core Idea (DCI)** *Students who demonstrate understanding can:*	**Unit Focus**
LS **Unit** **Structures of Life**	**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.] **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.] ● **3-LS3-2** Use evidence to support the explanation that traits can be influenced by the environment. [Clarification Statement: Examples of the environment affecting a trait could include normally tall plants grown with insufficient water are stunted; and, a pet dog that is given too much food and little exercise may become overweight.]. **3-ESS3: 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.]	The anchor phenomenon for the Structures of Life Module is the diversity of plants and animals we observe in our world. Students experience that organisms exhibit a variety of strategies for life, have a variety of observable structures and behaviors, have varied but predictable life cycles, and reproduce their own kind by passing inherited characteristics to offspring. Students explore how individual organisms have variations in their traits that may provide an advantage in surviving in a particular environment, and how our knowledge of animals that survived in past environments is inferred by studying fossil characteristics. The driving questions for the module are where do organisms come from, how do they survive, and how are all the different kinds of plants and animals able to continue to exist on Earth? Students observe, compare, categorize, and care for a selection of organisms. Students engage in science and engineering practices to investigate structures and behaviors of the organisms and learn how some of the structures function in growth, survival, and reproduction. Students look at the interactions between organisms of the same kind, among organisms of different kinds, and between the environment and populations over time. Students focus on these crosscutting concepts to develop understandings about organisms and population survival—patterns; cause and effect; scale, proportion, and quantity; systems and system models; structure and function; and stability and change.
Suggested Open Educational Resources	● FOSS Next Generation Science Curriculum Resources ○ Think Link ○ Student Resource Books ● Generation Genius	

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Weather and Climate: Life and Physical Sciences

Overview

Water and Climate is a full year course that is designed to enable students to engage in science and engineering practices while investigating water, weather, and climate, and explore the crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; and systems and system models. They are introduced to the nature of science, how science affects everyday life, and the influence of engineering, technology, and science on society and the natural world. This comprehensive curriculum guide meets the requirements of the New Jersey Student Learning Standards for Science Grade 3, along with the Career Ready Practice standards for 21st Century Life and Careers.

Essential Questions	Enduring Understandings
Overarching Driving Questions: *What happens when water falls on different surfaces?* *What is the difference between climate and weather, and how do they relate to the water cycle?* *How does temperature affect water and weather?* ***Focus Questions for Investigation 1:*** ● How does water move on a slope? ● What is the effect of rain on natural materials? ● How does water interact with other materials? ● How can humans take steps to reduce the impacts of natural and weather-related hazards? ***Focus Questions for Investigation 2:*** ● How can you measure temperature accurately? ● What is the effect on water when it gets hot? cold? ● How do animals stay warm or stay cool? ***Focus Questions for Investigation 3:*** ● What does the weather forecast tell us? ● How does surface area affect evaporation? ● What else affects how fast water evaporates? ● What causes moisture to form on the side of a cup?	**Anchoring Phenomenon: Severe Weather** ● Weather and climate are related to the water cycle. ● Water behaves in predictable patterns, whether it is falling onto surfaces, interacting with materials, or as rain or moving down a slope. ● Humans impact the natural world around them in various ways. ● Humans can take steps to reduce their impacts on the planet. ● Humans can take steps to minimize the impacts of natural and weather-related hazards. ● Weather data and visualizations such as graphs and satellite images can help study and predict weather patterns. ● Weather is observable local daily temperatures, precipitation, etc; whereas climate is predictable patterns of temperature and rainfall over long periods of time in a given area. ● Temperature has a predictable effect on water. ● Water evaporates into the air as a gas. The speed of this process is determined by a variety of factors such as temperature and surface area. ● Water vapor in the air can affect weather conditions. ● Water vapor in the air interacts with surfaces, by condensing on colder materials.

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Weather and Climate: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

Students who demonstrate understanding can:

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

Science and Engineering Practices

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)

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)

Crosscutting Concepts

Patterns

- Patterns of change can be used to make predictions. (3-ESS2-1), (3- ESS2-2)

Student Learning Objectives

Students will be able to…

Investigation one: Water and Observation

- investigate water and identify water as a critical factor defining weather and climate.
- explore the phenomena of water's observable properties, its interactions with other materials and substrates, and make connections to outdoor experiences with water.
- compare the ways water interacts with four different surfaces.

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- compare the rate of flow of water on different slopes.
- explore how sponges interact with water to soak up spills.
- go outdoors to explore how water interacts with natural materials.

Investigation two: Hot Water Cold Water

- investigate properties of water and observe the phenomenon of how temperature affects water's state and density.
- use standard metric units to measure temperature and observe the properties of water as it is heated, cooled, and frozen.
- construct a thermometer and find that water expands as it is heated.
- compare the density of water at different temperatures and find that warm water is less dense than cool water, and that ice is less dense than liquid water.
- go outdoors to investigate melting of ice in different conditions.

Investigation Three: Weather and Water

- compare local weather data that they observe and collect to meteorologists' forecasts and historical weather data.
- explore the phenomena of evaporation and condensation, which account for the transformations of water between liquid to gas.
- find out how these transformations are the key drivers of the water cycle, the mechanism that redistributes water over the whole planet.

Integrated Accommodations and Modifications		
Special Education Students	**English Language Learners**	**At Risk**
• Utilize modifications & accommodations delineated in the student's IEP • Provide additional manipulatives to support instruction • Allow for alternative strategies to solve algorithms or tasks • Provide the steps needed to complete the task • Model frequently • Provide repetition and practice. • Use visuals to demonstrate/model the processes • Restate, reread, and clarify directions/questions • Ask students to restate information, directions, and assignments. • Provide copy of class notes • Distribute study guide for classroom tests. • Provide preferential seating to be mutually determined by the student and teacher	WIDA Can Do Descriptors https://wida.wisc.edu/teach/can-do/descriptors • Modify Assignments • Use testing and portfolio assessment • Utilize Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary) • Repeat, rephrase, paraphrase key concepts and directions • Allow for extended time for assignment completion as needed • Highlight key vocabulary • Define essential vocabulary in context • Use graphic organizers, visuals, manipulatives and other concrete materials	• Pair visual prompts with verbal presentations • Ask students to restate information, directions, and assignments. • Provide repetition and practice • Model skills / techniques to be mastered. • Provide extended time to complete class work • Provide copy of class notes • Provide preferential seating to be mutually determined by the student and teacher • Allow the use of a computer to complete assignments. • Establish expectations for correct spelling on assignments • Provide extra textbooks for home. • Provide Peer Support • Increase one on one time

• Provide extra textbooks for home. • Provide regular parent/ school communication • Allow extended time to complete assignment • Establish procedures for accommodations / modifications for assessments • Allow student to take/complete tests in an alternate setting as needed <u>Appendix A: Special Education Accommodations and Modifications</u>	• Use gestures, facial expressions and body language • Read aloud • Build on what students already know and prior experience	

Gifted and Talented Students	**504 Plan**
• Utilize advanced, accelerated, or compacted content • Provide assignments that emphasize higher- level thinking skills. • Allow for individual student interest • Gear assignments to development in areas of affect, creativity, cognition, and research skills • Allow for a variety in types of resources • Provide problem-based assignments with planned scope and sequence • Utilize inquiry-based instruction • Adjust the pace of lessons • Utilize Choice Boards • Provide Problem-Based Learning • Establish flexible Grouping	• Pair visual prompts with verbal presentations • Ask students to restate information, directions, and assignments. • Provide repetition and and practice • Model skills / techniques to be mastered. • Provide extended time to complete class work • Provide copy of class notes • Break long assignments into smaller parts • Assist student in setting short term goals • Allow for preferential seating to be mutually determined by the student and teacher • Provide extra textbooks for home. • Model and reinforce organizational systems (i.e. color-coding) • Write out homework assignments, check student's recording of assignments

Interdisciplinary Connections	**Computer Science and Design Thinking**
Connections to NJSLS - English Language Arts *Reading* • RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS2-1) • RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-ESS2-2) • RI.3.9 Compare and contrast the most important points and key details presented in two texts on the same topic. (3-ESS2-2) *Writing*	**Computer Science and Design Thinking Practices** 1. ✓ Fostering an Inclusive Computing and Design Culture 2. ✓ Collaborating Around Computing and Design 3. ☐ Recognizing and Defining Computational Problems 4. ✓ Developing and Using Abstractions 5. ✓ Creating Computational Artifacts

- W.3.8 Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-ESS2-2)

Connections to NJSLS - Mathematics

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

6. ✓ Testing and Refining Computational Artifacts
7. ✓ Communicating About Computing and Design

Computer Science and Design Thinking Standards

Impacts of Computing

- The development and modification of computing technology is driven by individuals' needs and wants and can affect individuals differently.
    - 8.1.5.IC.1: Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes.

Data and Analysis

- Data can be organized, displayed, and presented to highlight relationships.
    - 8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.
- Individuals can select, organize, and transform data into different visual representations and communicate insights gained from the data.
    - 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.
- Many factors influence the accuracy of inferences and predictions.
    - 8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

Engineering Design

- Engineering design is a systematic and creative process of communicating and collaborating to meet a design challenge. Often, several design solutions exist, each better in some way than the others.
    - 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.
- Engineering design requirements include desired features and limitations that need to be considered.
    - 8.2.5.ED.4: Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints).

Interaction of Technology and Humans

- Societal needs and wants determine which new tools are developed to address real-world problems.

	○ 8.2.5.ITH.1: Explain how societal needs and wants influence the development and function of a product and a system. ● A new tool may have favorable or unfavorable results as well as both positive and negative effects on society. Technology spurs new businesses and careers. ○ 8.2.5.ITH.2: Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have. ○ 8.2.5.ITH.3: Analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use. ○ 8.2.5.ITH.4: Describe a technology/tool that has made the way people live easier or has led to a new business or career. *Nature of Technology* ● Technology innovation and improvement may be influenced by a variety of factors. Engineers create and modify technologies to meet people's needs and wants; scientists ask questions about the natural world. ○ 8.2.5.NT.4: Identify how improvement in the understanding of materials science impacts technologies. Effects of Technology on the Natural World ● The technology developed for the human designed world can have unintended consequences for the environment. Technology must be continually developed and made more efficient to reduce the need for non-renewable resources. ○ 8.2.5.ETW.2: Describe ways that various technologies are used to reduce improper use of resources. ○ 8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved. ○ 8.2.5.ETW.4: Explain the impact that resources, such as energy and materials used to develop technology, have on the environment. ○ 8.2.5.ETW.5: Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change.
Career Readiness, Life Literacies and Key Skills	

Career Readiness, Life Literacies and Key Skills Practices

- Act as a responsible and contributing community member and employee.
- Attend to financial well-being.
- Consider the environmental, social and economic impacts of decisions.
- Demonstrate creativity and innovation.
- Utilize critical thinking to make sense of problems and persevere in solving them.
- Model integrity, ethical leadership and effective management.
- Plan education and career paths aligned to personal goals.
- Use technology to enhance productivity, increase collaboration and communicate effectively.
- Work productively in teams while using cultural/global competence.

Career Readiness, Life Literacies and Key Skills Standards

9.1 Personal Financial Literacy

- You can give back in areas that matter to you.
    - 9.1.5.CR.1: Compare various ways to give back and relate them to your strengths, interests, and other personal factors

9.2 Career Awareness, Exploration, Preparation, and Training

- An individual's passions, aptitude and skills can affect his/her employment and earning potential.
    - 9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.
    - 9.2.5.CAP.2: Identify how you might like to earn an income.
    - 9.2.5.CAP.3: Identify qualifications needed to pursue traditional and non-traditional careers and occupations.
    - 9.2.5.CAP.4: Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements.
- Income and benefits can vary depending on the employer and type of job or career.
    - 9.2.5.CAP.5: Identify various employee benefits, including income, medical, vacation time, and lifestyle benefits provided by different types of jobs and careers.

9.4 Life Literacies and Key Skills

Creativity and Innovation

- Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.
    - 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).
- Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation 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).

Critical Thinking and Problem-solving

- The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.
    - 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.2: Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1).
    - 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.
    - 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).

Digital Citizenship

- Intellectual property rights exist to protect the original works of individuals. It is allowable to use other people's ideas in one's own work provided that proper credit is given to the original source
    - 9.4.5.DC.2: Provide attribution according to intellectual property rights guidelines using public domain or creative commons media.
    - 9.4.5.DC.3: Distinguish between digital images that can be reused freely and those that have copyright restrictions.

Global and Cultural Awareness

- Culture and geography can shape an individual's experiences and perspectives.
    - 9.4.5.GCA.1: Analyze how culture shapes individual and community perspectives and points of view (e.g., 1.1.5.C2a, RL.5.9, 6.1.5.HistoryCC.8).

Information and Media Literacy

- Digital tools and media resources provide access to vast stores of information, but the information can be biased or inaccurate.
    - 9.4.5.IML.1: Evaluate digital sources for accuracy, perspective, credibility and relevance (e.g., Social Studies Practice - Gathering and Evaluating Sources).
- Digital tools can be used to modify and display data in various ways that can be organized to communicate ideas.
    - 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
- Specific situations require the use of relevant sources of information.
    - 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).

Technology Literacy

- Different digital tools have different purposes.
    - 9.4.5.TL.2: Sort and filter data in a spreadsheet to analyze findings.
    - 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.
- Collaborating digitally as a team can often develop a better artifact than an individual working alone.
    - 9.4.5.TL.4: Compare and contrast artifacts produced individually to those developed collaboratively (e.g., 1.5.5.CR3a).
    - 9.4.5.TL.5: Collaborate digitally to produce an artifact (e.g., 1.2.5CR1d).

Climate Change

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

SEL Competencies

- **Self - Awareness**
- **Self - Management**
- **Social Awareness**

- **Responsible Decision Making**
- **Relationship Skills**

https://www.nj.gov/education/safety/wellness/selearning/index.shtml

District/School Formative Assessment Plan	District/School Summative Assessment Plan
Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards. Teachers are encouraged to incorporate Formative Assessments into all lessons. During instruction, teachers will collect ongoing information on students' mastery of content through a variety of methods: ● Pre-Assessment ● Questioning: using Socratic method, probing questions, a hierarchical system in complexity (Bloom's Taxonomy) ● Exit tickets, rotational activities (stations), quizzes, and small group activities ● Classwork, homework, group work (formative assessment) ● Teacher's observation, class discussion, and Student Notebook	*Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.* **Benchmark Assessments:** ● Assessment 1.1: Mid-Unit Assessment ● Assessment 1.2: End of Unit Assessment ● Assessment 1.3: End of Unit Performance Assessment **Standardized Assessments:** ● NJSLA **Other Summative Assessments:** Teachers are encouraged to design and implement their own assessments (topic/module tests and quizzes) individually and/or with their department or grade-level partners, as per Uniform Grading Profile.

Targeted Academic Vocabulary
Weather, climate, water, cycle, natural materials, non-natural materials, slope, temperature, freezing, thawing, melting, evaporation, condensation, solid, liquid, gas, forecasting, meteorologist

District/School Tasks	District/School Primary and Supplementary Resources
• Common Formative Assessments • Common District Summative Assessments • See above Assessment Sections for more information	**District-Mandated Resources** • FOSS Curriculum **Assessment Resources:** • Available on FOSS - ThinkLink • For additional resources, log in to https://edconnectnj.schoolnet.com **Other Resources:** • Generation Genius: "Heating and Cooling", "Solids, Liquids and Gases" • Famous African American Climate Scientist (Amistad Law Resource) • Dr. Alan Shepard, Climate Scientist at NASA (Amistad Law Resource) • Teaching about the Holocaust/Genocide, Prejudice & Bullying Using UDL (Grades K5) (Holocaust Law) • Climate Change Activities for Early Elementary (Climate Change Resource) • NASA - Climate Kids (Climate Change Resource) • Brain Pop • YouTube **Project Ideas:** • Gallery walk of labeled diagrams of water evaporating and condensing on surfaces

Instructional Best Practices and Exemplars
See Appendix A for Instructional Best Practices and Exemplars

Pacing Guide
Grade 3 Unit 1 "Weather and Climate" Pacing Guide

Motion and Matter: Life and Physical Sciences

Overview

Throughout the Motion and Matter Module, students engage in science and engineering practices to collect data to answer questions, and to define problems in order to develop solutions. Students reflect on their own use of these practices and find out about how others use these practices in science and engineering careers. designed to enable students to build a basic understanding of Newton's Three Laws of Motion. There are mini-lessons that teach physical science-specific vocabulary terms, five hands-on lessons, one personalized learning pathway and an assessment piece. This comprehensive curriculum guide meets the requirements of the New Jersey Student Learning Standards for Science grade 3, along with the Career Ready Practice standards for 21st Century Life and Career.

The unit is specifically designed with a young child's desire and motivation to learn through movement and physical activity. It incorporates sports such as running, basketball and soccer into the science curriculum. Through the activities, students will apply what they have learned about forces, friction, mass and speed. The integration of reading, writing, and diagramming in a science notebook is the backbone of each lesson. The personalized learning approach is integrated as students work independently on their pathway. This pathway includes reading, writing, explorations and technology as choices for students to make connections to the learning they have done in class.

Essential Questions	Enduring Understandings
Overarching Driving Questions: *What causes change of motion?* *How can some objects push and pull one another without touching?* *How can we use observed patterns of motion to design solutions to engineering problems?* ***Focus Questions for Investigation 1:*** ● What happens when magnets interact with other materials? ● How is the magnetic field affected when more magnets are added? ***Focus Questions for Investigation 2:*** ● What are some important features of a cart? ● How can you improve the design of your cart? ***Focus Questions for Investigation 3:*** ● How can we use tools to measure the mass of materials in a mixture? ● What happens when you mix two materials? ***Focus Questions for Investigation 4:*** ● What is the importance of accurate measurements for a metric field day?	**Anchoring Phenomenon: Changes in Motion** ● Forces are pushes and pulls. ● Motion occurs in predictable patterns. ● The cause and effect relationships of electric interactions. ● The cause and effect relationships of magnetic interactions. ● Magnets can be used to solve problems. ● How different forces and combinations of forces will affect the motion of an object. ● Why a certain force has a particular effect on an object.

Motion and Matter: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

Students who demonstrate understanding can:

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. Qualitative and conceptual, but not quantitative addition of forces, are used at this level. [Assessment Boundary: Assessment is limited to one variable at a time: number, size, or direction of forces. Assessment does not include quantitative force size, only qualitative and relative. Assessment is limited to gravity being addressed as a force that pulls objects down.]
- **3-PS2-2** Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. [Clarification Statement: Examples of motion with a predictable pattern could include a child swinging in a swing, a ball rolling back and forth in a bowl, and two children on a see-saw.] [Assessment Boundary: Assessment does not include technical terms such as period and frequency.]
- **3-PS2-3** Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. [Clarification Statement: Examples of an electric force could include the force on hair from an electrically charged balloon and the electrical forces between a charged rod and pieces of paper; examples of a magnetic force could include the force between two permanent magnets, the force between an electromagnet and steel paper clips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of cause and effect relationships could include how the distance between objects affects strength of the force and how the orientation of magnets affects the direction of the magnetic force.] [Assessment Boundary: Assessment is limited to forces produced by objects that can be manipulated by students, and electrical interactions are limited to static electricity.]
- **3-PS2-4** Define a simple design problem that can be solved by applying scientific ideas about magnets. [Clarification Statement: Examples of problems could include constructing a latch to keep a door shut and creating a device to keep two moving objects from touching each other.]

Scientific and Engineering Practices

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. (3-PS2-3)
    - Define a simple problem that can be solved through the development of a new or improved object or tool. (3-PS2-4)

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. (3-PS2-1)
    - 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. (3-PS2-2)

Disciplinary Core Ideas

PS2.A: Forces and Motion

Motion and Matter: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

- 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.) (3-PS2-1)
- 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.) (3-PS2-2)

PS2.B: Types of Interactions

- Objects in contact exert forces on each other. (3-PS2-1)
- 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. (3-PS2-3), (3-PS2-4)

Crosscutting Concepts

Patterns

- Patterns of change can be used to make predictions. (3-PS2-2)

Cause and Effect

- Cause and effect relationships are routinely identified. (3-PS2-1)
- Cause and effect relationships are routinely identified, tested, and used to explain change. (3-PS2-3)

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. (3-PS2-4)

Connections to Nature of Science

Science Knowledge is Based on Empirical Evidence

- Science findings are based on recognizing patterns. (3-PS2-2)

Scientific Investigations Use a Variety of Methods

- Science investigations use a variety of methods, tools, and techniques. (3-PS2-1)

Student Learning Objectives

Students will be able to...

Investigation 1: Forces

- explore phenomena that can affect the motion of masses—the forces of magnetism and gravity.

- find that both magnetism and gravity can pull, and magnetism can sometimes push as well.
- find, through their investigations, that both forces can make things move even when not in direct contact with another object.
- refine their investigations and their abilities to use science practices and collect data regarding their observations of the interaction between paper clips and magnets.
- use those data to predict how far the magnetic field extends. Building on their experience with magnetic force, students explore other pushes and pulls, considering strength and direction.
- introduced to the effects of balanced and unbalanced forces.

Investigation 2: Patterns of Motion

- use a variety of systems as phenomena to explore patterns of motion.
- design wheel-and-axle systems and roll the systems down ramps to observe the pattern of motion.
- extend their rolling investigations to systems with big and little wheels and use the predictable curved rolling path to meet challenges.
- make twirly birds (flying spinners) and explore the variables involved in the interaction between twirling systems, gravity, and air.
- design tops and explore the variables that result in the best spinning top.

Investigation 3: Engineering

- tackle an engineering design challenge in incremental steps.
- design a cart that can roll "from here to there," and then improve their designs to meet a specific distance challenge.
- continue with an investigation involving the phenomenon of gravity and explore how starting position on a ramp affects the distance the cart travels. The final challenge incorporates students' knowledge of magnetism into their cart design to meet new challenges.
- understand engineering design concepts and engage in engineering practice.

Investigations 4: Mixtures

- use tools to quantify data to develop evidence for the phenomenon of conservation of mass.
- determine the mass of the materials prior to mixing and after mixing. In one mixture, salt dissolves (disappears), resulting in a solution.
- confirm that the mass of the solution is equal to the starting masses of the water and salt.
- mix vinegar and baking soda and observe a bubbling reaction. Students determine that the mass of the ending mixtures is less than the mass of the original materials, which challenges students to infer that carbon dioxide gas, which escaped, has mass.
- design and conduct a metric field day to creatively apply their understanding of standards of measurement.

Integrated Accommodations and Modifications		
Special Education Students	**English Language Learners**	**At Risk**
• Utilize modifications & accommodations delineated in the student's IEP • Provide additional manipulatives to support instruction	WIDA Can Do Descriptors https://wida.wisc.edu/teach/can-do/descriptors • Modify Assignments • Use testing and portfolio assessment	• Pair visual prompts with verbal presentations • Ask students to restate information, directions, and assignments. • Provide repetition and practice • Model skills / techniques to be mastered.

• Allow for alternative strategies to solve algorithms or tasks • Provide the steps needed to complete the task • Model frequently • Provide repetition and practice. • Use visuals to demonstrate/model the processes • Restate, reread, and clarify directions/questions • Ask students to restate information, directions, and assignments. • Provide copy of class notes • Distribute study guide for classroom tests. • Provide preferential seating to be mutually determined by the student and teacher • Provide extra textbooks for home. • Provide regular parent/ school communication • Allow extended time to complete assignment • Establish procedures for accommodations / modifications for assessments • Allow student to take/complete tests in an alternate setting as needed Appendix A: Special Education Accommodations and Modifications	• Utilize Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary) • Repeat, rephrase, paraphrase key concepts and directions • Allow for extended time for assignment completion as needed • Highlight key vocabulary • Define essential vocabulary in context • Use graphic organizers, visuals, manipulatives and other concrete materials • Use gestures, facial expressions and body language • Read aloud • Build on what students already know and prior experience	• Provide extended time to complete class work • Provide copy of class notes • Provide preferential seating to be mutually determined by the student and teacher • Allow the use of a computer to complete assignments. • Establish expectations for correct spelling on assignments • Provide extra textbooks for home. • Provide Peer Support • Increase one on one time

Gifted and Talented Students	**504 Plan**
• Utilize advanced, accelerated, or compacted content • Provide assignments that emphasize higher- level thinking skills. • Allow for individual student interest • Gear assignments to development in areas of affect, creativity, cognition, and research skills • Allow for a variety in types of resources • Provide problem-based assignments with planned scope and sequence • Utilize inquiry-based instruction • Adjust the pace of lessons • Utilize Choice Boards • Provide Problem-Based Learning • Establish flexible Grouping	• Pair visual prompts with verbal presentations • Ask students to restate information, directions, and assignments. • Provide repetition and practice • Model skills / techniques to be mastered. • Provide extended time to complete class work • Provide copy of class notes • Break long assignments into smaller parts • Assist student in setting short term goals • Allow for preferential seating to be mutually determined by the student and teacher • Provide extra textbooks for home. • Model and reinforce organizational systems (i.e. color-coding) • Write out homework assignments, check student's recording of assignments

Interdisciplinary Connections	Computer Science and Design Thinking
Connections to NJSLS - English Language Arts *Reading* ● RI.3.1 Ask and answer questions, and make relevant connections to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-PS2-1), (3-PS2-3) ● RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-PS2- 3) ● RI.3.8 Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence) to support specific points the author makes in a text. (3-PS2-3) *Writing* ● W.3.7 Conduct short research projects that build knowledge about a topic. (3-PS2-1), (3-PS2-2) ● W.3.8 Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-PS2-1), (3-PS2-2) *Speaking and Listening* ● SL.3.3 Ask and answer questions about information from a speaker, offering appropriate elaboration and detail. (3-PS2-3) **Connections to NJSLS - Mathematics** ● MP.2 Reason abstractly and quantitatively. (3-PS2-1) ● MP.5 Use appropriate tools strategically. (3-PS2-1) ● 3.MD.A.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (3-PS2-1)	**Computer Science and Design Thinking Practices** 8. ✓ Fostering an Inclusive Computing and Design Culture 9. ✓ Collaborating Around Computing and Design 10. ☐ Recognizing and Defining Computational Problems 11. ✓ Developing and Using Abstractions 12. ✓ Creating Computational Artifacts 13. ✓ Testing and Refining Computational Artifacts 14. ✓ Communicating About Computing and Design **Computer Science and Design Thinking Standards** *Impacts of Computing* ● The development and modification of computing technology is driven by individual's needs and wants and can affect individuals differently. ○ 8.1.5.IC.1: Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes. *Data and Analysis* ● Data can be organized, displayed, and presented to highlight relationships. ● 8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim. ● Individuals can select, organize, and transform data into different visual representations and communicate insights gained from the data. ● 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. ● Many factors influence the accuracy of inferences and predictions. ○ 8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data. *Engineering Design* ● Engineering design is a systematic and creative process of communicating and collaborating to meet a design challenge. Often, several design solutions exist, each better in some way than the others.

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	○ 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.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task. ● Engineering design requirements include desired features and limitations that need to be considered. ○ 8.2.5.ED.4: Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints). ○ 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. *Interaction of Technology and Humans* ● Societal needs and wants determine which new tools are developed to address real-world problems. ○ 8.2.5.ITH.1: Explain how societal needs and wants influence the development and function of a product and a system. ● A new tool may have favorable or unfavorable results as well as both positive and negative effects on society. Technology spurs new businesses and careers. ○ 8.2.5.ITH.2: Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have. ○ 8.2.5.ITH.3: Analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use. ○ • 8.2.5.ITH.4: Describe a technology/tool that has made the way people live easier or has led to a new business or career. *Nature of Technology* ● Technology innovation and improvement may be influenced by a variety of factors. Engineers create and modify technologies to meet people's needs and wants; scientists ask questions about the natural world. ○ 8.2.5.NT.4: Identify how improvement in the understanding of materials science impacts technologies. Effects of Technology on the Natural World ● The technology developed for the human designed world can have unintended consequences for the environment. Technology must be continually developed and made more efficient to reduce the need for non-renewable resources.

	○ 8.2.5.ETW.1: Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems. ○ 8.2.5.ETW.2: Describe ways that various technologies are used to reduce improper use of resources. ○ 8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.

Career Readiness, Life Literacies and Key Skills

Career Readiness, Life Literacies and Key Skills Practices

- Act as a responsible and contributing community member and employee.
- Attend to financial well-being.
- Consider the environmental, social and economic impacts of decisions.
- Demonstrate creativity and innovation.
- Utilize critical thinking to make sense of problems and persevere in solving them.
- Model integrity, ethical leadership and effective management.
- Plan education and career paths aligned to personal goals.
- Use technology to enhance productivity, increase collaboration and communicate effectively.
- Work productively in teams while using cultural/global competence.

Career Readiness, Life Literacies and Key Skills Standards

9.1 Personal Financial Literacy

- You can give back in areas that matter to you.
    - 9.1.5.CR.1: Compare various ways to give back and relate them to your strengths, interests, and other personal factors

9.2 Career Awareness, Exploration, Preparation, and Training

- An individual's passions, aptitude and skills can affect his/her employment and earning potential.
    - 9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.
    - 9.2.5.CAP.2: Identify how you might like to earn an income.
    - 9.2.5.CAP.3: Identify qualifications needed to pursue traditional and non-traditional careers and occupations.
    - 9.2.5.CAP.4: Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements.
- Income and benefits can vary depending on the employer and type of job or career.
    - 9.2.5.CAP.5: Identify various employee benefits, including income, medical, vacation time, and lifestyle benefits provided by different types of jobs and careers.

9.4 Life Literacies and Key Skills

Creativity and Innovation

- Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.
    - 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).
- Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation 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).

Critical Thinking and Problem-solving

- The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.
    - 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.2: Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1).
    - 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.
    - 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).

Digital Citizenship

- Intellectual property rights exist to protect the original works of individuals. It is allowable to use other people's ideas in one's own work provided that proper credit is given to the original source
    - 9.4.5.DC.2: Provide attribution according to intellectual property rights guidelines using public domain or creative commons media.
    - 9.4.5.DC.3: Distinguish between digital images that can be reused freely and those that have copyright restrictions.

Global and Cultural Awareness

- Culture and geography can shape an individual's experiences and perspectives.
    - 9.4.5.GCA.1: Analyze how culture shapes individual and community perspectives and points of view (e.g., 1.1.5.C2a, RL.5.9, 6.1.5.HistoryCC.8).

Information and Media Literacy

- Digital tools and media resources provide access to vast stores of information, but the information can be biased or inaccurate.
    - 9.4.5.IML.1: Evaluate digital sources for accuracy, perspective, credibility and relevance (e.g., Social Studies Practice - Gathering and Evaluating Sources).
- Digital tools can be used to modify and display data in various ways that can be organized to communicate ideas.
    - 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
- Specific situations require the use of relevant sources of information.
    - 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).

Technology Literacy

- Different digital tools have different purposes.
    - 9.4.5.TL.2: Sort and filter data in a spreadsheet to analyze findings.
    - 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.
- Collaborating digitally as a team can often develop a better artifact than an individual working alone.

- 9.4.5.TL.4: Compare and contrast artifacts produced individually to those developed collaboratively (e.g., 1.5.5.CR3a).
- 9.4.5.TL.5: Collaborate digitally to produce an artifact (e.g., 1.2.5CR1d).

Climate Change

Addressed in Units 1 and 3

SEL Competencies

- **Self - Awareness**
- **Self - Management**
- **Social Awareness**
- **Responsible Decision Making**
- **Relationship Skills**

https://www.nj.gov/education/safety/wellness/selearning/index.shtml

District/School Formative Assessment Plan	District/School Summative Assessment Plan
Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards. Teachers are encouraged to incorporate Formative Assessments into all lessons. During instruction, teachers will collect ongoing information on students' mastery of content through a variety of methods: ● Questioning: using Socratic method, probing questions, a hierarchical system in complexity (Bloom's Taxonomy) ● Exit tickets, rotational activities (stations), quizzes, and small group activities ● Classwork, homework, group work (formative assessment) ● Pre-Assessment, teacher's observation, class discussion, and journal	*Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.* **Benchmark Assessments:** ● Assessment 1.1: Mid-Unit Assessment ● Assessment 1.2: End of Unit Assessment ● Assessment 1.3: End of Unit Performance Assessment **Standardized Assessments:** ● NJSLA **Other Summative Assessments:** Teachers are encouraged to design their own assessments (topic/module tests and quizzes) individually and/or with their department or grade-level partners, as per Uniform Grading Profile.

Targeted Academic Vocabulary

Magnet, magnetic field, static, motion, push, pull, force, unbalanced, balanced, mass, speed, velocity, gravity, electric, law of conservation of mass, mixing, solution, dissolve.

District/School Tasks	District/School Primary and Supplementary Resources
• Common Formative Assessments • Common District Summative Assessments • See above Assessment Sections for more information	**District-Mandated Resources** • FOSS Curriculum **Assessment Reosurces:** • Available on FOSS - ThinkLink • For additional resources, log in to https://edconnectnj.schoolnet.com **Other Resources:** • Generation Genius: "Magnets and Static Electricity", "Patterns of Motion and Friction" • www.teachersdomain.org • www.sciencenetlinks.com • Thesciencespot.com • Mystery Science • Brain Pop • Famous African American Climate Scientist (Amistad Law Resource) • Famous Scientist: Sir Issac Newton • Teaching about the Holocaust/Genocide, Prejudice & Bullying Using UDL (Grades K5) (Holocaust Law) • Climate Change Activities for Early Elementary (Climate Change Resource) **Project Ideas:** • Favorite "Soup" Mixture Model/Project - which ingredients can be removed easily? which can not? What changes are reversible or irreversible?
Instructional Best Practices and Exemplars	
See Appendix A for Instructional Best Practices and Exemplars	
Pacing Guide	
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Structures of Life: Life and Physical Sciences

Overview

The anchor phenomenon for the Structures of Life Module is the diversity of plants and animals we observe in our world. Students experience that organisms exhibit a variety of strategies for life, have a variety of observable structures and behaviors, have varied but predictable life cycles, and reproduce their own kind by passing inherited characteristics to offspring. Students explore how individual organisms have variations in their traits that may provide an advantage in surviving in a particular environment, and how our knowledge of animals that survived in past environments is inferred by studying fossil characteristics. The driving questions for the module are where do organisms come from, how do they survive, and how are all the different kinds of plants and animals able to continue to exist on Earth? Students observe, compare, categorize, and care for a selection of organisms. Students engage in science and engineering practices to investigate structures and behaviors of the organisms and learn how some of the structures function in growth, survival, and reproduction. Students look at the interactions between organisms of the same kind, among organisms of different kinds, and between the environment and populations over time. Students focus on these crosscutting concepts to develop understandings about organisms and population survival—patterns; cause and effect; scale, proportion, and quantity; systems and system models; structure and function; and stability and change.

Essential Questions	Enduring Understandings
Overarching Driving Questions: *How do organisms live, grow, respond to their environment, and reproduce?* *How are characteristics similar to and different from parents to offspring?* *How does variation in traits among individuals of a species affect survival?* *What is needed to sustain a food chain?* ***Focus Questions for Investigation 1:*** ● What are seeds and what happens to them? ● How do seeds disperse away from the parent plant? ***Focus Questions for Investigation 2:*** ● What can we learn about animals that lived in the past by looking at their skeletons? ● What are the functions of the skeletal system? ● In what ways are the skeletons of a rodent and a human similar? ***Focus Questions for Investigation 3:*** ● What are characteristics that allow populations of animals to survive and reproduce in an environment? ● How do crayfish structures and behaviors help crayfish survive? ● What kind of behavior do crayfish display in their habitat? ● How are the characteristics of crayfish and other animals alike and different? ***Focus Questions for Investigation 4:*** ● How are characteristics similar to and different from parents to offspring? ● How are fingerprints alike and different?	**Anchoring Phenomenon: The vast diversity of living things** ● The pattern of life cycles include birth, growth, reproduction, and death. ● Plants (and most seeds) need water to grow. ● Every human has a unique set of fingerprints. ● Fingerprints are very unique but can have similar patterns. ● The skeletons of different animals are similar and different in many ways. ● Skeletons support the body of an organism by keeping its shape, protect vital organs, and allow for movement. ● Skeletons have hinge points, which can move when muscles push and pull on the bones. ● The structures and behaviors of an organism help it survive. ● Related species have many similarities, and some key differences. The more closely the species are related, the more similarities they are likely to have. ● Even within the same species, there will be variation between individuals. ● Biodiversity and variation between individuals of the same species are important factors to the survival of species and ecosystems.

Structures of Life: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

Students who demonstrate understanding can:

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.]

3-LS2: Ecosystems: Interactions, Energy, and Dynamics

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

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

3-ESS3: 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.]

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.]
- **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.]
- **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.]
- **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.]

Structures of Life: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

Scientific and Engineering Practices

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. (3-PS2-3)
  - Define a simple problem that can be solved through the development of a new or improved object or tool. (3-PS2-4)

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)

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. (3-LS3-1), (3-LS4-1)

Constructing Explanations and Designing Solutions

- Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.
  - Use evidence (e.g., observations, patterns) to support an explanation. (3-LS3-2), (3-LS4-2)

Engaging in Argument from Evidence

- Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).
  - Construct an argument with evidence, data, and/or a model. (3- LS2-1), (3-LS4-3)
  - 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-LS4-4) , (3-ESS3-1)

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)

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 to 3-LS4-4)

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 (3-LS2-1)

LS3.A: Inheritance of Traits

- Many characteristics of organisms are inherited from their parents. (3- LS3-1)
- Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. (3- LS3-2)

LS3.B: Variation of Traits

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Structures of Life: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

- Different organisms vary in how they look and function because they have different inherited information. (3-LS3-1)
- The environment also affects the traits that an organism develops. (3-LS3-2)

LS4.A: Evidence of Common Ancestry and Diversity

- Some kinds of plants and animals that once lived on Earth are no longer found anywhere. (3-LS4-1)
- Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. (3-LS4-1)

LS4.B: Natural Selection

- Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (3-LS4-2)

LS4.C: Adaptation

- For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4- 3)

LS4.D: Biodiversity and Humans

- Populations live in a variety of habitats and change in those habitats affects the organisms living there. (3-LS4-4)

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.)

Crosscutting Concepts

Patterns

- Patterns of change can be used to make predictions. (3-LS1-1)
- Similarities and differences in patterns can be used to sort and classify natural phenomena. (3- LS3-1)

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change. (3-LS2-1), (3-LS3-2), (3-LS4-2), (3- LS4-3), (3-ESS3- 1)

Scale, Proportion, and Quantity

- Observable phenomena exist from very short to very long time periods. (3-LS4-1)

Systems and System Models

- A system can be described in terms of its components and their interactions. (3-LS4-4)

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology

- Knowledge of relevant scientific concepts and research findings is important in engineering. (3-LS4- 4)

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

Scientific Knowledge is Based on Empirical Evidence

- Science findings are based on recognizing patterns. (3-LS1-1)

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes consistent patterns in natural systems. (3- LS4-1)

Science is a Human Endeavor

- Science affects everyday life. (3-ESS3-1)

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Structures of Life: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

Student Learning Objectives

Students will be able to…

Investigation 1: Origin of seeds

- conduct a seed hunt by opening fresh fruit and locating the seeds.
- describe and compare seed properties.
- examine and sort a selection of seeds—bean, pea, sunflower, and corn.
- investigate the effect water has on seeds by setting up seed sprouters and observing and recording changes over a week.
- systematically find out how much water lima beans soak up in a day.
- investigate seed dispersal mechanisms of plants.

Investigation 2 : Growing Further

- examine germinated seeds to determine similarities and differences in the way the organisms grow.
- set up a hydroponic garden to observe the life cycle of a bean plant.
- go outdoors to investigate the roots and shoots of various plants.
- use tools to dig up plants and compare the structures above ground to those below ground.
- learn about plant structures and functions, through direct experience and readings.

Investigation 3: Meet the Crayfish

- analyze and observe crayfish by keeping a record of some of the structures of a crustacean, the crayfish, and compare it to other organisms.
- establish a feeding and maintenance schedule for the organisms.
- investigate crayfish behavior and map where the crayfish spend time within their habitat.
- readings, organism cards, and a video, students learn about adaptations of organisms in different environments, including different kinds of group and social behaviors.
- use a computer simulation to study variation of traits in species and explore how variation might affect survival of individuals. Students engage in an outdoor simulation activity to explore food chains.

Investigation 4 : Human Body

- observe the articulated human skeletal system in action, use posters and a sense of touch to estimate and refine a count of the 206 human bones, and build skeleton puzzles from memory.
- dissect rodent bones from owl pellets and compare them to human bones.

- explore joints and their role in movement focusing on opposable thumbs.
- build operational models of muscle-bone systems to see how muscles move bones.
- investigate their skin by making and analyzing fingerprint patterns.

Integrated Accommodations and Modifications		
Special Education Students	**English Language Learners**	**At Risk**
• Utilize modifications & accommodations delineated in the student's IEP • Provide additional manipulatives to support instruction • Allow for alternative strategies to solve algorithms or tasks • Provide the steps needed to complete the task • Model frequently • Provide repetition and practice. • Use visuals to demonstrate/model the processes • Restate, reread, and clarify directions/questions • Ask students to restate information, directions, and assignments. • Provide copy of class notes • Distribute study guide for classroom tests. • Provide preferential seating to be mutually determined by the student and teacher • Provide extra textbooks for home. • Provide regular parent/ school communication • Allow extended time to complete assignment • Establish procedures for accommodations / modifications for assessments • Allow student to take/complete tests in an alternate setting as needed Appendix A: Special Education Accommodations and Modifications	WIDA Can Do Descriptors https://wida.wisc.edu/teach/can-do/descriptors • Modify Assignments • Use testing and portfolio assessment • Utilize Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary) • Repeat, rephrase, paraphrase key concepts and directions • Allow for extended time for assignment completion as needed • Highlight key vocabulary • Define essential vocabulary in context • Use graphic organizers, visuals, manipulatives and other concrete materials • Use gestures, facial expressions and body language • Read aloud • Build on what students already know and prior experience	• Pair visual prompts with verbal presentations • Ask students to restate information, directions, and assignments. • Provide repetition and practice • Model skills / techniques to be mastered. • Provide extended time to complete class work • Provide copy of class notes • Provide preferential seating to be mutually determined by the student and teacher • Allow the use of a computer to complete assignments. • Establish expectations for correct spelling on assignments • Provide extra textbooks for home. • Provide Peer Support • Increase one on one time

Gifted and Talented Students		**504 Plan**
• Utilize advanced, accelerated, or compacted content • Provide assignments that emphasize higher- level thinking skills. • Allow for individual student interest • Gear assignments to development in areas of affect, creativity, cognition, and research skills • Allow for a variety in types of resources • Provide problem-based assignments with planned scope and sequence • Utilize inquiry-based instruction • Adjust the pace of lessons • Utilize Choice Boards • Provide Problem-Based Learning • Establish flexible Grouping		• Pair visual prompts with verbal presentations • Ask students to restate information, directions, and assignments. • Provide repetition and practice • Model skills / techniques to be mastered. • Provide extended time to complete class work • Provide copy of class notes • Break long assignments into smaller parts • Assist student in setting short term goals • Allow for preferential seating to be mutually determined by the student and teacher • Provide extra textbooks for home. • Model and reinforce organizational systems (i.e. color-coding) • Write out homework assignments, check student's recording of assignments
Interdisciplinary Connections		**Computer Science and Design Thinking**
Connections to NJSLS - English Language Arts *Reading* • RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS2-1), (3-LS4-1), (3-LS4-2), (3-LS4-3), (3-LS4-4), (3-ESS3-1) • RI.3.2 Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS3-1), (3-LS3-2), (3-LS4-1), (3-LS4-2), (3-LS4-3), (3-LS4-4) • RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS2-1), (3-LS3- 1), (3-LS3-2), (3-LS4-1), (3-LS4-2), (3-LS4-3), (3-LS4-4) • RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). (3-LS1-1) *Writing* • W.3.1 Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-LS2-1), (3-LS4-1), (3-LS4-2), (3-LS4-3), (3-LS4-4)		**Computer Science and Design Thinking Practices** 15. ✓ Fostering an Inclusive Computing and Design Culture 16. ✓ Collaborating Around Computing and Design 17. ☐ Recognizing and Defining Computational Problems 18. ✓ Developing and Using Abstractions 19. ✓ Creating Computational Artifacts 20. ✓ Testing and Refining Computational Artifacts 21. ✓ Communicating About Computing and Design **Computer Science and Design Thinking Standards** *Impacts of Computing* • The development and modification of computing technology is driven by individuals' needs and wants and can affect individuals differently. ○ 8.1.5.IC.1: Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes.

- W.3.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS3-1), (3-LS3-2), (3-LS4-1), (3-LS4-2), (3-LS4-3), (3-LS4-4)
- W.3.7 Conduct short research projects that build knowledge about a topic. (3-ESS3-1)
- W.3.8 Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-LS4-1)

Speaking and Listening

- SL.3.4 Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (3-LS3-1), (3-LS3-2), (3-LS4-2), (3-LS4-3), (3-LS4-4)
- SL.3.5 Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details. (3-LS1-1)

Connections to NJSLS - Mathematics

- MP.2 Reason abstractly and quantitatively. (3-LS4-1), (3-LS4-2), (3-LS4-3), (3-LS4-4), (3-ESS3-1)
- MP.4 Model with mathematics. (3-LS2-1), (3-LS1-1), (3-LS4-1), (3-LS4-2), (3-LS4-3), (3-LS4-4), (3-ESS3-1)
- MP.5 Use appropriate tools strategically. (3-LS4-1)
- 3.NBT Number and Operations in Base Ten (3-LS2-1), (3-LS1-1)
- 3.NF Number and Operations—Fractions (3-LS1-1)
- 3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. (3-LS4-2), (3-LS4-3)
- 3.MD.B.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (3-LS3-1), (3-LS3-2), (3-LS4-1)

Data and Analysis

- Data can be organized, displayed, and presented to highlight relationships.
  - 8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.
- Individuals can select, organize, and transform data into different visual representations and communicate insights gained from the data.
  - 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.
- Many factors influence the accuracy of inferences and predictions.
  - 8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

Engineering Design

- Engineering design is a systematic and creative process of communicating and collaborating to meet a design challenge. Often, several design solutions exist, each better in some way than the others.
  - 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.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.
- Engineering design requirements include desired features and limitations that need to be considered.
  - 8.2.5.ED.4: Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints).
  - 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.

Interaction of Technology and Humans

- Societal needs and wants determine which new tools are developed to address real-world problems.
  - 8.2.5.ITH.1: Explain how societal needs and wants influence the development and function of a product and a system.
- A new tool may have favorable or unfavorable results as well as both positive and negative effects on society. Technology spurs new businesses and careers.
  - 8.2.5.ITH.2: Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have.

	○ 8.2.5.ITH.3: Analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use. ○ 8.2.5.ITH.4: Describe a technology/tool that has made the way people live easier or has led to a new business or career. *Nature of Technology* ● Technology innovation and improvement may be influenced by a variety of factors. Engineers create and modify technologies to meet people's needs and wants; scientists ask questions about the natural world. ○ 8.2.5.NT.4: Identify how improvement in the understanding of materials science impacts technologies. Effects of Technology on the Natural World ● The technology developed for the human designed world can have unintended consequences for the environment. Technology must be continually developed and made more efficient to reduce the need for non-renewable resources. ○ 8.2.5.ETW.1: Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems. ○ 8.2.5.ETW.2: Describe ways that various technologies are used to reduce improper use of resources. ○ 8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.

Career Readiness, Life Literacies and Key Skills

Career Readiness, Life Literacies and Key Skills Practices

- Act as a responsible and contributing community member and employee.
- Attend to financial well-being.
- Consider the environmental, social and economic impacts of decisions.
- Demonstrate creativity and innovation.
- Utilize critical thinking to make sense of problems and persevere in solving them.
- Model integrity, ethical leadership and effective management.
- Plan education and career paths aligned to personal goals.
- Use technology to enhance productivity, increase collaboration and communicate effectively.
- Work productively in teams while using cultural/global competence.

Career Readiness, Life Literacies and Key Skills Standards

9.1 Personal Financial Literacy

- You can give back in areas that matter to you.
    - 9.1.5.CR.1: Compare various ways to give back and relate them to your strengths, interests, and other personal factors

9.2 Career Awareness, Exploration, Preparation, and Training

- An individual's passions, aptitude and skills can affect his/her employment and earning potential.
    - 9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.
    - 9.2.5.CAP.2: Identify how you might like to earn an income.
    - 9.2.5.CAP.3: Identify qualifications needed to pursue traditional and non-traditional careers and occupations.
    - 9.2.5.CAP.4: Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements.
- Income and benefits can vary depending on the employer and type of job or career.
    - 9.2.5.CAP.5: Identify various employee benefits, including income, medical, vacation time, and lifestyle benefits provided by different types of jobs and careers.

9.4 Life Literacies and Key Skills

Creativity and Innovation

- Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.
    - 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).
- Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation 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).

Critical Thinking and Problem-solving

- The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.
    - 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.2: Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1).
    - 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.
    - 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).

Digital Citizenship

- Intellectual property rights exist to protect the original works of individuals. It is allowable to use other people's ideas in one's own work provided that proper credit is given to the original source
    - 9.4.5.DC.2: Provide attribution according to intellectual property rights guidelines using public domain or creative commons media.
    - 9.4.5.DC.3: Distinguish between digital images that can be reused freely and those that have copyright restrictions.

Global and Cultural Awareness

- Culture and geography can shape an individual's experiences and perspectives.

- 9.4.5.GCA.1: Analyze how culture shapes individual and community perspectives and points of view (e.g., 1.1.5.C2a, RL.5.9, 6.1.5.HistoryCC.8).

Information and Media Literacy

- Digital tools and media resources provide access to vast stores of information, but the information can be biased or inaccurate.
  - 9.4.5.IML.1: Evaluate digital sources for accuracy, perspective, credibility and relevance (e.g., Social Studies Practice - Gathering and Evaluating Sources).
- Digital tools can be used to modify and display data in various ways that can be organized to communicate ideas.
  - 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
- Specific situations require the use of relevant sources of information.
  - 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).

Technology Literacy

- Different digital tools have different purposes.
  - 9.4.5.TL.2: Sort and filter data in a spreadsheet to analyze findings.
  - 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.
- Collaborating digitally as a team can often develop a better artifact than an individual working alone.
  - 9.4.5.TL.4: Compare and contrast artifacts produced individually to those developed collaboratively (e.g., 1.5.5.CR3a).
  - 9.4.5.TL.5: Collaborate digitally to produce an artifact (e.g., 1.2.5CR1d).

Climate Change

- **3-LS3-2** Use evidence to support the explanation that traits can be influenced by the environment.
- **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.

SEL Competencies

- **Self - Awareness**
- **Self - Management**
- **Social Awareness**
- **Responsible Decision Making**
- **Relationship Skills**

https://www.nj.gov/education/safety/wellness/selearning/index.shtml

District/School Formative Assessment Plan	District/School Summative Assessment Plan
Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards. Teachers are encouraged to incorporate Formative Assessments into all lessons. During instruction, teachers will collect ongoing information on students' mastery of content through a variety of methods:	*Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.* **Benchmark Assessments:** • Assessment 1.1: Mid-Unit Assessment • Assessment 1.2: End of Unit Assessment

• Questioning: using Socratic method, probing questions, a hierarchical system in complexity (Bloom's Taxonomy) • Exit tickets, rotational activities (stations), quizzes, and small group activities • Classwork, homework, group work (formative assessment) • Pre-Assessment, teacher's observation, class discussion, and journal	• Assessment 1.3: End of Unit Performance Assessment **Standardized Assessments:** • NJSLA **Other Summative Assessments:** Teachers are encouraged to design their own assessments (topic/module tests and quizzes) individually and/or with their department or grade-level partners, as per Uniform Grading Profile.

Targeted Academic Vocabulary

Reproduce, pollinate, habitat, adaptation, germinate, photosynthesis, ecosystem, decomposer, adaptation, larva, nutrient, metamorphosis, consumer, producer, community, genetic, traits, heredity, environment, diversity, plant, animal, structures, behaviors, variations, advantages, organism, survival

District/School Tasks	District/School Primary and Supplementary Resources
• Common Formative Assessments • Common District Summative Assessments • See above Assessment Sections for more information	**District-Mandated Resources** • FOSS Curriculum **Assessment Resources:** • Available on FOSS - ThinkLink • For additional resources, log in to https://edconnectnj.schoolnet.com **Other Resources:** • Generation Genius • Mystery Science • Brain Pop • Famous African American Climate Scientist (Amistad Law Resource) • Famous Fossil Scientists: Charles Darwin and Mary Anning • Teaching about the Holocaust/Genocide, Prejudice & Bullying Using UDL (Grades K5) (Holocaust Law) • Climate Change Activities for Early Elementary (Climate Change Resource) **Project Ideas:**

	• "The importance of diversity to a healthy (eco)system" project. Poster, performance piece, collaboration with Art teacher, etc (SEL; Diversity, Equity and Inclusion) • Organism life cycle and habitat models
Instructional Best Practices and Exemplars	
See Appendix A for Instructional Best Practices and Exemplars	
Pacing Guide	
Grade 3 Unit 3 "Structures of Life" Pacing Guide	

Appendix A: **Instructional Best Practices and Exemplars**

Appendix A: Instructional Best Practices and Exemplars: Unit 1

Appendix A: Instructional Best Practices and Exemplars: Unit 2

Appendix A: Instructional Best Practices and Exemplars: Unit 3

Appendix B:

Exemplars and Explanations

Appendix B: Instructional Exemplars and Explanations: Unit 1

Appendix B: Instructional Exemplars and Explanations: Unit 2

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Appendix C:

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