Lakewood Public School District Curriculum Guide

Grade: 3	Content Area: Science

Original Adoption: Original Adoption: 2023 NJSLS English Language Arts and English as a Second Language (8-21-24); Math NJSLS Mathematics (8-21-24); 2020 NJSLS Science, Social Studies, Career Readiness, Life Literacies & Key Skills, Computer Design & Thinking, Visual & Performing Arts, World Language, Comprehensive Health and Physical Education (5-11-22)
Created By:

Recommended Pacing Guide	
Unit 1: Balancing Forces	45 days
Unit 2: Inheritance and Traits	45 days
Unit 3: Environments and Survival	45 days
Unit 4: Weather and Climate	45 days

Alignment with State Mandates

The following colors are used throughout this document to indicate areas in which the curriculum is aligned with the following NJSA requirements:

- Holocaust and genocides (N.J.S.A. 18A:35-28)
- History and contributions of African-Americans (Amistad Law) (N.J.S.A. 18A:35-4.43)
- Highlight and promote diversity and inclusion (Diversity & Inclusion Law) (N.J.S.A. 18A:35-4.36a)
- History of disabled and LGBT persons included in middle and high school curriculum (Section 18A:35-4.35)
- Climate Change - to prepare students to understand how and why climate change happens, the impact it has on our local and global communities and to act in informed and sustainable ways. Please click here for specific examples (by subject).

Unit 1: Balancing Forces	Duration: 45 days

New Jersey Student Learning Standards	
3-PS2-1	Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
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.

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3-PS2-3	Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.
3-PS2-4	Define a simple design problem that can be solved by applying scientific ideas about magnets.
3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Science and Engineering Practices	Discipline Core Ideas/Unit Enduring Understandings	Crosscutting Concepts
• **Practice 2: Developing and Using Models:** Students receive explicit instruction and opportunities to practice developing models: a) with diagrams, to represent the forces acting on the floating train, and b) with physical materials, to show how the floating train might work. • **Practice 6: Constructing Explanations and Designing Solutions:** Students learn about scientific explanations and have multiple opportunities to write increasingly complex explanations over the course of the unit as they explain why the floating train rises above the track, floats, and then falls back on the track. • **Practice 8: Obtaining, Evaluating, and Communicating Information:** Students receive explicit instruction and have multiple opportunities to use the reading comprehension strategy of setting a purpose for reading as they engage with the informational texts in the unit.	**PS2.A: Forces and Motion** • Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. (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. (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.	**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) **Patterns** • Patterns of change can be used to make predictions. (3-PS2-2) ***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. (3PS2-4) **Influence of Engineering, Technology, and Science on Society and the Natural World** • People's needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1) • Engineers improve

● **Practice 3: Planning and Carrying Out Investigations:** Just as students focused on using the strategy of setting a purpose for reading informational text, students also learn to bring intentionality to their firsthand investigations as they focus on setting a purpose for investigating. Noticing this synergy—using similar cognitive practices in both reading and firsthand investigations—helps students understand the utility and power of this sense-making strategy across different domains. The focus on setting a purpose for investigating partially addresses the science and engineering practice of Planning and Carrying Out Investigations. ● **Practice 4: Analyzing and Interpreting Data:** Students have multiple opportunities to analyze the data they have collected from firsthand investigations with touching and non-touching forces and balanced and unbalanced forces, including data in one of the books they read. ● **Practice 1: Asking Questions:** Students ask questions about concepts such as magnetic force and gravity as they begin to investigate these ideas, and the class later returns to discuss what they have discovered related to these questions. ● **Practice 7: Engaging in Argument from Evidence:** Each time before landing on their scientific explanations, students discuss their ideas	(3-PS2-3), (3-PS2-4) **ETS1.A: Defining and Delimiting Engineering Problems:** ● Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3-5-ETS1-1) **ETS1.B: Developing Possible Solutions:** ● Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2) ● At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-5-ETS1-2)	existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2) ***Connections to Nature and 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)

with their peers. Students are given the following prompts to query each other: Why do you think that? What is your evidence? ● **Practice 5: Using Mathematics and Computational Thinking:** Students have multiple opportunities to develop and use models in order to explore gravitational force, magnetic force, and balanced forces. As appropriate, they analyze data in order to discover patterns related to these forces.		

New Jersey Social and Emotional Competencies and Sub-Competencies	
Self-Awareness	● Recognize one's feelings and thoughts. ● Recognize the impact of one's feelings and thoughts on one's own behavior. ● Recognize one's personal traits, strengths, and limitations. ● Recognize the importance of self-confidence in handling daily tasks and challenges.
Self-Management	● Understand and practice strategies for managing one's own emotions, thoughts, and behaviors. ● Recognize the skills needed to establish and achieve personal and educational goals. ● Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals.
Social Awareness	● Recognize and identify the thoughts, feelings, and perspectives of others. ● Demonstrate an awareness of the differences among individuals, groups, and others' cultural backgrounds. ● Demonstrate an understanding of the need for mutual respect when viewpoints differ. ● Demonstrate an awareness of the expectations for social interactions in a variety of settings.
Responsible Decision Making	● Develop, implement, and model effective problem-solving and critical thinking skills. ● Identify the consequences associated with one's actions in order to make constructive choices. ● Evaluate personal, ethical, safety, and civic impact of decisions.

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Relationship Skills	● Establish and maintain healthy relationships. ● Utilize positive communication and social skills to interact effectively with others. ● Identify ways to resist inappropriate social pressure. ● Demonstrate the ability to prevent and resolve interpersonal conflicts in constructive ways. ● Identify who, when, where, or how to seek help for oneself or others when needed.

Interdisciplinary Connections	
ELA Standards	
RI.CR.3.1	Ask and answer questions and make relevant connections to demonstrate understanding of an informational text, referring explicitly to textual evidence as the basis for the answers.
RI.IT.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.
RI.TS.3.4	Utilize and reference features of a text when writing or speaking about a text, using text features (e.g., graphics, images, captions, headings) and search tools (e.g., key words, sidebars, hyperlinks) to locate and integrate information relevant to a given topic efficiently. '
RI.MF.3.6	Use information gained from text features (e.g., illustrations, maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).
W.IW.3.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly. **A.** Introduce a topic clearly. **B.** Develop the topic with facts, definitions, and concrete details, text evidence, or other information and examples related to the topic. **C.** Include text features (e.g.: illustrations, diagrams, captions) when useful to support comprehension. **D.** Link ideas within sections of information using transition words and phrases (e.g., then, because, also, another, therefore). **E.** Provide a conclusion related to the information or explanation presented.
W.WR.3.5	Generate questions about a topic and independently locate related information from at least two reference sources (print and non-print) to obtain information on that topic.
W.SE.3.6	Use discussion, books, or media resources to gather ideas, outline them, and prioritize the information to include while planning to write about a topic.
W.RW.3.7	Engage in independent and task-based writing for both short and extended periods of time, producing written work routinely.

SL.PE.3.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly. **A.** Explicitly draw on previously read text or material and other information known about the topic to explore ideas under discussion. **B.** Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion). **C.** Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others. **D.** Explain their own ideas and understanding in light of the discussion.
SL.II.3.2	Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
L.RF.3.3	Know and apply grade-level phonics and word analysis skills in decoding and encoding words.
L.RF.3.4	Read with sufficient accuracy and fluency to support comprehension. **A.** Read grade-level text with purpose and understanding. **B.** Read grade-level text orally with accuracy, appropriate rate, and expression. **C.** Use context to confirm or self-correct word recognition and understanding, rereading as necessary.
L.KL.3.1	Use knowledge of language and its conventions when writing, speaking, reading, or listening. **A.** Acquire and use accurately grade-appropriate conversational, general academic, and domain-specific words and phrases.
L.VL.3.2	Determine or clarify the meaning of unknown and multiple-meaning academic and domain-specific words and phrases based on grade 3 reading and content, choosing flexibly from a range of strategies. **A.** Use sentence-level context as a clue to the meaning of a word or phrase. **B.** Determine the meaning of the new word formed when a known affix is added to a known word (e.g., agreeable/disagreeable, comfortable/uncomfortable, care/careless, heat/preheat). **C.** Use a known root word as a clue to the meaning of an unknown word with the same root (e.g., company, companion). **D.** Use glossaries or beginning dictionaries, both print and digital, to determine or clarify the precise meaning of key words
Mathematics Standards	
MP1	Make sense of problems and persevere in solving them.
MP2	Reason abstractly and quantitatively.
MP4	Model with mathematics.
MP5	Use appropriate tools strategically.

3.NF.2	Understand a fraction as a number on the number line; represent fractions on a number line diagram. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)
3.M.2	Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). (Excludes compound units such as cm3 and finding the geometric volume of a container.) 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. (Excludes multiplicative comparison problems [problems involving notions of “times as much”].)
3.DL.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. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.
3.DL.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.

Computer Science & Design Thinking	
8.1.5.DA.1	Collect, organize, and display data in order to highlight relationships or support a claim.
8.1.5.DA.3	Organize and present collected data visually to communicate insights gained from different views of the data.
8.1.5.DA.5	Propose cause and effect relationships, predict outcomes, or communicate ideas using data.
8.1.5.AP.4	Break down problems into smaller, manageable sub-problems to facilitate program development.
8.2.5.ED.5	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.
8.2.5.ED.4	Explain factors that influence the development and function of products and systems
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.

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Career Readiness, Life Literacies & Key Skills	
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.
9.4.5.CI.31	Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity
9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process
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
9.4.5.IML.2	Create a visual representation to organize information about a problem or issue
9.4.5.IML.6	Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions
9.4.5.IML.7	Evaluate the degree to which information meets a need including social emotional learning, academic, and social
9.4.5.TL.4	Compare and contrast artifacts produced individually to those developed collaboratively

Career Readiness, Life Literacies, and Key Skills Practices	
CLKS.1	Act as a responsible and contributing community member and employee.
CLKS.2	Attend to financial well-being.
CLKS.3	Consider the environmental, social and economic impacts of decisions.
CLKS.4	Demonstrate creativity and innovation.
CLKS.5	Utilize critical thinking to make sense of problems and persevere in solving them.
CLKS.6	Model integrity, ethical leadership and effective management.
CLKS.7	Plan education and career paths aligned to personal goals.
CLKS.8	Use technology to enhance productivity, increase collaboration and communicate effectively.
CLKS.9	Work productively in teams while using cultural/global competence.

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Evidence of Student Learning	
Formative Tasks: ● Teacher observations ● Class discussions ● Whiteboard/Communicators ● On-the-Fly Assessments ● Daily classwork ● Checks for understanding ● Clipboard Assessment Tool ● Critical Juncture Assessment ● Crosscutting Concept Tracker	**Alternative Assessments:** ● Oral assessments ● Student Self-Assessments ● Pre-Unit Assessments ● 3-D Assessments
Summative Assessments: ● End of Unit Assessment	**Benchmark Assessments:** ● Benchmark 3A

Knowledge & Skills	
Enduring Understandings: ● A force acts between two objects. ● When an object starts moving or stops moving, that is evidence that a force has acted on it. ● Some forces happen between objects that are touching. Other forces happen between objects that aren't touching. ● Non-touching forces can act between magnets and some, but not all, other objects. ● Magnets can attract or repel other magnets. ● Magnets can attract some metal objects. ● An object falls because Earth pulls the object toward it with the force of gravity. ● Two forces can be exerted on an object at the same time. ● When two forces are exerted on an object in opposite directions, the forces can be balanced. ● If forces are balanced, and then a force is changed, the forces become unbalanced, which can cause an object to start moving.	**Essential Questions:** ● What makes an object start to move? ● How can a force act without objects touching? ● In what ways can magnetic forces make an object move? ● What makes an object fall? ● Why would an object not move even though a force is acting on it? ● What can make forces not be balanced anymore?

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Content

Students will know…

- Reflecting on what you understand and don't understand allows you to prepare for learning new things.
- Scientists gather information by making observations.
- Compiling many observations in a table makes it easier to look for patterns.
- An object can start moving when it is pushed or pulled by another object. This push or pull is called a force.
- Scientists pay attention to change because understanding how and why something changes can be a way of figuring out how something works.
- Scientists gather information and evidence from books.
- Setting a purpose before reading can help readers focus their attention.
- When an object starts moving or stops moving, that is evidence that a force has acted on it.
- A force acts between two objects.
- Making explanations is an important practice in science.
- Scientific explanations begin with a topic sentence and include science vocabulary to explain ideas.
- Scientists can make explanations even when they still have some questions about what they are explaining.
- Some forces can act without objects touching. These are called non-touching forces.
- Magnets can cause other objects to move without touching them. This non-touching force is called magnetic force.
- Scientists investigate with a purpose in mind.
- Scientists use evidence from investigations to help answer questions.
- Diagrams are pictures with labels that help scientists show their ideas about how something works or what causes something to happen.

Skills

Students will be able to …

- Read to gather evidence.
- Set a purpose before engaging in a reading or an investigation.
- Find evidence in a text.
- Organize scientific data in a table.
- Analyze data and patterns in a chart.
- Write a scientific explanation.
- Plan and conduct an investigation to test an idea.
- Draw a diagram to show observations made.
- Make and test predictions.
- Analyze data to draw conclusions; write about the conclusions.
- Identify common text features found in a reference book.
- Write to reflect on ideas learned about while reading.
- Identify specific information in a text related to the purpose set for reading.
- Explain why a table is a useful way to present information
- Create a physical model based on ideas.
- Investigate and gather evidence.
- Create a diagram using the Diagramming Tool.
- Make comparisons using key vocabulary
- Construct a device in order to gather evidence to support an idea.
- Conceptualize evidence that is happening.
- Analyze data presented in a table and draw conclusions about an investigation.
- Relate words to one another to understand their meanings.
- Observe an event and make predictions based on observations.
- Make and use models.
- Synthesize information and write a scientific explanation.
- Engage in a student-driven learning sequence to apply ideas they have learned.

● Non-touching forces can act between magnets and some, but not all, other objects. ● A reference book contains information on several related topics and is usually not read from beginning to end. ● A table of contents lists topics in the order they appear in a book. ● A glossary is like a small dictionary with definitions for several important words in a book. ● A magnetic force can be an attraction or a repulsion. ● A magnetic force, like other forces, acts between two objects. ● Scientists often gather evidence from books to help them make sense of evidence they get from their own investigations. ● Magnets can attract or repel other magnets. ● Magnets can attract some metal objects. ● Magnets can have different shapes and different strengths. ● Tables are a way of organizing data so that patterns are easier to find. ● Tables have features that help readers interpret the data they presented. ● Recording the results of an investigation is a way to remember what happened and share it with others. ● Scientists use notebooks to record their ideas. ● Making explanations is an important practice in science. ● Scientists gather more evidence about their ideas by making and testing models. ● Scientific explanations describe things that are not easy to observe. ● Gravity is a force that causes objects to move downward toward Earth. ● Diagrams serve as models by making things simpler and easier to see. ● In diagrams of forces, an arrow represents a force. The non-pointy part of	

the arrow is on the object upon which the force is acting. ● Like other forces, gravity acts between two objects. ● When we observe evidence of gravity, Earth is one of the two objects involved. ● Scientists often reread a text with a new purpose in mind. ● There are often many good options when setting a purpose for reading. ● Gravity can make objects roll down a slope as well as make objects fall straight down. ● There are similarities and differences among touching forces, magnetic force, and gravity. ● Identifying causes and effects is an important part of science. ● Scientists of all kinds make diagrams to show their ideas. ● A scientist may use more than one kind of model. ● Many ideas are easier to show with pictures and words rather than just with words. ● Two forces can be exerted on an object at the same time. ● More than one force can act on an object, even an object that is not moving. ● When gravity and another force on an object are balanced, the object won't fall. ● An object that is not moving may have balanced forces acting on it. ● Subheadings describe the kinds of information found in a section of a reference book. ● When two forces are exerted on an object in opposite directions, the forces can be balanced. ● Engineers must be certain that the forces on a bridge will remain balanced so the bridge is stable and safe. ● One important part of an engineer's job can be to explain science ideas to the	

public so people trust that the things engineers build are safe. ● Models can make it easier to understand how something works by showing something, such as forces, that can't actually be seen. ● A model is never exactly like the thing it represents. ● Magnetic force decreases as the distance between the objects involved increases. ● The force of gravity also decreases as distance increases, though this is not possible to observe without getting far from Earth into outer space. ● Hoverboards work by balancing gravity and magnetic force. ● Some engineers use the science of balanced and unbalanced forces to design inventions. ● If forces are balanced, and then a force is changed, the forces become unbalanced, which can cause an object to start moving. ● An electromagnet is a magnet that can be turned on and off. ● An electromagnet is made with coiled wire and a source of electric charge, such as a battery. ● Observations of an object's motion provide evidence that a pattern can be used to predict future motion. ● The reason that objects are at rest is because the forces acting on them are balanced. ● Scientists often refer to models, such as diagrams, they have made as they write explanations. ● Ideas about magnetic force can help people think of new inventions. ● Creativity and imagination are important to science.	

Core Instructional & Supplemental Materials

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Suggested Activities/Resources:	**Supplemental Materials**
● Books in This Unit ○ *Forces All Around* ○ *Handbook of Forces* ○ *What My Sister Taught Me About Magnets* ○ *Hoverboard* ○ *Explaining a Bridge* ● *Balancing Forces* Kit	● *Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds* PDF ● Digital Resources included in each unit ○ Force Diagramming Tool ● Multi-language glossary

Suggested Accommodations

English Language Learners:

- Multi-sensory instruction
- Flexible grouping
- Small group instruction
- Provide peer tutoring
- Use a strong student as a "buddy" (does not necessarily have to speak the primary language)
- Chunking information
- Scaffolded questioning
- Academic language support
- Vocabulary support
- Co-Constructed Word Banks
- Anchor charts
- Gradual release model
- Visual models
- Native language support when possible (Multi-language glossary)
- Sheltered English Instruction Strategies
- Sentence starters

Special Education/Students with Disabilities:

- Allow extra time to complete assignments or tests
- Work in a small group
- Allow answers to be given orally or dictated
- Follow all IEP modifications
- Calculators
- Manipulatives/concrete models
- Directions repeated, clarified, and reworded
- Breakdown task into manageable parts

504 Plans:

- Allow extra time to complete assignments or tests
- Work in a small group
- Allow answers to be given orally or dictated
- Calculators
- Manipulatives/concrete models

- Follow all 504 modifications

Gifted and Talented:
- Higher level questioning
- Enriched assignments
- Tiered assignments
- Choice board to extend learning

Students at Risk of Failure:
- Provide peer tutoring
- Use a strong student as a “buddy”
- Allow extra time to complete assignments or tests
- Work in a small group
- One on one instruction
- Provide immediate praise and feedback
- Create a nurturing environment
- Provide visuals
- Be flexible with assignments and time frames
- Provide needed academic resources
- Chunking information
- Scaffolded questioning
- Tiered activities
- Manipulatives/concrete models
- Modified assignments
- Brain breaks

Economically Disadvantaged:
- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Graphic organizers
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge

Culturally Diverse:
- Create an emotionally positive classroom climate.
- Create effective communication
- Model and teach cultural respect
- Build relationships with students by interviewing students to understand their background

New Jersey Social and Emotional Competencies and Sub-Competencies	
Self-Awareness	• Recognize one’s feelings and thoughts.

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	● Recognize the impact of one's feelings and thoughts on one's own behavior. ● Recognize one's personal traits, strengths, and limitations. ● Recognize the importance of self-confidence in handling daily tasks and challenges.
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Responsible Decision Making	● Develop, implement, and model effective problem-solving and critical thinking skills. ● Identify the consequences associated with one's actions in order to make constructive choices. ● Evaluate personal, ethical, safety, and civic impact of decisions.
Relationship Skills	● Establish and maintain healthy relationships. ● Utilize positive communication and social skills to interact effectively with others. ● Identify ways to resist inappropriate social pressure. ● Demonstrate the ability to prevent and resolve interpersonal conflicts in constructive ways. ● Identify who, when, where, or how to seek help for oneself or others when needed.

Unit 2: Inheritance and Traits	Duration: 45 days

New Jersey Student Learning Standards	
3-LS1-1	Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.
3-LS2-1	Construct an argument that some animals form groups that help members survive.
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.

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

Science and Engineering Practices	Discipline Core Ideas/Unit Enduring Understandings	Crosscutting Concepts
• **Practice 1: Asking Questions:** Students receive explicit instruction about asking questions in order to improve their facility with and understanding of this practice. Students ask questions and think about how their questions can be answered when reading informational text, when analyzing data, and when conducting firsthand investigations. Students learn that some questions, while valid, are not the kinds of questions that scientists investigate. They also learn that some questions can be researched through secondhand sources such as reference books, and some questions can be investigated directly. Students then practice asking investigable questions by using data about organisms, the traits of those organisms, and the environments of those organisms. • **Practice 4: Analyzing and Interpreting Data:** Throughout the unit, students use visual, quantitative, and qualitative data to draw conclusions about organisms and their traits. For instance, students analyze the weight of several wolves in two different wolf packs as well as a measurement of how much food the wolves eat in order to conclude that a	**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.D: Social Interactions and Group Behavior:** • Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size (Note: Moved from K–2). (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:** • 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)	**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. (3LS3-1) **Cause and Effect** • Cause and effect relationships are routinely identified and used to explain change. (3-LS2-1) • Cause and effect relationships are routinely identified and used to explain change. (3-LS3-2) ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** • Science findings are based on recognizing patterns. (3-LS1-1)

wolf's body size is the result of both inheritance and the influence of the environment. Students have many opportunities to use data to find the answer to questions about specific organisms, which can then be applied to draw conclusions about organisms more generally. ● **Practice 6: Constructing Explanations and Designing Solutions:** Students learn about the purpose that scientific explanations serve in the scientific community and have multiple opportunities to write increasingly complex explanations over the course of the unit. To write these explanations, students must answer scientific questions by using the evidence they have gathered and ensure that their explanations describe inheritance and the influence of the environment on traits— processes that are impossible to see. ● **Practice 3: Planning and Carrying Out Investigations:** In this unit, students receive explicit instruction and opportunities to practice planning and carrying out investigations, with a particular focus on asking investigable questions that advance the understanding of the phenomena being studied. Students conduct investigations with data as well as with physical materials in order to gather evidence about how organisms get their traits. Students use this information as they work to		

understand and explain the phenomenon of inheritance and the influence of the environment. Students carry out investigations by using photographs and illustrations showing the traits of a wide variety of organisms, by using various sets of data cards, and by working with the digital Inheritance and Traits Modeling Tool. ● **Practice 2: Developing and Using Models:** Students use the Inheritance and Traits Modeling Tool to represent their ideas about traits that are inherited and influenced by the environment. Through using the Modeling Tool, students have multiple opportunities to practice identifying the factors that are important in determining the traits of an individual. Students then demonstrate their ideas as they select traits of parents, offspring, and environments to develop models of inheritance and environmental influence that are consistent with their understanding. ● **Practice 8: Obtaining, Evaluating, and Communicating Information:** Just as students focus on asking questions as they investigate, they receive explicit instruction and have multiple opportunities to use the sense-making strategy of asking questions as they engage with the informational texts in the unit. Students gather evidence through firsthand and secondhand sources, as well as participate in		

various discourse routines that help them communicate about and make sense of science ideas, using key vocabulary. ● **Practice 5: Using Mathematics and Computational Thinking:** Students collect quantitative data for several class traits (e.g., length of fingernails, eye color) and make bar graphs representing how these traits are distributed across the class. Students use this data to help them think about how organisms get their traits, and students return to the data to analyze it for a new purpose.		

New Jersey Social and Emotional Competencies and Sub-Competencies	
Self-Awareness	● Recognize one's feelings and thoughts. ● Recognize the impact of one's feelings and thoughts on one's own behavior. ● Recognize one's personal traits, strengths, and limitations. ● Recognize the importance of self-confidence in handling daily tasks and challenges.
Self-Management	● Understand and practice strategies for managing one's own emotions, thoughts, and behaviors. ● Recognize the skills needed to establish and achieve personal and educational goals. ● Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals.
Social Awareness	● Recognize and identify the thoughts, feelings, and perspectives of others. ● Demonstrate an awareness of the differences among individuals, groups, and others' cultural backgrounds. ● Demonstrate an understanding of the need for mutual respect when viewpoints differ. ● Demonstrate an awareness of the expectations for social interactions in a variety of settings.
Responsible Decision Making	● Develop, implement, and model effective problem-solving and critical thinking skills. ● Identify the consequences associated with one's actions in order to make constructive choices. ● Evaluate personal, ethical, safety, and civic impact of decisions.

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Relationship Skills	● Establish and maintain healthy relationships. ● Utilize positive communication and social skills to interact effectively with others. ● Identify ways to resist inappropriate social pressure. ● Demonstrate the ability to prevent and resolve interpersonal conflicts in constructive ways. ● Identify who, when, where, or how to seek help for oneself or others when needed.

Interdisciplinary Connections	
ELA Standards	
RI.CR.3.1	Ask and answer questions and make relevant connections to demonstrate understanding of an informational text, referring explicitly to textual evidence as the basis for the answers.
RI.IT.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.
RI.TS.3.4	Utilize and reference features of a text when writing or speaking about a text, using text features (e.g., graphics, images, captions, headings) and search tools (e.g., key words, sidebars, hyperlinks) to locate and integrate information relevant to a given topic efficiently. '
RI.MF.3.6	Use information gained from text features (e.g., illustrations, maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).
W.IW.3.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly. **A.** Introduce a topic clearly. **B.** Develop the topic with facts, definitions, and concrete details, text evidence, or other information and examples related to the topic. **C.** Include text features (e.g.: illustrations, diagrams, captions) when useful to support comprehension. **D.** Link ideas within sections of information using transition words and phrases (e.g., then, because, also, another, therefore). **E.** Provide a conclusion related to the information or explanation presented.
W.WR.3.5	Generate questions about a topic and independently locate related information from at least two reference sources (print and non-print) to obtain information on that topic.
W.SE.3.6	Use discussion, books, or media resources to gather ideas, outline them, and prioritize the information to include while planning to write about a topic.
W.RW.3.7	Engage in independent and task-based writing for both short and extended periods of time, producing written work routinely.

SL.PE.3.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly. **A.** Explicitly draw on previously read text or material and other information known about the topic to explore ideas under discussion. **B.** Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion). **C.** Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others. **D.** Explain their own ideas and understanding in light of the discussion.
SL.II.3.2	Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
SL.ES.3.3	Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.
L.RF.3.3	Know and apply grade-level phonics and word analysis skills in decoding and encoding words.
L.RF.3.4	Read with sufficient accuracy and fluency to support comprehension. **A.** Read grade-level text with purpose and understanding. **B.** Read grade-level text orally with accuracy, appropriate rate, and expression. **C.** Use context to confirm or self-correct word recognition and understanding, rereading as necessary.
L.KL.3.1	Use knowledge of language and its conventions when writing, speaking, reading, or listening. **A.** Acquire and use accurately grade-appropriate conversational, general academic, and domain-specific words and phrases.
L.VL.3.2	Determine or clarify the meaning of unknown and multiple-meaning academic and domain-specific words and phrases based on grade 3 reading and content, choosing flexibly from a range of strategies. **A.** Use sentence-level context as a clue to the meaning of a word or phrase. **B.** Determine the meaning of the new word formed when a known affix is added to a known word (e.g., agreeable/disagreeable, comfortable/uncomfortable, care/careless, heat/preheat). **C.** Use a known root word as a clue to the meaning of an unknown word with the same root (e.g., company, companion). **D.** Use glossaries or beginning dictionaries, both print and digital, to determine or clarify the precise meaning of key words and
Mathematics Standards	
MP1	Make sense of problems and persevere in solving them.
MP2	Reason abstractly and quantitatively.

MP4	Model with mathematics.
MP5	Use appropriate tools strategically.
3.DL.4	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.NF.1	Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b.

Computer Science & Design Thinking	
8.1.5.DA.1	Collect, organize, and display data in order to highlight relationships or support a claim.
8.1.5.DA.3	Organize and present collected data visually to communicate insights gained from different views of the data.
8.1.5.DA.5	Propose cause and effect relationships, predict outcomes, or communicate ideas using data.
8.1.5.AP.4	Break down problems into smaller, manageable sub-problems to facilitate program development.
8.2.5.ED.5	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.
8.2.5.ED.4	Explain factors that influence the development and function of products and systems
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.

Career Readiness, Life Literacies & Key Skills	
9.2.5.CAP.3	Identify qualifications needed to pursue traditional and non-traditional careers and occupations.

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9.2.5.CAP.4	Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements.
9.4.5.CI.31	Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity
9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process
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
9.4.5.IML.2	Create a visual representation to organize information about a problem or issue
9.4.5.IML.6	Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions
9.4.5.IML.7	Evaluate the degree to which information meets a need including social emotional learning, academic, and social
9.4.5.TL.4	Compare and contrast artifacts produced individually to those developed collaboratively

Career Readiness, Life Literacies, and Key Skills Practices	
CLKS.1	Act as a responsible and contributing community member and employee.
CLKS.2	Attend to financial well-being.
CLKS.3	Consider the environmental, social and economic impacts of decisions.
CLKS.4	Demonstrate creativity and innovation.
CLKS.5	Utilize critical thinking to make sense of problems and persevere in solving them.
CLKS.6	Model integrity, ethical leadership and effective management.
CLKS.7	Plan education and career paths aligned to personal goals.
CLKS.8	Use technology to enhance productivity, increase collaboration and communicate effectively.
CLKS.9	Work productively in teams while using cultural/global competence.

Evidence of Student Learning	
Formative Tasks: ● Teacher observations ● Class discussions	**Alternative Assessments:** ● Oral assessments ● Student Self-Assessments

● Whiteboard/Communicators ● On-the-Fly Assessments ● Daily classwork ● Checks for understanding ● Clipboard Assessment Tool ● Critical Juncture Assessment ● Crosscutting Concept Tracker	● Pre-Unit Assessments ● 3-D Assessments
Summative Assessments: ● End of Unit Assessment	**Benchmark Assessments:** ● Benchmark 3B

Knowledge & Skills	
Enduring Understandings: ● Organisms have observable traits. ● Organisms in a species have many similar traits, but for each trait there can be variation. ● Scientists ask questions they can investigate by making observations. ● Organisms can have traits that are similar to their parents' traits. ● Offspring inherit instructions for each trait from both their parents. ● Offspring can inherit different instructions from their parents, so offspring may have different traits. ● Some traits result from the environment. ● Organisms stay in groups in order to obtain food and meet their needs. The number of organisms in a group varies. ● Some traits result from both inheritance and interaction with the environment. ● Scientists can investigate questions by looking for patterns in data.	**Essential Questions:** ● What are some ways that organisms can be similar or different? ● How can we describe the traits of organisms in a species? ● Why do only some organisms of the same species have similar traits? ● Why do offspring have similar traits to their parents but not always to each other? ● Can the environment affect inherited traits? ● How can scientists investigate questions about traits?
Content *Students will know…* ● Wildlife biologists study living things in order to learn more about them. ● Living things have life cycles that are unique and diverse. ● An organism is a living thing, such as a plant or an animal.	**Skills** *Students will be able to …* ● Reflecting on what you understand and don't understand allows you to prepare for learning new things. ● Preview and familiarize themselves with a reference book.

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● All organisms are related. ● Scientists closely observe the similarities and differences between different organisms to see how closely related they may be. ● Asking questions during reading helps readers better understand the ideas in the text. ● Science findings are based on recognizing patterns. ● Science findings are limited to what can be answered with evidence. ● Organisms have observable traits. ● Scientists learn about organisms by observing them and looking for similarities and differences. ● Scientists look for patterns among the traits of organisms in order to classify organisms into groups. ● Having many of the same traits can mean that organisms are more closely related. ● Some groups of animals are more closely related to one another. ● Within a type of organism, there can be many species. ● Organisms within a species can have similarities and variation. ● Scientists ask questions about how the natural world works and what parts of the world are like. ● There are similarities and variation in the traits of humans. ● Scientists create graphs to help them organize information and look for patterns. ● Making observations helps scientists look for patterns. ● Text features in a reference book can help readers locate specific information. ● Organisms in a species have many of the same traits, but for some traits there can be variation. ● Evidence is information that supports an answer to a question.	● Ask questions while reading in order to make sense of the text. ● Make observations and record similarities and differences between organisms. ● Look for patterns in order to make sense of the similarities and differences observed in organisms. ● Identify organisms that are closely related. ● Analyze data in order to make comparisons about different organisms based on their traits. ● Differentiate between science questions and non-science questions. ● Create a bar graph to show similarity and variation of traits across the class. ● Participate in a structured peer-to-peer discussion. ● Model ideas using a digital app. ● Use text features to locate information about traits that have variation within a species. ● Create sentences using scientific vocabulary. ● Set a purpose for reading an informational text. ● Use information gathered in a text to construct an explanation of how traits vary within a species. ● Gather data to demonstrate understanding about variation within a species. ● Incorporate ideas from investigations and text to construct a scientific explanation about variation in traits within a species. ● Make observations about the traits of parents and offspring in different fruit fly families to notice patterns in the fruit fly family data. ● Ask questions that can be investigated. ● Use the online *Inheritance and Traits* Modeling Tool to apply understanding of patterns between parents and offspring. ● Identify similarities and variations between creature siblings. ● Construct the idea that because offspring can inherit different instructions from the same set of parents, there may be variation among siblings who are offspring of the same parents. ● Use the *Inheritance and Traits* Modeling Tool to predict offspring.

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● A scientific explanation answers a question about how something works or why something happens. ● A scientific explanation is written for an audience. ● Scientists use scientific language to explain their ideas. ● Scientists support their explanations with ideas from investigations and text. ● Members of a family have similarities in many traits but can also show variation among traits. ● One of the most important ways that scientists figure out answers to their questions is through investigation. ● When scientists investigate, they find or set up situations in which they can observe some part of the world and learn more about it. ● Some questions can be investigated, some cannot. ● Offspring have more similarities with their own parents than with others of their species that are not their parents. ● Organisms can have traits that are similar to their parents' traits. ● The traits of offspring can be like one parent or both parents. ● The traits of offspring can sometimes be a mix of their parents' traits. ● Genes provide instructions for traits. ● Some of an organism's traits are determined by its genes. ● Readers use information in books to help them answer questions they ask before, during, and after reading. ● Different instructions inherited from parents (cause) can lead to different traits in offspring (effect). ● When parents reproduce, they create offspring. ● Offspring inherit instructions for each trait from both of their parents.	● Use scientific vocabulary to discuss key ideas. ● Analyze data that is presented in a family tree. ● Gather data from data cards and informational texts in order to complete a graphic organizer. ● Write a scientific explanation, incorporating information that may be hard for others to see. ● Analyze data in order to make observations, ask questions, and answer these questions. ● Use the table of contents in a reference book to prompt their thinking about other ways that organism can get traits besides being inherited. ● Independently write a scientific explanation to demonstrate understanding that traits can result from an organism's environment. ● Gather evidence to support the idea that the environment affects inherited traits. ● Use the *Inheritance and Traits* Modeling Tool to demonstrate understanding of how traits can result from a combination of inheritance and the environment. ● Draw conclusions about factors that might determine a trait. ● Use scientific language to strengthen a scientific explanation.

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● Offspring can inherit different instructions from their parents, so offspring may have different traits. ● A family tree shows how members of a family are related. ● Scientific explanations describe things that are not easy to observe. ● Sharing ideas with others helps solidify an understanding of ideas. ● Inheritance is not the only factor that determines a trait. ● Sometimes, offspring can have a trait that is not similar to the traits of either parent. ● Organisms stay in groups in order to obtain food and meet their needs. The number of organisms in a group varies. ● Some traits result from the environment. ● A scientific explanation describes things that are difficult to observe. ● Setting up and conducting investigations allows scientists to answer questions. ● A fair test involves setting up situations to compare, keeping all things the same except one. ● The environment can affect inherited traits. ● Some traits result from both inheritance and interaction with the environment. ● Scientists may find evidence in reference books to support their ideas. ● Patterns can help scientists explain how organisms get their traits. ● Using data and information from books and investigations help scientists answer their questions. ● Scientists can investigate questions by looking for patterns in data. ● The methods scientists use are determined by the questions they are investigating. ● Scientists use a variety of methods, tools, and techniques when they conduct investigations. ● Science theories are based on a body of evidence and many tests.	

● Looking for patterns can help scientists identify whether a trait is inherited or a result of the environment. ● Scientists look for patterns in data about traits and the environment to describe the possible traits of offspring. ● Investigations in science often lead to new questions.	

Core Instructional & Supplemental Materials	
Suggested Activities/Resources: ● Books in This Unit ○ *Blue Whales and Buttercups* ○ *The Code* ○ *How the Sparrow Learned Its Song* ○ *Scorpion Scientist* ○ *Handbook of Traits* ● *Properties of Materials* Kit	**Supplemental Materials** ● *Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds* PDF ● Digital Resources included in each unit ○ *Inheritance and Traits* Modeling Tool ● Hands-On Flextension: ○ Comparing Life Cycles ○ Isopod Traits ● Multi-language glossary

Suggested Accommodations

English Language Learners:
- Multi-sensory instruction
- Flexible grouping
- Small group instruction
- Provide peer tutoring
- Use a strong student as a "buddy" (does not necessarily have to speak the primary language)
- Chunking information
- Scaffolded questioning
- Academic language support
- Vocabulary support
- Co-Constructed Word Banks
- Anchor charts
- Gradual release model
- Visual models
- Native language support when possible (Multi-language glossary)
- Sheltered English Instruction Strategies
- Sentence starters

Special Education/Students with Disabilities:
- Allow extra time to complete assignments or tests
- Work in a small group

- Allow answers to be given orally or dictated
- Follow all IEP modifications
- Calculators
- Manipulatives/concrete models
- Directions repeated, clarified, and reworded
- Breakdown task into manageable parts

504 Plans:
- Allow extra time to complete assignments or tests
- Work in a small group
- Allow answers to be given orally or dictated
- Calculators
- Manipulatives/concrete models
- Follow all 504 modifications

Gifted and Talented:
- Higher level questioning
- Enriched assignments
- Tiered assignments
- Choice board to extend learning

Students at Risk of Failure:
- Provide peer tutoring
- Use a strong student as a “buddy”
- Allow extra time to complete assignments or tests
- Work in a small group
- One on one instruction
- Provide immediate praise and feedback
- Create a nurturing environment
- Provide visuals
- Be flexible with assignments and time frames
- Provide needed academic resources
- Chunking information
- Scaffolded questioning
- Tiered activities
- Manipulatives/concrete models
- Modified assignments
- Brain breaks

Economically Disadvantaged:
- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Graphic organizers
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema

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- Build background knowledge

Culturally Diverse:

- Create an emotionally positive classroom climate.
- Create effective communication
- Model and teach cultural respect
- Build relationships with students by interviewing students to understand their background

Unit 3: Environments and Survival	Duration: 45 days

New Jersey Student Learning Standards	
3-LS4-1	Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.
3-LS4-2	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.
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.
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.
3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
3-5-ETS3-1	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Science and Engineering Practices	Discipline Core Ideas/Unit Enduring Understandings	Crosscutting Concepts
• **Practice 6: Constructing Explanations and Designing Solutions:** Students learn about scientific explanations and have multiple opportunities to write increasingly complex explanations over the course of the unit about why snails with particular	**LS2.C: Ecosystems 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	**Cause and Effect** • Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3) **Scale, Proportion, and Quantity** • Observable phenomena

traits are more likely or less likely to survive in their environment. Students use their understanding of the adaptive traits of grove snails, and other types of organisms, to inspire designs that solve different problems. By the end of the unit, students have the opportunity to work through each of the four phases of the iterative design cycle as they learn, plan, make, and test designs for robots that remove invasive plants, inspired by giraffe traits. ● **Practice 2: Developing and Using Models:** Students receive explicit instruction and opportunities to practice using models that represent different factors affecting the survival of organisms in different environments. Students use the Environments and Survival Modeling Tool to show their ideas about the likelihood of survival of organisms with specific traits in an environment. Students then consider how organisms' likelihood of survival might change when an environment undergoes a change. ● **Practice 4: Analyzing and Interpreting Data:** Throughout the unit, students use visual, quantitative, and qualitative data to draw conclusions about the survival of organisms in their environments. Students analyze data about the grove snail population and the snails' environment to stimulate questions about why snails with certain traits are more likely to survive	new locations, yet others move into the transformed environment, and some die. (secondary to 3-LS4-4) **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) **ETS1.A: Defining and Delimiting Engineering Problems:** ● Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets	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-LS44) ***Connections to Nature of Science*** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** ● Science assumes consistent patterns in natural systems. (3LS4-1)

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than others and why this pattern is different today than in a past environment. Students collect data as they carry out investigations and test their designs; they use two digital apps—the Environments and Survival Data Tool and the RoboGrazer Simulation—to facilitate analysis and interpretation of their data. ● **Practice 3: Planning and Carrying Out Investigations:** Students conduct various investigations to gather evidence about the survival of organisms in their environment. Using physical models, students investigate the ability of organisms to meet their needs for survival in different environments. Students also investigate how different traits affect whether organisms are likely to survive in a given environment and how this likelihood shifts when the environment changes. ● **Practice 5: Using Mathematics and Computational Thinking:** Students engage with models and collect quantitative data about different factors that affect the survival of organisms, and the class creates bar graphs that represent their data. Students use this data to understand why some organisms are more likely or less likely to survive in their environment. Students use the RoboGrazer Simulation to test and revise their designs and to understand how different components of their designs contribute to its success in meeting the	the specified criteria for success or how well each takes the constraints into account. (3-5-ETS1-1) **ETS1.B: Developing Possible Solutions:** ● Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2) ● At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-5-ETS1-2) ● Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3) **ETS1.C: Optimizing the Design Solution:** ● Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3)	

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criteria. ● **Practice 8: Obtaining, Evaluating, and Communicating Information:** Students receive explicit instruction and have multiple opportunities to use the reading comprehension strategy of making inferences as they engage with the informational texts in the unit. Students gather evidence through firsthand and secondhand sources, as well as participate in various discourse routines that help them communicate about and make sense of science ideas, using key vocabulary. ● **Practice 1: Asking Questions:** As students are presented with new information about the grove snail population and environment, they have opportunities to discuss questions about the survival of organisms in the population. When reading informational texts, analyzing data, and conducting firsthand investigations, students ask questions and use their observations and prior knowledge to make inferences that can help them answer their questions. ● **Practice 7: Engaging in Argument from Evidence:** Students learn that engineers systematically evaluate their designs against specific criteria to determine which design solution is the most successful for addressing a problem. Students prepare design arguments by		

reviewing their test data and describing how their designs meet each criterion. Students participate in a class engineering conference in which they share their designs and design arguments with one another.		

New Jersey Social and Emotional Competencies and Sub-Competencies	
Self-Awareness	● Recognize one's feelings and thoughts. ● Recognize the impact of one's feelings and thoughts on one's own behavior. ● Recognize one's personal traits, strengths, and limitations. ● Recognize the importance of self-confidence in handling daily tasks and challenges.
Self-Management	● Understand and practice strategies for managing one's own emotions, thoughts, and behaviors. ● Recognize the skills needed to establish and achieve personal and educational goals. ● Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals.
Social Awareness	● Recognize and identify the thoughts, feelings, and perspectives of others. ● Demonstrate an awareness of the differences among individuals, groups, and others' cultural backgrounds. ● Demonstrate an understanding of the need for mutual respect when viewpoints differ. ● Demonstrate an awareness of the expectations for social interactions in a variety of settings.
Responsible Decision Making	● Develop, implement, and model effective problem-solving and critical thinking skills. ● Identify the consequences associated with one's actions in order to make constructive choices. ● Evaluate personal, ethical, safety, and civic impact of decisions.
Relationship Skills	● Establish and maintain healthy relationships. ● Utilize positive communication and social skills to interact effectively with others. ● Identify ways to resist inappropriate social pressure. ● Demonstrate the ability to prevent and resolve interpersonal conflicts in constructive ways. ● Identify who, when, where, or how to seek help for oneself or others when needed.

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Interdisciplinary Connections	
ELA Standards	
RI.CR.3.1	Ask and answer questions and make relevant connections to demonstrate understanding of an informational text, referring explicitly to textual evidence as the basis for the answers.
RI.IT.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.
RI.TS.3.4	Utilize and reference features of a text when writing or speaking about a text, using text features (e.g., graphics, images, captions, headings) and search tools (e.g., key words, sidebars, hyperlinks) to locate and integrate information relevant to a given topic efficiently. '
RI.MF.3.6	Use information gained from text features (e.g., illustrations, maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).
W.IW.3.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly. **A.** Introduce a topic clearly. **B.** Develop the topic with facts, definitions, and concrete details, text evidence, or other information and examples related to the topic. **C.** Include text features (e.g.: illustrations, diagrams, captions) when useful to support comprehension. **D.** Link ideas within sections of information using transition words and phrases (e.g., then, because, also, another, therefore). **E.** Provide a conclusion related to the information or explanation presented.
W.WR.3.5	Generate questions about a topic and independently locate related information from at least two reference sources (print and non-print) to obtain information on that topic.
W.SE.3.6	Use discussion, books, or media resources to gather ideas, outline them, and prioritize the information to include while planning to write about a topic.
W.RW.3.7	Engage in independent and task-based writing for both short and extended periods of time, producing written work routinely.
SL.PE3.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly. **A.** Explicitly draw on previously read text or material and other information known about the topic to explore ideas under discussion. **B.** Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion). **C.** Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.

	D. Explain their own ideas and understanding in light of the discussion.
SL.II.3.2	Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
SL.PI.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.
L.RF.3.3	Know and apply grade-level phonics and word analysis skills in decoding and encoding words.
L.RF.3.4	Read with sufficient accuracy and fluency to support comprehension. **A.** Read grade-level text with purpose and understanding. **B.** Read grade-level text orally with accuracy, appropriate rate, and expression. **C.** Use context to confirm or self-correct word recognition and understanding, rereading as necessary.
L.KL.3.1	Use knowledge of language and its conventions when writing, speaking, reading, or listening. **A.** Acquire and use accurately grade-appropriate conversational, general academic, and domain-specific words and phrases.
L.VL.3.2	Determine or clarify the meaning of unknown and multiple-meaning academic and domain-specific words and phrases based on grade 3 reading and content, choosing flexibly from a range of strategies. **A.** Use sentence-level context as a clue to the meaning of a word or phrase. **B.** Determine the meaning of the new word formed when a known affix is added to a known word (e.g., agreeable/disagreeable, comfortable/uncomfortable, care/careless, heat/preheat). **C.** Use a known root word as a clue to the meaning of an unknown word with the same root (e.g., company, companion). **D.** Use glossaries or beginning dictionaries, both print and digital, to determine or clarify the precise meaning of key words
Mathematics Standards	
MP1	Make sense of problems and persevere in solving them.
MP2	Reason abstractly and quantitatively.
MP4	Model with mathematics.
MP5	Use appropriate tools strategically.
MP6	Attend to precision.
3.OA.8	Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess

	the reasonableness of answers using mental computation and estimation strategies including rounding.
3.NF.2	Develop understanding of fractions as numbers. Understand a fraction as a number on the number line; represent fractions on a number line diagram.
3.NF.3	Develop understanding of fractions as numbers. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. B. Recognize and generate simple equivalent fractions (e.g., 1/2 = 2/4, 4/6 = 2/3), Explain why the fractions are equivalent, e.g., by using a visual fraction model. D. Compare two fractions with the same numerator or the same denominator, by reasoning about their size, Recognize that valid comparisons rely on the two fractions referring to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.
3.M.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 to represent the problem.
3.DL.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.

Computer Science & Design Thinking	
8.1.5.DA.1	Collect, organize, and display data in order to highlight relationships or support a claim.
8.1.5.DA.3	Organize and present collected data visually to communicate insights gained from different views of the data.
8.1.5.DA.5	Propose cause and effect relationships, predict outcomes, or communicate ideas using data.
8.1.5.AP.4	Break down problems into smaller, manageable sub-problems to facilitate program development.
8.2.5.ED.5	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.
8.2.5.ED.4	Explain factors that influence the development and function of products and systems

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.

Career Readiness, Life Literacies & Key Skills	
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.
9.4.5.CI.31	Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity
9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process
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
9.4.5.IML.2	Create a visual representation to organize information about a problem or issue
9.4.5.IML.6	Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions
9.4.5.IML.7	Evaluate the degree to which information meets a need including social emotional learning, academic, and social
9.4.5.TL.4	Compare and contrast artifacts produced individually to those developed collaboratively

Career Readiness, Life Literacies, and Key Skills Practices	
CLKS.1	Act as a responsible and contributing community member and employee.
CLKS.2	Attend to financial well-being.
CLKS.3	Consider the environmental, social and economic impacts of decisions.
CLKS.4	Demonstrate creativity and innovation.
CLKS.5	Utilize critical thinking to make sense of problems and persevere in solving them.
CLKS.6	Model integrity, ethical leadership and effective management.

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CLKS.7	Plan education and career paths aligned to personal goals.
CLKS.8	Use technology to enhance productivity, increase collaboration and communicate effectively.
CLKS.9	Work productively in teams while using cultural/global competence.

Evidence of Student Learning	
Formative Tasks: ● Teacher observations ● Class discussions ● Whiteboard/Communicators ● On-the-Fly Assessments ● Daily classwork ● Checks for understanding ● Clipboard Assessment Tool ● Critical Juncture Assessment ● Crosscutting Concept Tracker	**Alternative Assessments:** ● Oral assessments ● Student Self-Assessments ● Pre-Unit Assessments ● 3-D Assessments
Summative Assessments: ● End of Unit Assessment	**Benchmark Assessments:** ● Benchmark 3C

Knowledge & Skills	
Enduring Understandings: ● When it's easy for organisms to meet their needs in their environment, they are likely to survive. ● When it's hard for organisms to meet their needs in their environment, they are not likely to survive. ● Organisms in a population can have different traits. ● An organism's traits can make it easier or harder for the organism to meet its needs in its environment. ● In a population, organisms with adaptive traits are more likely to survive in their environment. ● In a population, organisms with non-adaptive traits are less likely to survive in their environment. ● Organisms' traits can inspire engineers to create designs that solve problems.	**Essential Questions:** ● What makes organisms in a population more likely to survive or less likely to survive? ● Why are some organisms in a population more likely to survive than others in their environment? ● How can organisms' traits help engineers make successful designs? ● How can organisms have traits that are adaptive at one time and non-adaptive at another time? ● How do engineers learn, plan, make, and test their designs?

● When an environment changes, traits that were adaptive might now be non-adaptive. ● When the environment changes, that doesn't mean that organisms can decide to change their traits to survive.	
Content *Students will know…* ● Engineers use science knowledge to design something to solve a problem. ● Biomimicry engineers get ideas for designs from organisms' traits and how they work. ● Creativity and imagination are important to science. ● Different organisms have different needs for survival. These needs can be met or not met in different environments. ● Organisms and the environment in which they live are a system. Studying systems helps scientists figure out how things in the natural world work. ● Earthworms, like other organisms, have many needs for survival, including the needs for air, water, food, and for avoiding predators. ● Earthworms, like other organisms, have traits that help them meet their needs for survival in their environment. ● Organisms have traits that you can observe, such as color or size. ● When it's easy for organisms to meet their needs in their environment, they are likely to survive. ● When it's hard for organisms to meet their needs in their environment, they are not likely to survive. ● Making explanations is an important practice in science. ● Scientific explanations describe things that are not easy to observe. ● Scientific explanations are based on ideas from investigations and text. ● Organisms in a population can have different traits.	**Skills** *Students will be able to …* ● Examine information presented in a bar graph and use it to draw a conclusion. ● Reflect on what they understand and don't understand to prepare to learn new things. ● Make inferences based on what they observe and what they already know. ● Make connections between an organism's likelihood of survival and its ability to meet its needs in an environment. ● Make inferences based on readings. ● Engage in the Survival Model to investigate how well organisms can meet their needs in an environment and how that affects their likelihood of survival. ● Interpret data from investigations to understand how organisms' environment affects their likelihood of survival. ● Write a scientific explanation to answer questions about how or why something happens. ● Observe images of animal populations to notice that traits can vary among organisms in a population. ● Engage in a classroom model to discover that variation in traits may affect how easy or hard it is for different organisms in a population to meet their needs for survival in a given environment. ● Analyze data to determine that some beak traits make it easier for the hummingbird to meet its needs in its environment, while other traits make it harder for the hummingbird to meet its needs. ● Observe the structure of an animal's teeth to make inferences about what that animal eats. ● Make inferences to figure something out based on what you read or observe and what you already know.

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● Models are representations of systems that help us understand something by making it simpler or easier to see. ● Some traits involve structures with specific functions that help organisms meet their needs for survival in a given environment. ● Some kinds of plants and animals that once lived on Earth are no longer found anywhere. ● Fossils are clues about life from the past that are preserved in rock. ● An organism's traits can make it easier or harder for the organism to meet its needs in its environment. ● Adaptive traits make it easier for an organism to meet its needs in an environment. ● Non-adaptive traits make it harder for an organism to meet its needs in an environment. ● In a population, organisms with adaptive traits are more likely to survive in their environment. ● In a population, organisms with non-adaptive traits are less likely to survive in their environment. ● Organisms' traits can inspire engineers to create designs that solve problems. ● Environmental changes can affect which organisms are likely to survive in their environment. ● Environments can be changed in many different ways, such as by drought, fire, or as a result of human impact. ● In a particular environment, some organisms can survive and reproduce, and others do not survive. ● When an environment changes, traits that were adaptive might now be non-adaptive. ● When the environment changes, it doesn't mean that organisms can decide to change their traits to survive.	● Make observations of the structure of fossils to make inferences about organisms that lived long ago. ● Engage in an open-ended discussion about their ideas for possible designs based on traits. ● Use the Concept Mapping routine to discuss the relationships among key science ideas related to traits and survival in an environment. ● Write a scientific explanation for an audience in order to share ideas with others and help solidify an understanding of ideas. ● Draw on their interpretations of the data to make inferences about how and why different traits for shell color and shell strength make it easier or harder for grove snails to meet their needs in their environment. ● Use scientific ideas to plan designs to solve problems. ● Get ideas from looking at other engineers' designs and revise their own designs. ● Make inferences about whether or not organisms are likely to survive after an environmental change. ● Engage in discussions about a text with others to help understand ideas. ● Create models to communicate ideas. ● Write scientific explanations using scientific language to convey ideas clearly. ● Create designs inspired by real organisms. ● Use each part of the design cycle to help them design and refine solutions. ● Use tools and technologies to make accurate measurements and observations. ● Design solutions to problems that can arise when the environment changes. ● Test designs to determine how well they meet criteria, and they identify ways in which their designs can be improved. ● Reflect on their design work and generate new ideas to improve their solutions. ● Determine what kinds of changes need to be made to designs by testing and revising designs to better meet the criteria.

● Organisms such as cockroaches have traits that engineers use to inspire their designs. ● People from all cultures and backgrounds choose careers as scientists and engineers. ● Most scientists and engineers work in teams. ● Science affects everyday life. ● Giraffe necks have structures that help them reach food in many places. ● Invasive plants can change the environment, which can make it hard for other plants or animals to survive there. ● Giraffes have different types of teeth in the different parts of their mouths. These teeth structures serve different functions that help the giraffe meet its needs.	● Present arguments with evidence about how their designs meet the criteria.

Core Instructional & Supplemental Materials

Suggested Activities/Resources:

- Books in This Unit
  - *Earthworms Underground*
  - *Mystery Mouths*
  - *Environment News*
  - *Cockroach Robots*
  - *Biomimicry Handbook*
- *Properties of Materials* Kit

Supplemental Materials

- *Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds* PDF
- Digital Resources included in each unit
  - *Environments and Survival* Data Tool
  - *Environments and Survival* Modeling Tool
- Hands-On Flextension:
  - Underwater Environments
- Multi-language glossary

Suggested Accommodations

English Language Learners:

- Multi-sensory instruction
- Flexible grouping
- Small group instruction
- Provide peer tutoring
- Use a strong student as a "buddy" (does not necessarily have to speak the primary language)
- Chunking information
- Scaffolded questioning
- Academic language support
- Vocabulary support

- Co-Constructed Word Banks
- Anchor charts
- Gradual release model
- Visual models
- Native language support when possible (Multi-language glossary)
- Sheltered English Instruction Strategies
- Sentence starters

Special Education/Students with Disabilities:
- Allow extra time to complete assignments or tests
- Work in a small group
- Allow answers to be given orally or dictated
- Follow all IEP modifications
- Calculators
- Manipulatives/concrete models
- Directions repeated, clarified, and reworded
- Breakdown task into manageable parts

504 Plans:
- Allow extra time to complete assignments or tests
- Work in a small group
- Allow answers to be given orally or dictated
- Calculators
- Manipulatives/concrete models
- Follow all 504 modifications

Gifted and Talented:
- Higher level questioning
- Enriched assignments
- Tiered assignments
- Choice board to extend learning

Students at Risk of Failure:
- Provide peer tutoring
- Use a strong student as a “buddy”
- Allow extra time to complete assignments or tests
- Work in a small group
- One on one instruction
- Provide immediate praise and feedback
- Create a nurturing environment
- Provide visuals
- Be flexible with assignments and time frames
- Provide needed academic resources
- Chunking information
- Scaffolded questioning
- Tiered activities
- Manipulatives/concrete models
- Modified assignments
- Brain breaks

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Economically Disadvantaged:

- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Graphic organizers
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge

Culturally Diverse:

- Create an emotionally positive classroom climate.
- Create effective communication
- Model and teach cultural respect
- Build relationships with students by interviewing students to understand their background

Unit 4: Weather and Climate	Duration: 45 days

New Jersey Student Learning Standards	
3-ESS2-1	Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.
3-ESS2-2	Obtain and combine information to describe climates in different regions of the world.
3-ESS3-1	Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.
3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
3-5-ETS1-3	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
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.

Science and Engineering Practices	Discipline Core Ideas/Unit Enduring Understandings	Crosscutting Concepts

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• **Practice 4: Analyzing and Interpreting Data:** Throughout the unit, students use visual representations of weather data to draw conclusions about the weather and climate in different locations. For example, students analyze bar graphs showing average monthly temperature and average monthly precipitation in a location to identify that location's warm and cold seasons and rainy and dry seasons. • **Practice 5: Using Mathematics and Computational Thinking:** Through work with standardized measurement to collect quantitative data and repeated interpretation of charts and graphs, students use mathematics almost daily in this unit. In one lesson, they organize a set of orangutan height data into a line plot and find the range of orangutans' heights. • **Practice 7: Engaging in Argument from Evidence:** Students apply their understanding of weather and climate content regularly throughout the unit to construct arguments supported by evidence. Students evaluate sets of evidence cards and select the strongest pieces of evidence to support their claims about which island has weather most like the weather where orangutans live. Students use their selected evidence to construct written arguments. • **Practice 1: Asking Questions:** Students help	**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) **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) **ETS1.A: Defining and Delimiting Engineering Problems:** • Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3-5-ETS1-1) **ETS1.B: Developing Possible Solutions:** • Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2) • At whatever stage, communicating with peers about proposed solutions is an important part of the	**Patterns** • Patterns of change can be used to make predictions. (3-ESS2-1), (3ESS2-2) **Cause and Effect** • Cause and effect relationships are routinely identified, tested, and used to explain change. (3-ESS3-1) • Cause and effect relationships are routinely identified and used to explain change. (3-LS4-2), (3LS4-3) ***Connections to Engineering, Technology, and Applications of Science*** **Influence of Engineering, Technology, and Science on Society and the Natural World** • Engineers improve existing technologies or develop new ones to increase their benefits (e.g., better artificial limbs), decrease known risks (e.g., seatbelts in cars), and meet societal demands (e.g., cell phones). (3-ESS3-1) • People's needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1) • Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2) ***Connections to Nature of Science*** **Science is a Human Endeavor** • Science affects everyday life. (3-ESS3-1)

the Wildlife Protection Organization figure out how to prepare for natural disasters that could affect their office. Students use maps with data about the location of natural hazards to determine likely natural hazards in the area of the office. They use this information to define the problems that could occur as a result of the natural hazards and go on to propose and defend solutions to those problems. ● **Practice 3: Planning and Carrying Out Investigations:** Early in the unit, students focus on data collection in investigations as they figure out the appropriate methods and tools for collecting weather data. Students work in groups to plan a way to measure the amount of simulated rainfall in two cups. As they try to compare data across groups, they conclude that in order for meteorologists to compare weather data, it must be collected systematically and consistently. From there and throughout the unit, students carry out investigations by using data—including daily temperatures and precipitation over a month, average temperatures over a year, and maps of natural hazard locations—to answer the Investigation Questions and Chapter Questions. ● **Practice 8: Obtaining, Evaluating, and Communicating Information:** Students receive explicit instruction and have multiple opportunities to use the	design process, and shared ideas can lead to improved designs. (3-5-ETS1-2) ● Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3) **ETS1.C: Optimizing the Design Solution:** ● Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3) **LS4.C: AdaptationL** ● For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)	

reading comprehension strategy of visualizing as they engage with the informational texts in the unit. Students gather evidence through firsthand and secondhand sources, as well as participate in various discourse routines that help them communicate about and make sense of science ideas, using key vocabulary. ● **Practice 2: Developing and Using Models:** Throughout the unit, students use line plots and bar graphs as models to describe and predict weather and temperature and to make sense of climate. Later in the unit, students model the effect of natural hazards on structures they design and build. ● **Practice 6: Constructing Explanations and Designing Solutions:** Students learn about a problem at the Wildlife Protection Organization's offices that was caused by natural hazards. They research solutions to the problem by using a set of materials to design and build structures that can withstand simulated natural hazards such as hurricane winds and rain. Then they check their designs for adherence to a set of criteria and test the efficacy of their solutions.		

New Jersey Social and Emotional Competencies and Sub-Competencies	
Self-Awareness	● Recognize one's feelings and thoughts. ● Recognize the impact of one's feelings and thoughts on one's own behavior. ● Recognize one's personal traits, strengths, and limitations.

	• Recognize the importance of self-confidence in handling daily tasks and challenges.
Self-Management	• Understand and practice strategies for managing one's own emotions, thoughts, and behaviors. • Recognize the skills needed to establish and achieve personal and educational goals. • Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals.
Social Awareness	• Recognize and identify the thoughts, feelings, and perspectives of others. • Demonstrate an awareness of the differences among individuals, groups, and others' cultural backgrounds. • Demonstrate an understanding of the need for mutual respect when viewpoints differ. • Demonstrate an awareness of the expectations for social interactions in a variety of settings.
Responsible Decision Making	• Develop, implement, and model effective problem-solving and critical thinking skills. • Identify the consequences associated with one's actions in order to make constructive choices. • Evaluate personal, ethical, safety, and civic impact of decisions.
Relationship Skills	• Establish and maintain healthy relationships. • Utilize positive communication and social skills to interact effectively with others. • Identify ways to resist inappropriate social pressure. • Demonstrate the ability to prevent and resolve interpersonal conflicts in constructive ways. • Identify who, when, where, or how to seek help for oneself or others when needed.

Interdisciplinary Connections	
ELA Standards	
RI.CR.3.1	Ask and answer questions and make relevant connections to demonstrate understanding of an informational text, referring explicitly to textual evidence as the basis for the answers.
RI.TS.3.4	Utilize and reference features of a text when writing or speaking about a text, using text features (e.g., graphics, images, captions, headings) and search tools (e.g., key words, sidebars, hyperlinks) to locate and integrate information relevant to a given topic efficiently. '
RI.MF.3.6	Use information gained from text features (e.g., illustrations, maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).

W.IW.3.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly. **A.** Introduce a topic clearly. **B.** Develop the topic with facts, definitions, and concrete details, text evidence, or other information and examples related to the topic. **C.** Include text features (e.g.: illustrations, diagrams, captions) when useful to support comprehension. **D.** Link ideas within sections of information using transition words and phrases (e.g., then, because, also, another, therefore). **E.** Provide a conclusion related to the information or explanation presented.
W.WR.3.5	Generate questions about a topic and independently locate related information from at least two reference sources (print and non-print) to obtain information on that topic.
W.SE.3.6	Use discussion, books, or media resources to gather ideas, outline them, and prioritize the information to include while planning to write about a topic.
W.RW.3.7	Engage in independent and task-based writing for both short and extended periods of time, producing written work routinely.
SL.PE.3.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly. **A.** Explicitly draw on previously read text or material and other information known about the topic to explore ideas under discussion. **B.** Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion). **C.** Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others. **D.** Explain their own ideas and understanding in light of the discussion.
SL.II.3.2	Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
SL.ES.3.3	Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.
L.RF.3.3	Know and apply grade-level phonics and word analysis skills in decoding and encoding words.
L.RF.3.4	Read with sufficient accuracy and fluency to support comprehension. **A.** Read grade-level text with purpose and understanding. **B.** Read grade-level text orally with accuracy, appropriate rate, and expression. **C.** Use context to confirm or self-correct word recognition and understanding, rereading as necessary.
L.KL.3.1	Use knowledge of language and its conventions when writing, speaking, reading, or listening.

	A. Acquire and use accurately grade-appropriate conversational, general academic, and domain-specific words and phrases.
L.VL.3.2	Determine or clarify the meaning of unknown and multiple-meaning academic and domain-specific words and phrases based on grade 3 reading and content, choosing flexibly from a range of strategies. **A.** Use sentence-level context as a clue to the meaning of a word or phrase. **B.** Determine the meaning of the new word formed when a known affix is added to a known word (e.g., agreeable/disagreeable, comfortable/uncomfortable, care/careless, heat/preheat). **C.** Use a known root word as a clue to the meaning of an unknown word with the same root (e.g., company, companion). **D.** Use glossaries or beginning dictionaries, both print and digital, to determine or clarify the precise meaning of key words and
Mathematics Standards	
MP1	Make sense of problems and persevere in solving them.
MP2	Reason abstractly and quantitatively.
MP3	Construct viable arguments and critique the reasoning of others.
MP4	Model with mathematics.
MP5	Use appropriate tools strategically.
MP6	Attend to precision.
MP7	Look for and make use of structure.
3.OA.8	Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
3.NBT.2	With accuracy and efficiency, add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
3.DL.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.DL.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.M3b	Recognize area as an attribute of plane figures and understand concepts of area measurement. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.

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Computer Science & Design Thinking	
8.1.5.DA.1	Collect, organize, and display data in order to highlight relationships or support a claim.
8.1.5.DA.3	Organize and present collected data visually to communicate insights gained from different views of the data.
8.1.5.DA.5	Propose cause and effect relationships, predict outcomes, or communicate ideas using data.
8.1.5.AP.4	Break down problems into smaller, manageable sub-problems to facilitate program development.
8.2.5.ED.5	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.
8.2.5.ED.4	Explain factors that influence the development and function of products and systems
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.

Career Readiness, Life Literacies & Key Skills	
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.
9.4.5.CI.31	Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity
9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process
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
9.4.5.IML.2	Create a visual representation to organize information about a problem or issue

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9.4.5.IML.6	Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions
9.4.5.IML.7	Evaluate the degree to which information meets a need including social emotional learning, academic, and social
9.4.5.TL.4	Compare and contrast artifacts produced individually to those developed collaboratively

Career Readiness, Life Literacies, and Key Skills Practices	
CLKS.1	Act as a responsible and contributing community member and employee.
CLKS.2	Attend to financial well-being.
CLKS.3	Consider the environmental, social and economic impacts of decisions.
CLKS.4	Demonstrate creativity and innovation.
CLKS.5	Utilize critical thinking to make sense of problems and persevere in solving them.
CLKS.6	Model integrity, ethical leadership and effective management.
CLKS.7	Plan education and career paths aligned to personal goals.
CLKS.8	Use technology to enhance productivity, increase collaboration and communicate effectively.
CLKS.9	Work productively in teams while using cultural/global competence.

Evidence of Student Learning	
Formative Tasks: ● Teacher observations ● Class discussions ● Whiteboard/Communicators ● On-the-Fly Assessments ● Daily classwork ● Checks for understanding ● Clipboard Assessment Tool ● Critical Juncture Assessment ● Crosscutting Concept Tracker	**Alternative Assessments:** ● Oral assessments ● Student Self-Assessments ● Pre-Unit Assessments ● 3-D Assessments
Summative Assessments: ● End of Unit Assessment	**Benchmark Assessments:** ● Benchmark 3D

Knowledge & Skills

Grade: 3	**Content Area: Science**

Enduring Understandings:

- Temperature data for one month can be described as the range of daily high temperatures over the whole month.
- Precipitation data for one month can be described as the total precipitation over the whole month.
- Although the temperature in a place can change each day, there is a pattern that can be described by the range of temperatures. Different places have different temperature ranges.
- Scientists evaluate evidence to find the strongest evidence. Stronger evidence makes an argument more convincing.
- Even though the weather can be different every day, there is a pattern to the weather. The seasons that happen in one year repeat at the same time every year.
- Different places have different climates.
- There is a pattern to where different types of weather happen.
- People can design solutions to prevent damage caused by natural hazards.

Essential Questions:

- Is there a pattern to the weather that we can use to make predictions?
- How can we predict what the weather in a place will be like many years from now?
- How can people prepare for natural hazards?

Content

Students will know…

- A meteorologist is a scientist who studies the weather.
- Precipitation is water that falls to Earth as rain, snow, sleet, or hail.
- Rainfall can be measured in a systematic way that enables comparison.
- Data is observations or measurements recorded in an investigation.
- To compare weather data, it must be measured and recorded in the same way.
- To measure is to use a tool to find out information such as how heavy, how big, how fast, or how hot or cold something is.
- Meteorologists use tools to measure weather data so they can compare it.
- Temperature is how hot or cold something is.
- Meteorologists describe weather in standard units. In the United States, they

Skills

Students will be able to …

- Reflect on what they do and do not understand in order to prepare to learn new things.
- Measure rainfall in millimeters.
- Use tools and technologies to make accurate measurements and observations.
- Use a thermometer to measure temperature.
- Organize data into tables to compare weather data.
- Support their answers to questions with evidence.
- Evaluate evidence to find the strongest evidence.
- Make predictions.
- Participate in structured discussions about evidence.
- Write an argument and support the claim with evidence.
- Organize data in a line plot.

describe temperature in degrees Fahrenheit. ● Scientists visualize using information from many sources. ● The methods scientists use are determined by the questions they are investigating. ● Scientists use a variety of methods, tools, and techniques when they conduct investigations. ● Scientists use tools and technologies to make accurate measurements and observations. ● Science findings are based on recognizing patterns. ● Science assumes consistent patterns in natural systems. ● Science affects everyday life. ● Meteorologists make weather measurements in the same way each time so they can make comparisons. ● Evidence is information that supports an answer to a question. ● Stronger evidence makes an answer more convincing. ● An argument is the use of evidence to say why one idea is best. ● A claim is a proposed answer to a question. ● A scientific argument answers a question with a claim about the natural world. ● A scientific argument includes evidence to support the claim.A graph is a way of organizing numbers that can help you see patterns. ● Line plots are one type of graph that displays large amounts of data in a way that is easier to analyze. ● The range of a set of numbers is the span between the lowest and highest numbers in the group. ● Range is a way to describe one kind of pattern.	● Visualize during reading to understand what the numbers on the line plot mean. ● Describe and analyze patterns about temperature. ● Use patterns to make predictions. ● Evaluate evidence to find the strongest evidence. Stronger evidence makes an argument more convincing. ● Write a scientific argument for an audience and make use of scientific language to give a more precise meaning to the writing. ● Interpret bar graphs of monthly total rainfall and monthly average high temperatures. ● Compare bar graphs that display average high temperatures in different locations. ● Analyze bar graphs and notice patterns in temperature throughout the year. ● Use visualization to understand the climate of a place. ● Compare climates in different parts of the world and discover that different places have different climates ● Complete a written reflection to convey the understanding that each place has a stable climate that can be seen in the repeating pattern of its seasons, and this allows us to predict a location's weather in future years. ● Evaluate evidence and classify it as strong or weak. ● Support a claim with evidence. ● Use the *Weather and Climate* Science Practice Tool to map natural hazards that have occurred and also look for patterns in order to make predictions. ● Plot temperatures on a map for the purpose of comparison. ● Use the maps in Dangerous Weather Ahead to predict possible natural hazards that could occur in their locale. ● Build model structures meant to withstand the effects of a hurricane using a constrained set of materials. ● Write an argument for the Wildlife Protection Organization that supports the need for a lightning rod or a backup generator in their Florida office building as preparation for non-hurricane natural hazards.

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● Temperature data for one month can be described as the range of daily high temperatures over the whole month. ● Precipitation data for one month can be described as the total precipitation over the whole month. ● Although the temperature in a place can change each day, there is a pattern that can be described by the range of temperatures. Different places have different temperature ranges. ● Patterns in data allow you to make predictions. ● A month of weather data is stronger evidence for supporting a prediction about future weather than one day of weather data. ● Bar graphs can show change over time. ● An average for one month of temperature data summarizes the temperatures into one number. This number is close to all the temperatures for the month. ● For a particular place, the hottest and coldest months of the year happen around the same time each year. ● Meteorologists describe climate as the typical weather in a place over time. ● Knowing a place's climate makes it possible to predict the weather far into the future. ● Climate is the typical weather in a place over a long period of time. ● Even though the weather is different every day, the monthly changes in weather repeat year after year. ● Graphs of average temperature or average precipitation summarize many years of data into one graph. ● Meteorologists describe climate by talking about warm, cold, wet, and dry seasons. ● Different places have different climates. ● One year of weather data is more useful for predicting future weather in a location than one month or one day of data.	● Describe how meteorologists use data and how they might use data patterns in their own daily lives.

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• One year of weather data can be used as evidence to support a claim about the future weather of a place. • There is a pattern to where weather-related natural hazards happen. • There is a pattern to temperature in different places. Temperatures are warmer near the equator and cooler near the poles. • Blizzards, hurricanes, and lightning are types of natural hazards. • A natural hazard is severe weather or another natural event that can cause damage. • There is a pattern to where different types of weather happen. • Meteorologists can use maps with weather events to identify the natural hazards that are most likely in different locations. • Whether or not the weather is severe, the ability to predict weather enables people to prepare for it.	

Core Instructional & Supplemental Materials	

Suggested Activities/Resources:
• Books in This Unit
  ○ *Sky Notebook*
  ○ *Seeing the World Through Numbers*
  ○ *What's Going On with the Weather?*
  ○ *Dangerous Weather Ahead*
  ○ *World Weather Handbook*
• *Properties of Materials* Kit
	Supplemental Materials
	• *Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds* PDF
	• Digital Resources included in each unit
	  ○ *Weather and Climate* Science Practice Tool
	• Hands-On Flextension:
	  ○ Designing Wind Measurement Tools
	• Multi-language glossary
	• *The Boy Who Harnessed the Wind: Picture Book Edition* by William Kamkwamba
	• *After the Rain: A Graphic Novel* by Nnedi Okorafor
	• *A Place Where Hurricanes Happen* by Renee Watson
	• *Come On, Rain!* by Karen Hesse
	• *Storm Maker's Tipi* by Paul Goble

	● *Fast Asleep in a Little Village in Israel* by Jennifer Tzivia MacLeod ● *To Change a Planet* by Christina Soontornvat ● *The Fog* by Kyo Maclear

Suggested Accommodations

English Language Learners:
- Multi-sensory instruction
- Flexible grouping
- Small group instruction
- Provide peer tutoring
- Use a strong student as a “buddy” (does not necessarily have to speak the primary language)
- Chunking information
- Scaffolded questioning
- Academic language support
- Vocabulary support
- Co-Constructed Word Banks
- Anchor charts
- Gradual release model
- Visual models
- Native language support when possible (Multi-language glossary)
- Sheltered English Instruction Strategies
- Sentence starters

Special Education/Students with Disabilities:
- Allow extra time to complete assignments or tests
- Work in a small group
- Allow answers to be given orally or dictated
- Follow all IEP modifications
- Calculators
- Manipulatives/concrete models
- Directions repeated, clarified, and reworded
- Breakdown task into manageable parts

504 Plans:
- Allow extra time to complete assignments or tests
- Work in a small group
- Allow answers to be given orally or dictated
- Calculators
- Manipulatives/concrete models
- Follow all 504 modifications

Gifted and Talented:
- Higher level questioning
- Enriched assignments

- Tiered assignments
- Choice board to extend learning

Students at Risk of Failure:
- Provide peer tutoring
- Use a strong student as a “buddy”
- Allow extra time to complete assignments or tests
- Work in a small group
- One on one instruction
- Provide immediate praise and feedback
- Create a nurturing environment
- Provide visuals
- Be flexible with assignments and time frames
- Provide needed academic resources
- Chunking information
- Scaffolded questioning
- Tiered activities
- Manipulatives/concrete models
- Modified assignments
- Brain breaks

Economically Disadvantaged:
- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Graphic organizers
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge

Culturally Diverse:
- Create an emotionally positive classroom climate.
- Create effective communication
- Model and teach cultural respect
- Build relationships with students by interviewing students to understand their background