



Washington Township School District



The mission of the Washington Township Public Schools is to provide a safe educational environment for all students to attain the skills and knowledge specified in the New Jersey Student Learning Standards at all grade levels so as to ensure their full participation in our global society as responsible, self-directed, and civic-minded citizens.

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| Course Title: | Science |
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| Grade Level(s): | 3rd |
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| Duration: | <i>Full Year:</i> | X | <i>Semester:</i> | | <i>Marking Period:</i> | MP2 & MP4 |
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| Course Description: | <p>The Washington Township School District third grade curriculum uses an integrated approach to general science that focuses on units in physical, life, and earth science. By using this approach, teachers are able to meet the needs of all students while aligning with the New Jersey Model Curriculum, the Next Generation Science Standards, and the New Jersey Student Learning Standards. Hands-on activities are stressed and include student discovery experiments, problem solving, model building, cooperative learning, technology integration, classroom discussion, teacher demonstrations, and writing opportunities for research and self-expression. Interdisciplinary subject areas are incorporated whenever possible. Students are introduced to the use of scientific tools and methods used for investigations. The course is designed to be implemented using the 5E Model of Instruction: Engage, Explore, Explain, Extend/Elaborate, and Evaluate. The major topics of study for fifth grade are taken specifically from the Next Generation Science Standards:</p> <ul style="list-style-type: none"> • Forces and Interactions • Interdependent Relationships In Organisms: Environmental Impacts on Organisms • Inheritance and Variation of Traits: Life Cycles and Traits • Weather and Climate • Engineering Design |
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| Grading Procedures: | <p>Summative: Unit Tests 40% Formative: Quizzes 30% Supportive: Classwork 20% Supplemental: Homework 10%</p> |
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| Primary Resources: | Exploring Science National Geographic Textbook , Exploring Science National Geographic Digital Copy, Science Notebook (SNB), and Student Laptops. |
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Washington Township Principles for Effective Teaching and Learning

- Implementing a standards-based curriculum
- Facilitating a learner-centered environment
- Using academic target language and providing comprehensible instruction
- Adapting and using age-appropriate authentic materials
- Providing performance-based assessment experiences
- Infusing 21st century skills for College and Career Readiness in a global society

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| Designed by: | Jenn Babilino and Amy Catalano |
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| Under the Direction of: | Linda Thomas, Elementary Supervisor and Gretchen Gerber, Director |
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Written: August 2017

Revised: _____

BOE Approval: _____

Unit Title: Life Science

Unit Description:

Students will explore interdependent relationships within ecosystems. They will construct an argument that some animals form groups that help them survive. The students will analyze and interpret data from fossils to provide evidence of the organisms and environments in which they lived long ago. Students will construct an argument with evidence that in a particular habitat organisms can survive well, some survive less well, and others cannot survive at all. Students will 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.

In this unit, student will also explore inheritance and variations of traits through the study of life cycles. Students will develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction and death. They will analyze and interpret data to provide evidence that plants and animals have traits inherited from their parents and that variation of these traits exist in a group of similar organisms. Students will use evidence to support the explanation that traits can be influenced by the environment. Also, students will use evidence to construct an explanation of how the variations in characteristics among individuals in the same species may provide advantages in surviving, finding mates, and reproducing.

Unit Duration: Marking Period 2 (38 lessons, some 2 days long)

Desired Results

Standard(s):

Students who demonstrate understanding can:

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

3-LS4-1., Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. [Clarification Statement: Examples of data could include type, size, and distributions of fossil organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.]

[Assessment Boundary: Assessment does not include identification of specific fossils or present plants and animals. Assessment is limited to major fossil types and relative ages.]

3-LS4-3., Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. [Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.]

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

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

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

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

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

Indicators:

Interdependent Relations in Ecosystems:

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

- When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce others move to new locations, yet others move into the transformed environment and some die. (secondary to 3-LS4-4)

LS2.D: Social Interactions and Group Behavior

- Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size. (3-LS2-1)

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 out the nature of their environments. (3-LS4-1)

LS4.C: Adaptation

- For any particular environment, some kinds of organisms survive well, some survive less, 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)

Inheritance and Variation of Traits: Life Cycles and Traits:

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)

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)

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)

Understandings:

Students will....

Ecosystems

- Describe how populations live and interact in a variety of ecosystems.

Forests Change

- Describe how natural events can change an environment.
- Explain how changes in an environment's physical characteristics, temperature, or availability of resources affect the organisms living there.

Searching for Water

- Describe how the availability of water changes habitats.
- Explain how availability of water in an environment affects the organisms living there.

Changes in Temperature

- Describe how shifts in temperature change habitats.
- Explain how changes in temperature in an environment affect organisms living there.

Living Things Make Changes

- Describe how living things make changes to the environments that affect the organisms living there.

People Change Land

- Describe how humans make changes to the land that affect the organisms living there.

People Change Ecosystems

- Describe how changes people make effect living things and change ecosystems.

Compare Solutions and Make a Claim (Think Like a Scientist)

- Make a claim about the merit of solutions to the drop in salmon population in the Columbia River.

Living in Groups

- Explain how being part of a group helps animals obtain food, defend themselves, and cope with changes.

Getting Food

- Explain how being part of a group helps animals obtain food.

Protection and Defense

- Explain how being part of a group helps animals protect and defend themselves.

Coping with Change

- Explain how being part of a group helps some animals cope with changes.

Construct an Argument (Think Like a Scientist)

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

Essential Questions:

- How do organisms survive in their ecosystem?
- How can I use fossils to understand their past environment?
- How does a life cycle affect the growth and change of plants and animals from birth to death?
- How do plant and animal traits effect the survival of organisms?

Fossils

- Explain that some kind of plants and animals that once lived on Earth are no longer found anywhere.
- Explain that fossils provide evidence about the types of organisms that lived long ago and the nature of their environments.

Fish in the Desert

- Explain that fossils provide evidence about the types of organisms that lived long ago and the nature of their environments.

Plants in the Antarctic

- Explain that fossils provide evidence about the types of organisms that lived long ago and the nature of their environments.

Fossils (Investigate)

- Explain how fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments.

Analyze and Interpret Data (Think Like a Scientist)

- Analyze and interpret data from pictures of fossils around the world.
- Provide evidence of the organisms and the environments in which they lived long ago.

Cold or Warm?

- Explain how for cold and warm environments, some kinds of organisms survive well, some survive less well, and some cannot survive at all.

Wet or Dry?

- Explain how, for wet and dry environments, some kinds of organisms survive well, some survive less well, and some cannot survive at all.

Light or Dark?

- Explain how for light and dark environments, some kinds of organisms survive well, some survive less well, and some cannot survive at all.

Construct an Argument (Think Like a Scientist)

- 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.

Life Cycles

- Explain that reproduction is essential to the continued existence of every kind of organism.
- Explain that living things have unique and diverse life cycles.

Life Cycle of a Jalapeño Pepper Plant

- Explain life cycle diagrams.
- Describe the unique life cycle of a jalapeño pepper plant.

Life Cycle of a Ladybug

- Describe the unique life cycle of a ladybug.

Life Cycle of a Leopard Frog

- Describe the life cycle of a leopard frog.

Life Cycles (Investigate)

- Describe the sequence of stages in the life cycle of a spotted salamander.

Develop a Model (Think Like a Scientist)

- Develop two models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

Inherited Traits: Looks

- Explain how many characteristics of organisms are inherited from their parents.
- Explain that different organisms vary in how they look and function because they have different inherited information.

Inherited Traits: Functions

- Explain how many characteristics of organisms are inherited their parents.
- Explain that different organisms vary in how they function because they have different inherited information.

Acquired Traits

- Explain how some characteristics of organisms result from individuals' interactions with the environment.
- Explain that different organisms vary in how they look and function because environmental factors, like diet, affect the traits that an organism develops.

More Acquired Traits

- Explain how some characteristics of organisms result from individuals' interactions with the environment.
- Explain that different organisms vary in how they look and function because environmental factors, like the weather, affect the traits that an organism develops.

Learning

- Explain how some characteristics of organisms result from individuals' interactions with the environment.
- Explain that different organisms vary in how they look and function because environmental factors, like learned behaviors, affect the traits that an organism develops.

Environment and Traits (Investigate)

- Explain how traits can be influenced by the environment.

Variation and Survival

- Explain how sometimes the difference in characteristics between individuals of the same species provide advantages in surviving.

Variation and Mates

- Explain how sometimes the difference in characteristics between individuals of the same species provide advantages in finding mates and reproducing.

Construct an Explanation (Think Like a Scientist)

- Construct an explanation for why the pink form of katydid is less common in adults than in hatchlings.

Marine Ecologist (Science Career)

- Connect the concepts of consistent patterns and natural systems with the career of a marine ecologist.

| Assessment Evidence | |
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| <p>Performance Tasks:</p> <p>Investigate Lessons: Students will practice performance tasks in cooperative groups engaging in the scientific steps of an investigation.</p> <ul style="list-style-type: none"> ➤ Lesson 27: Investigate Life Cycles (pgs. 92-93) <p>Objective: Describe the sequence of stages in the life cycle of a spotted salamander.</p> <ul style="list-style-type: none"> ➤ Lesson 34: Investigate Environment and Traits (pgs. 106-107) <p>Objective: Explain how traits can be influenced by the environment.</p> <p>Think Like a Scientist: Plan and Investigate Lessons- Students will engage in performance tasks in cooperative groups to plan and conduct an investigation, provide evidence and use that evidence to explain results. These tasks will be recorded in their science notebooks and evaluated by a Teacher Rubric and Student Rubric.</p> <ul style="list-style-type: none"> ➤ Lesson 8: Think Like a Scientist Compare Solutions and Make a Claim (pgs. 52- 55) <p>Objective: Make a claim about the merit of solutions to the drop in salmon population in the Columbia River.</p> <ul style="list-style-type: none"> ➤ Lesson 13: Think Like a Scientist Construct an Argument (pgs. 64-65b) <p>Objective: Construct and argument that some animals form groups that help members survive.</p> <ul style="list-style-type: none"> ➤ Lesson 18: Analyze and Interpret Data Think Like a Scientist (pgs. 74-75b) <p>Objective(s): Analyze and interpret data from pictures of fossils around the world.</p> <p>Provide evidence of the organisms and the environments in which they lived long ago.</p> <ul style="list-style-type: none"> ➤ Lesson 22: Think Like a Scientist Construct and Argument (pgs. 82-83b) <p>Objective: Construct and argument with evidence that in a particular habitat some</p> | <p>Other Evidence:</p> <p>Students will demonstrate their understandings through:</p> <ul style="list-style-type: none"> • Science Notebook Entries • Unit Test • Quizzes • Homework • Benchmark |

Performance Tasks:

Investigate Lessons: Students will practice performance tasks in cooperative groups engaging in the scientific steps of an investigation.

- **Lesson 27: Investigate Life Cycles (pgs. 92-93)**

Objective: Describe the sequence of stages in the life cycle of a spotted salamander.

- **Lesson 34: Investigate Environment and Traits (pgs. 106-107)**

Objective: Explain how traits can be influenced by the environment.

Think Like a Scientist: Plan and Investigate Lessons- Students will engage in performance tasks in cooperative groups to plan and conduct an investigation, provide evidence and use that evidence to explain results. These tasks will be recorded in their science notebooks and evaluated by a Teacher Rubric and Student Rubric.

- **Lesson 8: Think Like a Scientist Compare Solutions and Make a Claim (pgs. 52- 55)**

Objective: Make a claim about the merit of solutions to the drop in salmon population in the Columbia River.

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Objective(s): Analyze and interpret data from pictures of fossils around the world.

Provide evidence of the organisms and the environments in which they lived long ago.

- **Lesson 22: Think Like a Scientist Construct and Argument (pgs. 82-83b)**

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Other Evidence:

Students will demonstrate their understandings through:

- Science Notebook Entries
- Unit Test
- Quizzes
- Homework
- Benchmark

organisms can survive well, some survive less well, and some cannot survive at all.

➤ **Lesson 28: *Think Like a Scientist* Develop a Model (pgs. 94-95b)**

Objective: Develop two models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

➤ **Lesson 37: *Think Like a Scientist* Construct an Explanation (pgs. 112-113)**

Objective: Construct an explanation for why the pink form of katydids is less common in adults than in hatchlings.

Benchmarks: Concepts from this unit will be assessed on the Life Science Benchmark.

Learning Plan

| Lesson & Duration | Activities | Materials |
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| <p>Lesson 1 Ecosystems pp 38-39 NJSLS LS4.D Populations live in a variety of habitats, and change in those habitats affects the organisms living there. Objective: Describe how populations live and interact in a variety of ecosystems. 1 Day</p> | <p>Engage: Discuss what students know about where things live. Explore: Observe the picture, ask probing questions about, and read the text on pgs. 38-39 to describe how populations survive in a variety of environments where their needs are met. Explain: Describe populations and ecosystems. Elaborate: Extend thinking about ecosystem interactions. SNB: Research ecosystems. Evaluate: <i>Wrap It Up!</i> SNB Define ecosystem, interpret photo and describe living things in the forest ecosystem, and name nonliving things that cannot be seen that might be living in a forest ecosystem.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 2 Forests Change pp 40-41 NJSLS LS2.C When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, and yet others move into transformed environment, and some die. LS4.D Populations live in a variety of habitats, and change in those habitats affects the organisms living there. Objective(s): Describe how natural event scan change an environment. Explain how changes in an environment's physical characteristics,</p> | <p>Engage: Discuss what students know about natural events that change the physical characteristic of a place. Explore: Observe the pictures, ask probing questions about, and read the text on pgs. 40-41 to describe how changes in the forest affect the organisms living there. Explain: Describe how forests change and explain the effects of change in an environment. Elaborate: SNB In pairs, research and share the benefits of wildfires. Compare Effects of Natural Disasters by researching videos and photos of ways tornadoes change natural environments. How have some of</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |

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| <p>temperature, or availability or resources affect the organisms living there.</p> <p>1 Day</p> | <p>these changes unexpectedly benefited organisms.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Describe how a fire changes a forest, explain how a fire affects the deer in a forest, and after a forest fire, wildflowers begin to grow, infer how and why the wildflowers might affect the number of rabbits in the area.</p> | |
| <p>Lesson 3 Searching for Water pp 42-43 NJSLS LS2.C When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, and yet others move into transformed environment, and some die. LS4.D Populations live in a variety of habitats, and change in those habitats affects the organisms living there. Objective(s): Describe how the availability of water changes habitats. Explain how availability of water in an environment affects the organisms living there.</p> <p>1 Day</p> | <p>Engage: Share knowledge of how the availability of water affects an environment. Explore: Observe the pictures, ask probing questions about, and read the text on pgs. 42-43 to describe how the availability of water affects organisms living in an environment, or habitat, where their needs can be met. Explain: Describe how water availability changes the environment and explain how water availability affects organisms. Elaborate: SNB As a class, do an internet search for educational videos about the effects of drought. Extend Your Thinking: Answer and reflect on how the effects of too much and not enough water are similar and different. Evaluate: <i>Wrap It Up!</i> SNB identify the two main seasons in the grasslands in East Africa.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 4 Changes in Temperature pp44-45 NJSLS LS2.C When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, and yet others move into transformed environment, and some die. LS4.D Populations live in a variety of habitats, and change in those habitats affects the organisms living there. Objective(s): Describe how shift in temperature change habitats. Explain how changes in temperature in an environment affect organisms living there.</p> <p>1 Day</p> | <p>Engage: Share individual experiences with changes in temperature. Explore: Observe the pictures, ask probing questions about, and read the text on pgs. 44-45 to describe how environmental shifts in temperature affects habitats. Explain: Describe how shifts in temperature change environments and explain how these shifts in temperature affect organisms. Elaborate: SNB Research deciduous trees in areas that experience extreme weather changes during the four seasons. Extend Your Thinking: Reflect on why some animals hibernate while others migrate. Furthermore, explain how animals that neither hibernate nor migrate make it through the winter. Evaluate: <i>Wrap It Up!</i> SNB Explain two ways that plants respond to changes in the environment, such as fewer hours of daylight and the cold weather of winter, Explain how hibernation helps a dormouse survive, and generalize how the cold weather of winter affects the amount of food available to most animals.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |

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| <p>Lesson 5 Living Things Make Changes pp 46-47</p> <p>NJSLS LS2.C When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, and yet others move into transformed environment, and some die.</p> <p>LS4.D Populations live in a variety of habitats, and change in those habitats affects the organisms living there.</p> <p>Objective: Describe how living things make changes to the environments that affect the organisms living there.</p> <p>1 Day</p> | <p>Engage: Share individual experiences about how animals change their environments.</p> <p>Explore: Observe the pictures, ask probing questions about, and read the text on pgs. 46-47 to describe how living things make changes to the environment.</p> <p>Explain: Describe how living things make changes and how these changes affect other living things.</p> <p>Elaborate: SNB In small groups, research beavers' effect on ecosystems.</p> <p>Extend Your Thinking: Reflect on how redwood trees could change an environment and ecosystem.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Describe how a beaver dam changes a stream, explain how beaver dams affect the other animals in the ecosystem, and explain how might cutting down trees affect the animals in the nearby forest.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 6 People Change Land pp48-49</p> <p>NJSLS LS2.C When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, and yet others move into transformed environment, and some die.</p> <p>LS4.D Populations live in a variety of habitats, and change in those habitats affects the organisms living there.</p> <p>Objective: Describe how humans make changes to the land that affect the organisms living there.</p> <p>1 Day</p> | <p>Engage: Discuss what students know about how humans change the environment.</p> <p>Explore: Observe the pictures, ask probing questions about, and read the text on pgs. 48-49 to describe how people change the land.</p> <p>Explain: Describe how people change land.</p> <p>Elaborate: SNB In small groups, research climate change. Share three ways in which people change the land and contribute to climate change. If time permits, each group creates a graphic representation and shares their findings with the class.</p> <p>Extend Your Thinking: Research Earth Day and how it is observed in one's community. Describe a way that one could change the land that would have a positive effect.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB List some human activities that change the environment, Explain how cutting down trees in a forest affect the animals that live there, and describe a good way to protect the animals that live in forests.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 7 People Change Ecosystems pp 50-51</p> <p>NJSLS LS2.C When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, and yet</p> | <p>Engage: Discuss previous lessons, recall how the effects of humans change land.</p> <p>Explore: Observe the pictures, ask probing questions about, and read the text on pgs. 50-51 to describe how changes people make affect living things and change ecosystems.</p> <p>Explain: Describe how people change ecosystems.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |

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| <p>others move into transformed environment, and some die.</p> <p>LS4.D Populations live in a variety of habitats, and change in those habitats affects the organisms living there.</p> <p>Objective: Describe how changes make people affect living things and change ecosystems.</p> <p>1 Day</p> | <p>Elaborate: SNB In pairs, research the importance of trees. Create a Venn diagram to show how trees benefit wildlife, people and both. Combine the research of all pairs into one Venn diagram and discuss why it is in the best interest of all living organisms to protect our forests.</p> <p>Extend Your Thinking: Recommend on what could be done to help keep hummingbirds in an area that is being built upon.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Describe how rooftop gardens change the rooftop environment, explain how the temperature of a rooftop garden would differ from that of a bare roof, and infer how and why might building rooftop gardens affect the number of birds in a city.</p> | |
| <p>Lesson 8 <i>Think Like A Scientists</i> Compare Solutions and Make a Claim pp 52-55 NJSLS LS4.4 Make a claim about the merit of a solution to a problem when the environment changes and the types of plants and animals that live there may change.</p> <p>Objective: Make a claim about the merit of solutions to the drop in salmon population in the Columbia River.</p> <p>2 Days</p> | <p>Engage: Read “Set the Scene” paragraph on pg. 52. Engage students in a conversation about the Columbia River. Read “Define the problem” and captions on pgs. 52-53.</p> <p>Explore: Read “Compare solutions” and the captions on pgs. 54-55. Draw a table in their SNB’s. Read “Make a claim” on pg. 54. Students make a claim about which two solutions would be the best to include in a new dam design. Write a paragraph that makes and explains their claim.</p> <p>Explain: Read “Support your claim”. Groups students in fours and fives, and have them take turns defending and sharing their claims.</p> <p>Elaborate: SNB In small groups, Research the debate over dams in the Columbia River Basin. Prepare informal arguments as to whether the dams are more helpful or hurtful and whether efforts to restore declining fish populations are effective enough.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Explain why there has been a drop in the Columbia River salmon population, Summarize how fish ladders address the decreasing salmon population, and discuss the similarities between the way spillways and fish hatcheries address the salmon population.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ Sample Data Table see pg. 53 (Teacher’s Manual) ➤ Evaluation Rubrics see pg. 55 (Teacher’s Manual) <p>Suggested SNB for Quiz Grade</p> |
| <p>Lesson 9 Living in Groups pp 56-57 NJSLS LS2.D Being a part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size.</p> <p>Objective: Explain how being part of a group helps animals obtain food,</p> | <p>Engage: Share what students know about animals that live in groups.</p> <p>Explore: Observe the picture, ask probing questions about, and read the text on pgs. 56-57 to describe how being part of a group helps animals obtain food, defend themselves, and cope with changes.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |

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| <p>defend themselves, and cope with changes.</p> <p>1 Day</p> | <p>Explain: Explain the benefits of living things in groups.</p> <p>Elaborate: SNB In pairs, research social behaviors of animals such as the fox, chimpanzee, cat, and elephant. Share findings about how these animals' actions support group living.</p> <p>Extend Your Thinking: Explain some disadvantages of living in groups.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Name some of the names used for groups of animals, Describe how the size of a wolfpack is different from the size of a large flock of birds, and explain how living in groups helps an animal to survive.</p> | |
| <p>Lesson 10 Getting Food pp 58-59 NJSLS LS2.D Being a part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size. Objective: Explain how being a part of a group helps animals obtain food.</p> <p>1 Day</p> | <p>Engage: Recall what animals who want to eat other animals are referred to.</p> <p>Explore: Observe the picture, ask probing questions about, and read the text on pgs. 58-59 to describe how being part of a group helps animals obtain food.</p> <p>Explain: Describe how animals obtain food.</p> <p>Elaborate: SNB In pairs, research animals that hunt in packs; lions, hyenas, orcas, and army ants. What is their prey, why do they need a group to hunt their prey, and how does the group work together to hunt their prey.</p> <p>Extend Your Thinking: Reflect on whether an animal can be both predator and prey and give examples.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Define a pack, name the kind of prey a lone wolf can catch and how is it different from the prey that a pack of wolves can catch, and explain how hunting in groups help animals survive.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 11 Protection and Defense pp 60-61 NJSLS LS2.D Being a part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size. Objective: Explain how being part of a group helps protect and defend themselves.</p> <p>1 Day</p> | <p>Engage: Share what students know about how animals protect and defend themselves.</p> <p>Explore: Observe the pictures, ask probing questions about, and read the text on pgs. 60-61 to explain how being part of a group helps animals protect and defend themselves.</p> <p>Explain: Explain how animals protect and defend themselves.</p> <p>Elaborate: SNB In small groups, research the National Geographic Kids Website for information on how red-eyed tree frogs, pufferfish, skunks, and cichlid fish defend themselves. Chart and record information. As a class, discuss how these organisms' defense mechanisms are similar and different.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |

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| | <p>Extend Your Thinking: Reflect and explain as to whether safety in numbers or another type of defense is best for animals.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Define a school of fish, explain how swimming in a school of fish helps protect fish, infer how swimming in a large school might not help fish survive.</p> | |
| <p>Lesson 12 Coping with Change pp 62-63 NJSLS LS2.D Being a part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size. Objective: Explain how being part of a group helps some animals cope with changes.</p> <p>1 Day</p> | <p>Engage: Discuss how living things cope with change. Explore: Observe the picture, ask probing questions about, and read the text on pgs. 62-63 to describe how being part of a group helps animals cope with changes. Explain: Explain how animals cope with change. Elaborate: SNB In pairs, research orca migration along the North Pacific coast. Draw a map of the whales' migration route. As a class, discuss a pod, why orcas migrate, and other ways they cope with change of weather. Extend Your Thinking: Reflect on some advantages to hibernating in a group. Evaluate: <i>Wrap It Up!</i> SNB Define a swarm of bees, what conditions cause bees to swarm, and what change in their habitat make it necessary for birds to migrate in the fall.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 13 Think Like a Scientist Construct an Argument pp 64-65b NJSLS LS2.1 Construct an argument that some animals form groups that help members survive. Objective: Construct an argument that some animals form groups that help members survive.</p> <p>1 Day</p> | <p>Engage: Discuss how forming groups helps animals survive, and give examples of a living thing benefiting from forming a group. Explore: Observe and ask probing questions about the picture on pgs. 64-65. Explain: Read the introductory paragraph and discuss the first step in constructing an argument. Working in groups of four and five, students will construct an argument that answers the question in step 1. Gather information, read step 2, and create a table. Construct an argument and discuss step 3. Elaborate: SNB Explain why sandhill cranes form large groups to migrate, but raise their young in smaller groups. Explain how the size of each group satisfy a particular need. Evaluate: SNB Name three behaviors that sandhill cranes do in groups, explain how migration is a way that living things cope with change, and make a judgement as to what picture is the best representation of safety in numbers.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ Sample Data Table see pg. 65 (Teacher's Manual) ➤ Evaluation Rubric see pg. 65b (Teacher's Manual) <p>Suggested SNB for Quiz Grade</p> |

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| <p>Lesson 14 Fossils pp 66-67 NJSLS LS4.A Some kind of plants and animals that once lives on Earth are no longer found anywhere. LS4.1 Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. Objective(s): Explain that some kinds of plant and animals that once lived on Earth are no longer found anywhere. Explain that fossils provide evidence about the types or organisms that lived long ago and the nature of their environments.</p> <p>1 Day</p> | <p>Engage: Share what students know about fossils. Explore: Observe the picture, ask probing questions about, and read the text on pgs. 66-67 to explain that some kinds of plants and animals that once lived on Earth are no longer found anywhere and that fossils provide evidence about them and the nature of their environments. Explain: Explain extinct organisms and fossils. Elaborate: SNB In pairs, research pictures of fossils from National Geographic to study. If time permits, illustrate what students think the animals looked like, based on the information they can gather from the fossil images. Evaluate: <i>Wrap It Up!</i> SNB Define a fossil, explain how fossils form, and explain why dinosaur fossils only show their bones, not their heart and lungs.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 15 Fish in the Desert pp 68-69 NJSLS LS4.A Some kind of plants and animals that once lives on Earth are no longer found anywhere. LS4.1 Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. Objective: Explain that fossils provide evidence about the types of organisms that lived long ago and the nature of their environments.</p> <p>1 Day</p> | <p>Engage: Students share what they know about fish in the desert. Explore: Observe the picture, ask probing questions about, and read the text on pgs. 68-69 to explain that some kinds of plants and animals that once lived on Earth are no longer found anywhere and that fossils provide evidence about them and the nature of their environments. Explain: Explain fish in the desert. Elaborate: SNB In small groups, research mammoths. Extend Your Thinking: research redwood fossils found near the North Pole. Describe how the climate was different in that area millions of year ago and how scientists know. Evaluate: <i>Wrap It Up!</i> SNB Explain how the environment in Utah today was different from the environment when the fossils pictured were formed. Explain what the fossils of clams found at the top of mountains suggest about the rocks.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 16 Plants in the Antarctic pp 70-71 NJSLS LS4.A Some kind of plants and animals that once lives on Earth are no longer found anywhere. LS4.1 Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. Objective: Explain that fossils provide evidence about the types of organisms that lived long ago and the nature of their environments.</p> | <p>Engage: Share what students know about ancient environments. Explore: Observe the picture, ask probing questions about, and read the text on pgs. 70-71 to explain that fossils provide evidence about the types of organisms that lived long ago and the nature of their environments. Explain: Describe plants in the Antarctic. Elaborate: SNB In pairs, find pictures of plant fossils on the internet. Choose four to print and label each one with what type it's thought to be.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |

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| <p>1 Day</p> | <p>Extend Your Thinking: Describe what kind of plants existed in Antarctic millions of years ago. Evaluate: <i>Wrap It Up!</i> SNB Identify where ferns grow today, contrast the present environment of Antarctica with the environments where ferns grow today, and infer why fossil ferns can be found in a place that is frozen all year long.</p> | |
| <p>Lesson 17 Investigate Fossils pp 72-75 NJSLS LS4.A Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. Objective: Explain how fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments.</p> <p>1 Day</p> | <p>Engage: Share what students learned about fossils from previous lessons. Explore: Read pgs. 72-73 and guide students through the investigation. SNB create a table and construct models. Follow steps 1-4. Explain: Share and compare drawings, observations, and conclusions with groups. Elaborate: Discuss paleontologists. Evaluate: <i>Wrap It Up!</i> SNB Describe the environment of animal fossils found in the red layer of rock and explain what can be inferred about how the environment of the area represented by these layers changed over the years.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ <i>For each group of 4:</i> 4 lumps of clay-green, yellow, red, tan (About ½ cup of each), 4 small objects (Marbles, coins, buttons, washers, paperclips, centimeter cubes), plastic knife, craft stick, toothpick ➤ Sample Data Table see pg. 72 (Teacher’s Manual) |
| <p>Lesson 18 Think Like a Scientist Analyze and Interpret Data pp 74-75b NJSLS LS4.1 Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. Objective(s): Analyze and interpret data from pictures of fossils around the world. Provide evidence of the organisms and the environments in which they lived long ago.</p> <p>1 Day</p> | <p>Engage: Review fossils. Explore: Observe and ask probing questions about the pictures of the dragonfly on pgs. 74-75. Explain: In small groups, analyze and interpret fossil data. Elaborate: SNB In small groups, look for other pictures of fossils and research that fossil. If time permits, add fossils to the map on pages 74-75. Evaluate: <i>Wrap It Up!</i> SNB Explain what the different colored regions on a map represent. Explain and defend which of the fossils shown, came from a land area that was once covered in water.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ Sample Data Table see pg. 75 (Teacher’s Manual) |
| <p>Lesson 19 Cold or Warm? pp 76-77 NJSLS LS4.C For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. Objective: Explain how for cold and warm environments, some kinds of organisms survive well, some survive less well, and some cannot survive at all.</p> <p>1 Day</p> | <p>Engage: Share what students know about living things in cold and warm environments. Explore: Observe the pictures, ask probing questions about, and read the text on pgs. 76-77 to explain how for some cold and warm environments, some kinds of organisms survive well, some survive less well, and some cannot survive at all. Explain: Explain cold climate organisms and warm climate organisms. Elaborate: SNB In small groups, brainstorm a list of four things that all living things need to survive. (Food, water, air, ad shelter) Research what all living things need and then</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |

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| | <p>compare what they found to their own list.</p> <p>Extend Your Thinking: Discuss how animals adapt to cold and warm weather.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Describe where polar bears live and what the temperature is like there. Explain how polar bears can survive in their environment. Conclude whether a lizard could survive where polar bears live and explain why or why not.</p> | |
| <p>Lesson 20 Wet or Dry? pp 78-79 NJSLS LS4.C For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. Objective: Explain how, for wet and dry environments, some kinds of organisms survive well, some survive less well, and some cannot survive at all.</p> <p>1 Day</p> | <p>Engage: Recall what students know about where things live.</p> <p>Explore: Observe the picture, ask probing questions about, and read the text on pgs. 78-79 to explain how for wet and dry environments, some kinds of organisms survive well, some survive less well, and some cannot survive at all.</p> <p>Explain: Explain organisms in wet and dry environments.</p> <p>Elaborate: In groups, research how either bats, owls, jackrabbits, or snakes have adapted to living in harsh conditions.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Describe where most frogs lay their eggs, explain how camels survive in deserts, and infer whether a leopard frog could survive where a camel lives and why or why not.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 21 Light or Dark? pp 80-81 NJSLS LS4.C For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. Objective: Explain how for light and dark environments, some kinds of organisms survive well, some survive less well, and some cannot survive at all.</p> <p>1 Day</p> | <p>Engage: Students share what they know about how animals adapt to different environments.</p> <p>Explore: Observe the picture, ask probing questions about, and read the text on pgs. 80-81 to explain how in light and dark environments, some kinds of organisms survive well, some survive less well, and some cannot survive at all.</p> <p>Explain: Explain organisms in light and dark environments.</p> <p>Elaborate: In groups, research how either bats or owl find food in the dark. Extend Your Thinking: Investigate why scorpion glow.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Describe some animals that need bright sunlight to find food, explain why plants need sunlight, and explain whether or not plants could grow in the deep ocean.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 22 Think Like a Scientist Construct and Argument pp 82-83b NJSLS 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.</p> | <p>Engage: Discuss what students learned about some living things surviving better than others in particular environments.</p> <p>Explore: Make observations about the pictures on pgs. 82-83.</p> <p>Explain: Read the introductory paragraph on pg. 82 and the question</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ Sample Data Table see pg. 83 (Teacher's Manual) |

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| <p>Objective: 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.</p> <p>1 Day</p> | <p>from step 1. Guide students through all of the steps.</p> <p>Elaborate: SNB Construct an argument for other animals' habitats. Use <i>Keep Out! Keep Away!</i> To share habitat of pesky pests and how humans can affect their environment.</p> <p>Evaluate: SNB Infer now the star-nosed mole uses its big, clawed feet, explain what type of environment a muskox lives in, and explain how a mallard duck's webbed feet and wide bill help it find food.</p> | <ul style="list-style-type: none"> ➤ Evaluation Rubric see pg. 83b (Teacher's Manual) ➤ <i>Keep Out! Keep Away!</i> (Ladders, small book) <p>Suggested SNB for Quiz Grade</p> |
| <p>Lesson 23 Life Cycles pp 84-85 NJSLS LS1.B Reproduction is essential to the continued existence of every kind of organism. LS1.1 Plants and animals have unique and diverse life cycles. Objective(s): Explain that reproduction is essential to the continued existence of every kind of organism. Explain that living things have unique and diverse life cycles.</p> <p>1 Day</p> | <p>Engage: Students share what they know about words that begin with re-</p> <p>Explore: Observe the picture, ask probing questions about, and read the text on pgs. 84-85 to explain how life cycles and reproduction.</p> <p>Explain: Explain reproduction and life cycles.</p> <p>Elaborate: SNB Students extend their thinking by summarizing the stages of an orangutan's life cycle.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Define life cycle, explain how a mother orangutan and its baby are alike and different, and describe the stages in the life cycle of a cat.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 24 Life Cycle of a Jalapeño Pepper Plant pp 86-87 NJSLS LS1.B Reproduction is essential to the continued existence of every kind of organism. LS1.1 Plants and animals have unique and diverse life cycles. Objective(s): Explain life cycle diagrams. Describe the unique life cycle of a jalapeño pepper plant.</p> <p>1 Day</p> | <p>Engage: Students share what they know about life cycles.</p> <p>Explore: Observe the pictures, ask probing questions about, and read the text on pgs. 86-87 to explain how a jalapeño pepper plant has its own characteristic life cycle and that reproduction is essential to its continued existence.</p> <p>Explain: Explain life cycle diagrams and describe the life cycle of a jalapeño pepper plant.</p> <p>Elaborate: SNB In pairs, research any other type of plant and its life cycle. Draw and label the life cycle. If time permits, share findings and discuss the differences between the two life cycles.</p> <p>Extend Your Thinking: In small groups, research how seeds of the dandelions, coconuts, and raspberries are dispersed.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Explain what part of a pepper plant produces fruit, put the following in its correct order: young plant, seedling, seed, adult plant. Start with seed. Explain which stage of its life cycle a pepper plant reproduces.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 25 Life Cycle of a Ladybug pp 88-89</p> | <p>Engage: Share personal observations about ladybugs.</p> <p>Explore: Observe the picture, ask probing questions about, and read the</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop |

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| <p>NJSLS LS1.B Reproduction is essential to the continued existence of every kind of organism. LS1.1 Plants and animals have unique and diverse life cycles. Objective: Describe the unique life cycle of a ladybug.</p> <p>1 Day</p> | <p>text on pgs. 88-89 to describe the life cycle of a ladybug. Explain: Describe the life cycle of a ladybug. Elaborate: SNB In pairs, research the length of each stage of the ladybug's life cycle. Make life cycle drawings and write captions that include the length of each stage. Extend Your Thinking: Research how ladybugs can be helpful to humans. Evaluate: <i>Wrap It Up!</i> SNB List the stages of a ladybug's life cycle. List differences between the pupa and the adult stages in the ladybug life cycle.</p> | <ul style="list-style-type: none"> ➤ Science Notebook |
| <p>Lesson 26 Life Cycle of a Leopard Frog pp 90-91 NJSLS LS1.B Reproduction is essential to the continued existence of every kind of organism. LS1.1 Plants and animals have unique and diverse life cycles. Objective: Describe the unique life cycle of a leopard frog.</p> <p>1 Day</p> | <p>Engage: Share what students know about frogs and what they look like. Explore: Observe the picture, ask probing questions about, and read the text on pgs. 90-91 to describe the life cycle of the leopard frog. Explain: Describe the life cycle of a leopard frog. Elaborate: SNB In pairs, research amphibians and metamorphosis. Extend Your Thinking: Research the changes a leopard frog goes through as it grows. Evaluate: <i>Wrap It Up!</i> SNB Recall the stages in the life cycle of a frog. Describe some differences between the tadpole stage and the adult stage of the frog.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 27 Investigate Life Cycles pp 92-93 NJSLS LS1.B Reproduction is essential to the continued existence of every kind of organism. LS1.1 Plants and animals have unique and diverse life cycles. Objective: Describe the sequence of stages in the life cycle of the spotted salamander.</p> <p>1 Day</p> | <p>Engage: Students share when they remember about life cycles. Explore: Read and guide students through the investigation on pgs. 92-93. Explain: Students share their observations and conclusions with other students in their groups. Elaborate: Students write captions for each stage shown in their diagram of the salamander's life cycle. Evaluate: <i>Wrap It Up!</i> SNB Explain where the larva of a spotted salamander lives, what are the similarities between the life cycle of the spotted salamander and that of a frog. Describe the differences between the life cycle of the spotted salamander and that of a frog.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ <i>For each group of 4:</i> 4 stages in the Life Cycle of a Salamander charts (Teacher's Manual pg. 206), 2 scissors, 4 pieces of construction paper, 2 glue sticks, 4 markers ➤ Sample Data Table see pg. 92 (Teacher's Manual) |
| <p>Lesson 28 Think Like a Scientist Develop a Model pp 94-95b NJSLS LS1.1 Develop models to describe that organism have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.</p> | <p>Engage: Read the introductory paragraph on pg. 94. Discuss and research explanatory models. SNB Research the life cycles of the animals that the students chose. Explore: Construct explanatory models and models.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ Materials for making posters if desired. |

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| <p>Objective(s): Develop two models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.</p> <p>2 Days</p> | <p>Explain: Analyze, revise, share and explain models. Elaborate: SNB In small groups choose two life cycle models and compare and contrast both models. Groups use a Venn diagram to describe how the life cycles are alike and different. Evaluate: <i>Wrap It Up!</i> SNB Explain the purpose of creating two life cycle models, describe the steps that one would follow to make a life cycle model of another organism, and explain what life cycle organisms' life cycles have in common.</p> | <ul style="list-style-type: none"> ➤ Books about gray whales, toad, monarch butterfly, tomato, dandelion <p>Suggested SNB for Quiz Grade</p> |
| <p>Lesson 29 Inherited Traits: Looks pp 96-97 NJSLS LS3.A Many characteristics of organisms are inherited from their parents. LS3.B Different organisms vary in how they look and function because they have different inherited information. LS3.1 Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exist in a group of similar organisms. Objective(s): Explain how many characteristics of organisms are inherited from their parents. Explain that different organisms vary in how they look and function because they have different inherited information.</p> <p>1 Day</p> | <p>Engage: Share what students know about inherited traits. Explore: Observe the pictures, ask probing questions about, and read the text on pgs. 96-97 to explain how many characteristics of organisms are inherited from their parents and different organisms vary in how they look and function because they have different inherited information. Explain: Explain inherited traits. Analyze and interpret data. Elaborate: SNB In pairs, research traits that humans inherit. List three traits and their variations. If time permits, draw and print examples of each trait and its variations in a chart. Evaluate: <i>Wrap It Up!</i> SNB Define an inherited trait, list some inherited traits of potatoes, and list two other traits of tomatoes and corn besides color.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebooks ➤ Sample Data Table see pg. 97(Teacher's Manual) |
| <p>Lesson 30 Inherited Traits: Functions pp 98-99 NJSLS LS3.A Many characteristics of organisms are inherited from their parents. LS3.B Different organisms vary in how they look and function because they have different inherited information. LS3.1 Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exist in a group of similar organisms. Objective(s): Explain how many characteristics of organisms are inherited from their parents. Explain that different organisms vary in how they function because they have different inherited information.</p> | <p>Engage: Discuss the differences between a lion and an eagle. Explore: Observe the pictures, ask probing questions about, and read the text on pgs. 98-99 to explain how many characteristics of organisms are inherited from their parents, and different organisms vary in how they function because they have different inherited information. Explain: Explain inherited traits. Analyze and interpret data. Elaborate: Students consider and explain what functions each bird's legs serve on pgs. 98-99. Evaluate: <i>Wrap It Up!</i> SNB Explain what makes beak shape an example of an inherited trait and explain how the shape of the whooping crane's beak affect the way the beak functions.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebooks |

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| <p>1 Day</p> <p>Lesson 31 Acquired Traits pp 100-101 NJSLS LS3.A Inheritance of Traits; LS3.1 Many Characteristics of organisms are inherited from their parents. LS3.2 Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. LS3.B; Variation of Traits; LS3.1 Different organisms vary in how they look and function because they have different inherited information. LS3.2 The environment also affects the traits that an organism develops. Objective(s): Explain how some characteristics of organisms result from individuals' interactions with the environment. Explain that different organisms vary in how they look and function because environmental factors, like diet, affect that traits that an organism develops.</p> <p>1 Day</p> | <p>Engage: Share what students learned about traits in previous lessons. Explore: Observe the pictures, ask probing questions about, and read the text on pgs. 100-101 to explain how some characteristics of organisms result from individuals' interactions with the environment, and different organisms vary in how they look and function because environment factors like diet, affect the traits that an organism develops. Explain: Describe acquired traits. Elaborate: SNB In pairs, research examples of traits that humans acquire. Make a list of three traits students acquired. If time permits, share with the class. Extend Your Thinking: Explain other ways diet can affect an animal's traits. Evaluate: <i>Wrap It Up!</i> SNB Explain the difference between an inherited trait and an acquired trait, give evidence as to why the pinkness in flamingos is an acquired trait, describe how diet affects an animal's body weight.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebooks |
| <p>Lesson 32 More Acquired Traits pp 102-103 NJSLS LS3.A Inheritance of Traits; LS3.1 Many Characteristics of organisms are inherited from their parents. LS3.2 Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. LS3.B; Variation of Traits; LS3.1 Different organisms vary in how they look and function because they have different inherited information. LS3.2 The environment also affects the traits that an organism develops. Objective(s): Explain how some characteristics of organisms result from individuals' interaction with the environment. Explain that different organisms vary in how they look and function because environmental factors, like the weather, affect the traits that an organism develops.</p> <p>1 Day</p> | <p>Engage: Share what students learned about acquired traits in previous lessons. Explore: Observe the picture, ask probing questions about, and read the text on pgs. 102-103 to describe how some characteristics of organisms result from individuals' interactions with the environment, and different organisms vary in how they look and function because environment factors like weather, affect the traits that an organism develops. Explain: Describe more acquired traits. Elaborate: SNB In pairs, research three different plant galls. Label each picture with information about what caused the gall. Extend Your Thinking: Explain whether the texture of one's hair is an inherited or acquired trait and why. Evaluate: <i>Wrap It Up!</i> SNB Explain what part of the shape of the tree is inherited and part is acquired, describe what factors in the environment affect's the tree's shape, and infer how the tree might look if it were growing in a place with little wind.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebooks |
| <p>Lesson 33 Learning pp 104-105</p> | <p>Engage: Share what students learned about acquired traits from previous lessons.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science |

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| <p>NJSLS LS3.A Inheritance if Traits; LS3.2 Other characteristics result from individuals' interactions with the environment, which can range from diet to learning.</p> <p>LS3.B Variation of Traits; LS3.2 The environment also affects the traits that an organism develops.</p> <p>Objective(s): Explain how some characteristics of organisms result from individuals' interaction with the environment.</p> <p>Explain that different organisms vary in how they look and function because environmental factors, like learned behavior, affect the traits that an organism develops.</p> <p>1 Day</p> | <p>Explore: Observe the picture, ask probing questions about, and read the text on pgs. 104-105 to describe how some characteristics of organisms result from individuals' interactions with the environment, and different organisms vary in how they look and function because the environment affects the traits that an organism develops.</p> <p>Explain: Describe learning.</p> <p>Elaborate: SNB Extend thinking of the difference between inherited and acquired traits.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Define behavior, describe something a chimpanzee can learn, and explain how the environment can affect the way an animal behaves.</p> | <ul style="list-style-type: none"> ➤ Student Laptop ➤ Science Notebooks |
| <p>Lesson 34 Investigate Environment and Traits pp106-107</p> <p>NJSLS LS3.2 Use evidence to support the explanation that traits can be influenced by the environment.</p> <p>Objective: Explain how traits can be influenced by the environment.</p> <p>1 – 5 Days 25 minutes set up, 15 minutes for 3 days, and 30 minutes on day 5</p> | <p>Engage: Share what students learned in previous lessons about how environment affects traits.</p> <p>Explore: Read pgs. 106-107 and guide students through the investigation.</p> <p>Explain: Share observations and conclusions.</p> <p>Elaborate: Explain how one's investigation would be different if a cacti that required very little water was used.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Explain whether their results supported their predictions, explain whether your results provide evidence that traits can be affected by the environment. Explain whether seedling height is an inherited trait, acquired trait, or both.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebooks ➤ *** <i>Be sure to plant the wheatgrass seeds several days before today's experiment!</i> ➤ <u>For each group of 4:</u> 2 wheatgrass seedlings, masking tape, marker, ruler, spray bottle ➤ Sample Data Table see pg. 106 (Teacher's Manual) |
| <p>Lesson 35 Variation and Survival pp 108-109</p> <p>NJSLS LS4.B Natural Selection LS4.2 Sometimes the difference in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.</p> <p>Objective: Explain how sometimes the difference in characteristics between individuals of the same species provide advantages in surviving.</p> <p>1 Day</p> | <p>Engage: Share what students know about the benefits of variation.</p> <p>Explore: Observe the pictures, ask probing questions about, and read the text on pgs. 108-109 to explain how sometimes the difference in characteristics between individuals of the same species provides advantages in surviving.</p> <p>Explain: Describe variation and survival.</p> <p>Elaborate: As a class partake in an activity that answers the questions, how variation is important for resisting disease and what would happen if none of the ferrets were immune to the disease.</p> <p>Extend Your Thinking: Explain why the approach taken by the scientists to introduce panthers with different traits to the population worked.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Describe how traits of the sea dragon help it survive. Suppose a few of the thorn</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebooks |

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| | <p>bugs in the photo were orange. What could be inferred about the variation in thorn bug color?</p> | |
| <p>Lesson 36 Variation and Mates pp 110-111 NJSLS LS4.B Natural Selection LS4.2 Sometimes the difference in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. Objective: Explain how sometimes the difference in characteristics between individuals of the same species provide advantages in finding mates and reproducing.</p> <p>1 Day</p> | <p>Engage: Share what students learned about variation from previous lessons. Explore: Observe the picture, ask probing questions about, and read the text on pgs. 110-111 to explain how the differences in characteristic between individuals of the same species may provide advantages in finding mates and reproducing. Explain: Describe variation and mates. Elaborate: SNB In small groups, find pictures of both male and female bluebirds, peacocks, robins, and hummingbirds. Summarize and draw conclusions about their findings. Extend Your Thinking: Explain that if manes help lions attract mates, what traits would female lions be attracted to. Evaluate: <i>Wrap It Up!</i> SNB What advantage does the trait of a bright red pouch give a male great frigatebird? Explain the disadvantage of having a bright pouch.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebooks |
| <p>Lesson 37 Think Like a Scientist Construct and Explanation pp 112-113 NJSLS 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. Objective: Construct and explanation for why the pink form of katydid is less common in adults than in hatchlings.</p> <p>1 Day</p> | <p>Engage: Remind students that they have learned how variation can provide advantages. Explore: Observe and describe the pictures on pgs. 112-113. Explain: Make observations and construct an explanation. Elaborate: SNB Students write three facts that support their explanations for why the pink form of katydid is less common in adults than in hatchlings. Extend Your Thinking: Explain how color variation of katydids provide advantages for survival of the species. If time permits, think of another environment in which all three colors of katydids would have a fair chance of surviving. Evaluate: <i>Wrap It Up!</i> SNB Construct and explain why pink katydids in adults are less common than in hatchlings. Explain how the trait of color help katydids survive.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebooks |
| <p>Lesson 38 Science Career Marine Biologist pp 114-115</p> <p>Scientific knowledge assumes on order of consistent patterns and natural systems. Connect this concept with the career of a marine ecologist.</p> | <p>Engage: Students share personal experiences with the ocean. Explore: Observe the pictures, ask probing questions about, and read the text on pgs. 114-115 to learn about the work of a marine biologist. Explain: Describe the work of a marine biologist. Connect science topics to the career of a marine biologist.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebooks |

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| | <p>Elaborate: SNB In groups, research National Geographic's Explorers-in-Residence, Enric Sala.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Describe what a marine ecologist does, explain why Enric visits unspoiled areas of the ocean, and explain what Enric meant when he said "I want to show the world what the ocean was like hundreds of years ago and why we have to preserve it."</p> | |
| <p>Resources: Text Exploring Science or Digital version of Exploring Science, Student Laptop, Science Notebook</p> | | |

| Unit Learning Goal and Scale <i>(Level 2.0 reflects a minimal level of proficiency)</i> | |
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| <p>Standard(s): 3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. [Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.]</p> | |
| 4.0 | <p>Students will be able to:</p> <ul style="list-style-type: none"> In addition to constructing an argument with evidence at 3.0, students can create a unique environment and a new animal who is able to survive well in that habitat. Students must prove that the organism is able to have all of its needs met within the selected habitat. |
| 3.0 | <p>Students will be able to:</p> <ul style="list-style-type: none"> Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. [Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.] |
| 2.0 | <p>Students will be able to:</p> <ul style="list-style-type: none"> Define a habitat and the populations within. |
| <p>1.0 With help, partial success at level 2.0 content and level 3.0 content:</p> | |
| <p>0.0 Even with help, no success</p> | |

| Unit Learning Goal and Scale <i>(Level 2.0 reflects a minimal level of proficiency)</i> | |
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| <p>Standard(s): Standard(s): 3-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. [Clarification Statement: Examples of data could include type, size, and distributions of fossil organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.] [Assessment Boundary: Assessment does not include identification of specific fossils or present plants and animals. Assessment is limited to major fossil types and relative ages.]</p> | |
| 4.0 | <p>Students will be able to:</p> <ul style="list-style-type: none"> In addition to analyzing and interpreting data at 3.0, students can offer a hypothesis as to the environmental changes that contributed to the death of the fossilized organisms. |
| 3.0 | <p>Students will be able to:</p> <ul style="list-style-type: none"> Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. [Clarification Statement: Examples of data could include type, size, and distributions of fossil organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.] [Assessment Boundary: Assessment does not include identification of specific fossils or present plants and animals. Assessment is limited to major fossil types and relative ages.] |
| 2.0 | <p>Students will be able to:</p> |

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| | <ul style="list-style-type: none"> Define fossils and organize the data on a data table and can identify that the fossil is that of a plant or animal that lived long ago. |
| 1.0 | With help, partial success at level 2.0 content and level 3.0 content: |
| 0.0 | Even with help, no success |

| Unit Learning Goal and Scale <i>(Level 2.0 reflects a minimal level of proficiency)</i> | |
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| Standard(s): 3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. [Clarification Statement: Changes organisms go through during their life form a pattern.] [Assessment Boundary: Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.] | |
| 4.0 | Students will be able to: <ul style="list-style-type: none"> In addition to developing models of life cycles at a level 3.0, students will be able identify organisms that undergo incomplete metamorphosis and explain how they differ from those that complete all stages in a life cycle. |
| 3.0 | Students will be able to: <ul style="list-style-type: none"> Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. [Clarification Statement: Changes organisms go through during their life form a pattern.] [Assessment Boundary: Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.] |
| 2.0 | Students will be able to: <ul style="list-style-type: none"> Identify three out of the four stages of a life cycle. |
| 1.0 | With help, partial success at level 2.0 content and level 3.0 content: |
| 0.0 | Even with help, no success |

| Unit Learning Goal and Scale <i>(Level 2.0 reflects a minimal level of proficiency)</i> | |
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| Standard(s): 3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. [Clarification Statement: Examples of cause and effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.] | |
| 4.0 | Students will be able to: <ul style="list-style-type: none"> In addition to using evidence to construct an explanation at 3.0, students can tell how variation of the species provided advantages for its survival. Can name an environment in which species with different adaptations would have a fair chance of surviving. |
| 3.0 | Students will be able to: <ul style="list-style-type: none"> Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. [Clarification Statement: Examples of cause and effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.] |
| 2.0 | Students will be able to: <ul style="list-style-type: none"> Observe adaptations in species and provide evidence as to the usefulness of these adaptations. |
| 1.0 | With help, partial success at level 2.0 content and level 3.0 content: |
| 0.0 | Even with help, no success |

Unit Modifications for Special Population Students

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| Advanced Learners | <ul style="list-style-type: none">• Vocabulary- biodiversity, deciduous, petrification, conservation, paleontologist, dispersal• Challenge students to research concepts on their own from the Elaborate Section of each lesson• Ask probing questions at the beginning of lessons and tap into prior knowledge and allow students to explain their thinking |
| Struggling Learners | <ul style="list-style-type: none">• Provide concrete examples• Vocabulary-add unknown words to student notebook to refer to during the unit• Revisit pages with key concepts and have students point out and retell what they have learned (provide further information where gaps exist)• Ask questions where students find evidence in the book to provide an answer |
| English Language Learners | <ul style="list-style-type: none">• Vocabulary- affect vs effect, suffixes -ed/-ing, prepositions, comparative and superlatives, prefixes re-, un-, non-, noun/verb/adjective forms of words, suffixes -ology and -ist• Ask yes or no questions to help students express their ideas• Use of graphics and pictures to support language learning |
| Special Needs Learners | <ul style="list-style-type: none">• Provide concrete example when introducing new vocabulary and concepts.• Vocabulary- add unknown words to student notebook to refer to during the unit.• Provide drawings/graphic organizers for students to add to the Science Notebook to name and/or complete and label. |

Interdisciplinary Connections

Indicators:

ELA/Literacy - ,

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

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

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

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

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

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

Mathematics - ,

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

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

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

Integration of 21st Century Skills

Indicators:

8.1.5.A.1 Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.

8.1.5.A.2 Format a document using a word processing application to enhance text and include graphics, symbols and/ or pictures.

8.1.5.A.3 Use a graphic organizer to organize information about problem or issue.

8.1.5.A.4 Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.

8.1.5.C.1 Engage in online discussions with learners of other cultures to investigate a worldwide issue from multiple perspectives and sources, evaluate findings and present possible solutions, using digital tools and online resources for all steps.

8.1.5.D.3 Demonstrate an understanding of the need to practice cyber safety, cyber security, and cyber ethics when using technologies and social media.

8.1.5.D.4 Understand digital citizenship and demonstrate an understanding of the personal consequences of inappropriate use of technology and social media.

8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.

8.1.5.F.1 Apply digital tools to collect, organize, and analyze data that support a scientific finding.

8.2.5.B.1 Examine ethical considerations in the development and production of a product through its life cycle.

8.2.5.C.4 Collaborate and brainstorm with peers to solve a problem evaluating all solutions to provide the best results with supporting sketches or models.

8.2.5.C.5 Explain the functions of a system and subsystems.

8.2.5.D.1 Identify and collect information about a problem that can be solved by technology, generate ideas to solve the problem, and identify constraints and trade-offs to be considered.

8.2.5.D.2 Evaluate and test alternative solutions to a problem using the constraints and trade-offs identified in the design process to evaluate potential solutions.

9.2.4.A.1 Identify reasons why people work, and how work can help a person achieve personal and professional goals.

9.2.4.A.3 Investigate traditional and nontraditional careers and relate information to personal likes and dislikes.

9.2.4.A.4 Explain why knowledge and skills acquired in elementary grades lay the foundation for future academic and career success.

Unit Title: Earth Science

Unit Description:

In this unit the students exploring weather and climate. They will represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. They will obtain and combine information to describe climates in different regions of the world. Lastly, students will make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.

Unit Duration: About 2 ½ to 3 weeks (15 lessons, some 2 days)

Desired Results

Standard(s):

Students who demonstrate understanding can:

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

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

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

Indicators:

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) (Note: This Disciplinary Core Idea is also addressed by 4-ESS3-2.)

Understandings:

Students will understand that...

Weather

- Define and describe weather.
- Explain that weather changes over time.

Weather Measurements

- Identify and describe instruments that are used to measure weather.
- Describe the weather data that these instruments measure.

Weather (Investigate)

- Measure and record two types of changes in weather- wind speed and air temperature.
- Analyze weather data and interpret patterns to construct reasonable explanations from the data.

Patterns and Predictions

- Use a map key to interpret the symbols and colors used on a weather map.
- Make weather predictions using weather maps.

The Pattern of the Seasons

- Identify the sequence of seasons.

Essential Questions:

- 1) How do weather and climate vary throughout the world?
- 2) What are some solutions to help weather related hazards?

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| <ul style="list-style-type: none"> Describe patterns of change in the seasons over time. <p>Seasonal Changes</p> <ul style="list-style-type: none"> Analyze data to identify sequences of seasons over time. Analyze data to predict patterns of change in seasons over time. <p>Represent Data (Think Like a Scientist)</p> <ul style="list-style-type: none"> Represent data in graphical displays to describe typical weather conditions during a particular season. Compare and contrast data to find patterns of change for different seasons. <p>Climate</p> <ul style="list-style-type: none"> Define climate. Differentiate between weather and climate. Explore the different climate zones of the United States. <p>Obtain and Combine Information</p> <ul style="list-style-type: none"> Obtain and combine information to describe climates in different regions of the world. Analyze the information to draw conclusions about climates. <p>Weather Hazards</p> <ul style="list-style-type: none"> Identify and describe a variety of natural hazards such as thunderstorms, hurricanes, and floods. Describe some of the impacts of natural hazards. <p>Reducing the Impact of Flooding</p> <ul style="list-style-type: none"> Describe how humans can reduce the impact of flooding. <p>Reducing the Impact of Wind</p> <ul style="list-style-type: none"> Describe how humans can reduce the impact of wind. <p>Reducing the Impact of Lightning</p> <ul style="list-style-type: none"> Describe how humans can reduce the impact of lightning. <p>Make a Claim (Think Like an Engineer)</p> <ul style="list-style-type: none"> Conceptualize a house design that reduces the impacts of a weather-related event. Identify the merits of the design solution. <p>Severe-Storms Researcher (Science Career)</p> <ul style="list-style-type: none"> Connect the concept of weather with the career of a severe-storms researcher. | |
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Assessment Evidence

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| <p>Performance Tasks:</p> <p>Investigate Lessons: Students will practice performance tasks in cooperative groups engaging in the scientific steps of an investigation.</p> <p>➤ Lesson 3: Investigate Life Cycles (pgs. 122-123)</p> <p>Objectives: Measure and record two types of changes in weather- wind speed and air temperature. Analyze weather data and interpret patterns to construct reasonable explanations from the data.</p> | <p>Other Evidence:</p> <p>Students will demonstrate their understandings through:</p> <ul style="list-style-type: none"> Science Notebook Entries Unit Test Quizzes Homework Benchmark |
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Think Like a Scientist: Plan and Investigate Lessons- Students will engage in performance tasks in cooperative groups to plan and conduct an investigation, provide evidence and use that evidence to explain results. These tasks will be recorded in their science notebooks and evaluated by a Teacher Rubric and Student Rubric.

➤ **Lesson 7: Think Like a Scientist
Represent Data (pgs130-131b)**

Objectives: Represent data in graphical displays to describe typical weather conditions during a particular season. Compare/Contrast data to find patterns of change for different seasons.

➤ **Lesson 9: Think Like a Scientist
Obtain and Combine Information (pgs. 134-135)**

Objectives: Obtain and combine information to describe climates in different regions of the world. Analyze the information to draw conclusions about climates.

Think Like an Engineer: Plan and research a solution to a problem in cooperative groups. After defending solution, students refine and change their solution based on feedback received from other groups. These tasks will be recorded in their science notebooks and evaluated by a Teacher Rubric and Student Rubric.

➤ **Lesson 14: Think Like an Engineer
Make a Claim (pgs. 144-145b)**

Objectives: Conceptualize a house design that reduces the impacts of a weather-related event. Identify the merits of the design solution.

Benchmarks: Concepts from this unit will be assessed on the final benchmark.

Learning Plan

Learning Activities:

| Lesson & Duration | Activities | Materials |
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| <p>Lesson 1: Weather pgs. 118-119</p> <p>NJSLS ESS2.D Scientists record patterns of weather across different across time zones and areas so they can make predictions about what kind of weather might happen next.</p> <p>Objective: Define and describe weather. Explain that weather changes over time.</p> <p>1 Day</p> | <p>Engage: Students discuss memorable weather experiences and if weather affects their day-to-day lives and activities.</p> <p>Explore: Explore weather reading/sharing pages 118-119</p> <p>Explain: Define <i>weather, conditions</i>. Describe weather and explain how it changes.</p> <p>Elaborate: Find out more about weather and research weather adages.</p> <p>Evaluate: Wrap It Up! Science notebooks; define, explain changing weather, and describe weather in photos.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 2: Weather Measurements pgs. 120-121</p> <p>NJSLS ESS2.D Scientists record patterns of the weather across different time zones and areas so they can make predictions about what kind of weather might happen next.</p> <p>Objective: identify and describe instruments that are used to measure weather. Describe the weather data that these instruments measure.</p> <p>1 Day</p> | <p>Engage: Discuss how weather changes from day to day.</p> <p>Explore: Explore weather instruments (thermometer, wind vane, barometer, rain gauge.) Talk about how instruments (Thermometer, wind vane, barometer, rain gauge.) Talk about how instruments are used to take weather measurements.</p> <p>Explain: Identify weather instruments by reading pages 120-121. Define <i>precipitation</i>. Describe how instruments are used to measure and may be used to predict weather.</p> <p>Elaborate: Find out more about weather instruments by using specific instruments to record data from two locations over a one week period. Students summarize how measurements differ from shady location and sunny location. Data collection in Science Notebook.</p> <p>Evaluate:</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 3: Investigate Weather pgs. 122-123</p> <p>NJSLS ESS2.D Scientists record patterns of the weather across different time zones and areas so they can make predictions about what kind of weather might happen next.</p> <p>Objective(s): Measure and record two types of changes in weather- wind speed and air temperature. Analyze weather data and interpret patterns to construct reasonable explanations from the data.</p> <p>1 Day</p> | <p>Engage: Students describe air.</p> <p>Explore: Guide students through the investigation; documentation and analyzation of weather.</p> <p>Explain: Share weather patterns in groups.</p> <p>Elaborate: Design and construct a wind vane.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Summarize how the data for wind speed and temperature changes throughout the week. Explain how weather tools help measure weather conditions. Compare and Contrast collected data.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ <i>For each group of 4:</i> a heavy paper plate, golf-ball sized lump of clay, unsharpened pencils, 2 sturdy drinking straws, masking tape, 4 small, identical paper cups (about 3 oz. Size), marker, straight pin, stopwatch or timer, Celsius thermometer |

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| | | <ul style="list-style-type: none"> ➤ Sample Data Table see pg. 122 (Teacher's manual) |
| <p>Lesson 4: Patterns and Predictions pgs. 124-125</p> <p>NJSLS ESS2.D Scientists record patterns of the weather across time zones and areas so they can make predictions about what kind of weather might happen next.</p> <p>Objective(s): Use a map to interpret the symbols and colors used on a weather map. Make weather predictions using weather maps.</p> <p>1 Day</p> | <p>Engage: Discuss how weather changes and how it might be predicted.</p> <p>Explore: Explore weather maps.</p> <p>Explain: Define weather and discuss the map key on the weather map on pg. 125. Compare two maps and explain how maps can be used to observe how weather changes. Predict weather using weather maps, weather symbols, and a map key.</p> <p>Elaborate: SNB Using the map and key on page 125, make future weather predictions.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Describe how fronts moved, Interpret maps, and make weather predictions.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 5: The pattern of the Seasons pgs. 126-127</p> <p>NJSLS ESS2.D Scientists record patterns of the weather across time zones and areas so they can make predictions about weather that might happen next.</p> <p>Objective(s): Identify the sequence of seasons. Describe patterns of change in the seasons over time.</p> <p>1 Day</p> | <p>Engage: Discuss favorite season and tally results.</p> <p>Explore: Explore seasons, Compare and contrast pictures on pgs. 126-127. Read to identify the seasons and patterns of change over time.</p> <p>Explain: Discuss the sequence of the seasons. Identify the seasons and predict patterns of change.</p> <p>Elaborate: SNB Students will illustrate a given scene showing the patterns of seasonal changes. <u>Extend Your Thinking:</u> Research how the average number of daylight hours changes from season to season. Present findings in a graph.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Name the seasons in order, tell how weather differs in spring and summer, and estimate the average spring temperature.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 6: Seasonal Changes pgs.128-129</p> <p>NJSLS ESS2.D Scientists record patterns of the weather across different time zones and areas so they can make predictions about weather that might happen next.</p> <p>Objective(s): Analyze data to identify sequences of seasons over time. Analyze data to predict patterns of change in seasons over time.</p> <p>1 Day</p> | <p>Engage: Discuss the type of weather than happens in each season.</p> <p>Explore: Look at the pictures and explore weather on pgs. 128-129.</p> <p>Explain: Compare/Contrast and explore data tables and graphs. Analyze seasonal data and predict patterns of change in seasons.</p> <p>Elaborate: SNB Conduct research to find out the average high and low temperatures and the average amount of precipitation for each season in our area.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Interpret graphs and make future weather predictions.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |

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| <p>Lesson 7: Think Like a Scientist Represent Data pgs. 130-131b NJSLS ESS2.1 Represent data in table and graphical displays to describe typical weather conditions expected during a particular season. Objective(s): Represent data in graphical displays to describe typical weather conditions during a particular season. Compare and contrast data to find patterns of change for different seasons.</p> <p>2 Days</p> | <p>Engage: Contrast summer and winter weather in our area. SNB Students will work in groups to answer the question of what weather is like for one season in our area. Explore: Conduct research and organize data. Explain: Analyze and interpret data. Groups with the same season present and explain the data that was collected. Elaborate: Compare data with that of another season. Make future weather predictions. Evaluate: SNB Find the temperature range, explain weather patterns between temperature and precipitation, and compare data to those of other seasons.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ Information for students to use (Almanacs of information from the internet) containing average low and high temperatures, average precipitation, and average wind speed for the four seasons in our area. ➤ Graph paper ➤ Sample Data Tables see pg. 131 (Teacher's Manual) ➤ Evaluation Rubric see pg. 131b (Teacher's manual) |
| <p>Lesson 8: Climate pgs. 132-133 NJSLS ESS2.D Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over the years. Objective(s): Define climate. Differentiate between weather and climate. Explore the different climate zones of the United States.</p> <p>1 Day</p> | <p>Engage: Discuss climate zones and how temperature affects the way we dress. Explore: Look at the pictures on pgs. 132-133 and read about climate and climate zones in the United States. Explain: Differentiate between weather and climate. Study and describe the four climate zones in the United States. Elaborate: SNB Write a description of and illustrate the climate of our area based on personal experiences. Include temperatures and precipitation. <u>Extend Your Thinking:</u> Choose a climate zone and research its temperature, average precipitation, and where in world it's found. Evaluate: <i>Wrap It Up!</i> SNB Define climate, describe climate in Florida, and interpret maps.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook <p style="text-align: center;">Suggested SNB for Quiz Grade</p> |
| <p>Lesson 9: Think Like a Scientist Obtain and Combine Information pgs. 134-135 NJSLS ESS2.2 Obtain and combine information to describe climates in different regions of the world. Objective(s): Obtain and combine information to describe climates in different regions of the world. Analyze the information to draw conclusions about climates.</p> <p>1 Day</p> | <p>Engage: Discuss ways in which weather changes from day to day, explain the difference between weather and climate, and discuss climate in our area. Explore: Explore ways to obtain and combine information. Explain: Analyze the map and analyze the information found on pgs. 134-135. Elaborate: SNB Research climate zones and write a summary about Earth's most extreme climates using internet resources; NOAA (National Oceanic and Atmospheric Administration) and National Geographic websites.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |

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| | <p>Evaluate: SNB Use a map key to interpret maps, identify two cities with similar climates, and contrast climates near the equator from climate closer to the poles.</p> | |
| <p>Lesson 10: Weather Hazards pgs. 136-137 NJSLS ESS3.B A variety of natural hazards results from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. Objective(s): Identify and describe a variety of natural hazards such as thunderstorms, hurricanes, and floods. Describe some of the impacts of natural hazards.</p> <p>1 Day</p> | <p>Engage: Discuss severe or hazardous weather. Explore: Look at the pictures and read pgs. 136-137 to identify different kinds of weather hazards and their impact on humans. Share Ladders Big Storm pp 2-7 to discuss impact of weather Explain: Define and describe weather hazards from hurricanes and thunderstorms. Elaborate: SNB Research Hurricane Sandy. <u>Extend Your Thinking:</u> Create a severe weather plan for their family. Evaluate: <i>Wrap It Up!</i> SNB Identify two types of hazardous weather, explain why hurricanes are hazardous, and make inferences about what this type of weather could do to a house along the beach.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ <i>Big Storms</i> (Ladders small book) |
| <p>Lesson 11: Reducing the Impact of Flooding pgs. 138-139 NJSLS ESS2.2 A variety of natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. Objective: Describe how humans can reduce the impact of flooding.</p> <p>1 Day</p> | <p>Engage: Discuss how heavy rains can impact one's home. Explore: Look at the pictures and read about flooding and how humans can reduce the impact of flooding on pgs. 138-139. Share Big Storms pp 8 and 12-15 to discuss impact of flooding. Explain: Describe events that cause floods and contrast levees and dams. Elaborate: SNB Research and write a report about how engineers rebuilt the levees in New Orleans, Louisiana from Hurricane Katrina. Include a description of the damage it caused, why the levees failed and what engineers are doing now to modify the levees. <u>Extend Your Thinking:</u> Research dams.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ <i>Big Storms</i> (Ladders small book) |

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| <p>Lesson 12: Reducing the Impact of Wind pgs. 140-141 NJSLS ESS3.B A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. Objective: Describe how humans can reduce the impact of wind.</p> <p>1 Day</p> | <p>Engage: Discuss how strong winds can affect one's home. Explore: Look at the pictures and explore the impact of winds on pgs. 140-141. Explain: Compare and contrast events that cause wind damage such as hurricanes and tornadoes. Discuss ways to reduce the impact of these strong winds. Elaborate: SNB Research ways that the walls, roof, windows, and doors of a home can be made to withstand strong winds. Illustrate research with diagrams and photos. <u>Extend Your Thinking:</u> Explore various circumstances where one could be as a tornado approaches (In their homes, outside in an open area, in a car, or at school) and devise a plan as to how to protect oneself in that situation. Evaluate: <i>Wrap It Up!</i> SNB Identify two storms with strong winds, explain how people can protect their property from strong winds, and describe how people can protect themselves during a storm with strong winds.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 13: Reduce the Impact of Lightning pgs. 142-143 NJSLS ESS3.B A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. Objective: Describe how humans can reduce the impact of lightning.</p> <p>1 Day</p> | <p>Engage: Discuss personal experiences with lightning. Explore: Look at the pictures and read about the impact of lightning on pgs. 142-143. Explain: Describe how lightning happens, its impact, and how to reduce the impact of lightning. Elaborate: SNB Research Benjamin Franklin's invention of the lightning rod. SNB With a partner, research and create a book with interesting facts about lightning. <u>Extend Your Thinking:</u> Have students calculate the distance of a thunderstorm if thunder is heard ten seconds after seeing lightning. Evaluate: <i>Wrap It Up!</i> SNB Describe why lightning is dangerous, explain what one should do if they were caught outdoors during a thunderstorm, and infer why people unplug their electronic equipment when a thunderstorm is predicted.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 14: Think Like an Engineer Make a Claim pgs. 144-145b NJSLS ESS3.1 Make a claim about the merit of a design solution that reduces the impacts of a weather-related event.</p> | <p>Engage: Discuss severe weather events and the effects they have on people. SNB Respond to the question which asks why engineers are concerned with designing houses that can stand up to the impact of hurricanes. <i>Use Mountains, Valleys, and Plains</i> to learn</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ <u>For each group of 4:</u> several photos of houses (Pre and post) |

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| <p>Objective(s): Conceptualize a house design that reduces the impacts of weather-related events.</p> <p>Identify the merits of the design solution.</p> <p>2 Days</p> | <p>about other natural disasters (Earthquakes and volcanoes) Some groups may chose to do more extensive research for this project about these natural disasters instead.</p> <p>Explore: Look at and make inferences about the pictures on pgs. 144-145. Explore what kinds of materials can be utilized to build homes that are stronger and can withstand hurricanes. How might different shapes be used in designing a home? Explain: Group presentations; Defend, refine, and/or change solution. Elaborate: SNB Revise plans based on student feedback. Evaluate: SNB Summarize the impacts from hurricanes that could cause damage to a house, explain how the design of their house could help prevent it from being damaged by hurricanes, and evaluate whether specially designed houses are a good solution for homes that are in our community.</p> | <p>damaged by Hurricane Katrina, Hurricane Andrew, and Hurricane Sandy.</p> <ul style="list-style-type: none"> ➤ Evaluation Rubric see pg. 145b (Teacher's Manual) ➤ <i>Mountains, Valleys, and Plains</i> (Ladders small book) <p>Suggested SNB for Quiz Grade</p> |
| <p>Lesson 15: Science Career Severe-Storms Researcher pgs. 146-147</p> <p>Science is a human endeavor and affects everyday life. Concet the concept of waeher with the career of a severe-storms researcher.</p> | <p>Engage: Discuss the dangers of powerful storms. Explore: Read about severe-storms researchers on pgs. 146-147. Use Big Storm Book as added resource. Pp16-21 Explain: Describe the work of a severe-storms researcher. Elaborate SNB Research other careers involving severe storms. SNB Research how tornadoes are formed. Evaluate: SNB Recall a severe-storms researcher and explain why it is a dangerous job.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ <i>Big Storms</i> (Ladders small book) |
| <p>Resources: Text Exploring Science or Digital version of Exploring Science, Student Laptop, Science Notebook</p> | | |

Unit Learning Goal and Scale
(Level 2.0 reflects a minimal level of proficiency)

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

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| 4.0 | <p>Students will be able to:</p> <ul style="list-style-type: none"> In addition to using data in 3.0, students will predict weather during a specific month (rain total, winds, temperature...etc.) based on weather patterns. |
| 3.0 | <p>Students will be able to:</p> <ul style="list-style-type: none"> Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. [Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.] |
| 2.0 | <p>Students will be able to:</p> <ul style="list-style-type: none"> Show graphical displays which show average temperatures, average precipitation and average windspeed for two of the four seasons of a given climate. |
| 1.0 | With help, partial success at level 2.0 content and level 3.0 content: |
| 0.0 | Even with help, no success |

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

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| 4.0 | <p>Students will be able to:</p> <ul style="list-style-type: none"> In addition to making a claim for 3.0, students will find pictures of homes destroyed by storms and identify and describe features that could've help the home withstand the storms impact. |
| 3.0 | <p>Students will be able to:</p> <ul style="list-style-type: none"> Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.* [Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods.] |
| 2.0 | <p>Students will be able to:</p> <ul style="list-style-type: none"> Make some contributions toward a claim using little evidence. |
| 1.0 | With help, partial success at level 2.0 content and level 3.0 content: |
| 0.0 | Even with help, no success |

Unit Modifications for Special Population Students

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| <p>Advanced Learners</p> | <ul style="list-style-type: none"> • Vocabulary- Weather adageChallenge students to research concepts on their own from the Elaborate Section of each lesson • Permit students to chose graphaic organizers they feel most comfortable using • Write a weather report announcing a hurricane or tornado warning. It must explain to the listners why the weather evet is happening, how people can stay safe, and what to expect. • Ask probing questions at the beginning of lessons and tap into prior knowledge and allow students to explain their thinking |
| <p>Struggling Learners</p> | <ul style="list-style-type: none"> • Use clues to revisit main idea of passages • Vocabulary-add unknown words to student notebook to refer to during the unit • Differentiate between air masses and fronts • Discuss and identify cause -effect relationships with weather conditions • Revisit pages with key concepts and have students point out and retell what they have learned (provide further information where gaps exist) • Ask questions where students find evidence in the book to provide an answer |
| <p>English Language Learners</p> | <ul style="list-style-type: none"> • Vocabulary- floods, dams, levees • Scentence frames to describe weather for time, place, change • Picture card of weather instuments and their purposeMake word web of action verbs similar but not limited to: learn, help, prepare, measure, destroy • Ask yes or no questions to help students express their ideas • Use of graphics and pictures to support language learning |
| <p>Special Needs Learners</p> | <ul style="list-style-type: none"> • Provide concrete example when introducing new vocabulary and concepts. • Vocabulary- add unknown words to student notebook to refer to during the unit. • Provide students with word bank for terms: clouds, humidity, precipitation, wind speed, temperature, lightening, fog, changes quickly, and repeats year after year. • Constuct two column chart comparing the impact or wind with the impact of water, discuss similarities and differences between the causes and impacts of each • Help in construction of models for learners with fine motor skill difficulties • Clarify misconception about reason for season • Provide drawings/graphic organizers for students to add to the Science Notebook for data collection to name and/or complete and label. |

Interdisciplinary Connections

Indicators:

ELA/Literacy —,

RI.3.1, Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-ESS2-2),(3-ESS3-1)

RI.3.9, Compare and contrast the most important points and key details presented in two texts on the same topic. (3-ESS2-2)

W.3.1, Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-ESS3-1)

W.3.7, Conduct short research projects that build knowledge about a topic. (3-ESS3-1)

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

Mathematics —,

MP.2, Reason abstractly and quantitatively. (3-ESS2-1),(3-ESS2-2),(3-ESS3-1)

MP.4, Model with mathematics. (3-ESS2-1),(3-ESS2-2),(3-ESS3-1)

MP.5, Use appropriate tools strategically. (3-ESS2-1)

3.MD.A.2, Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (3-ESS2-1)

3.MD.B.3, Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in bar graphs. (3-ESS2-1)

Integration of 21st Century Skills

Indicators:

8.1.5.A.1 Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.

8.1.5.A.2 Format a document using a word processing application to enhance text and include graphics, symbols and/ or pictures.

8.1.5.A.3 Use a graphic organizer to organize information about problem or issue.

8.1.5.A.4 Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.

8.1.5.C.1 Engage in online discussions with learners of other cultures to investigate a worldwide issue from multiple perspectives and sources, evaluate findings and present possible solutions, using digital tools and online resources for all steps.

8.1.5.D.3 Demonstrate an understanding of the need to practice cyber safety, cyber security, and cyber ethics when using technologies and social media.

8.1.5.D.4 Understand digital citizenship and demonstrate an understanding of the personal consequences of inappropriate use of technology and social media.

8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.

8.1.5.F.1 Apply digital tools to collect, organize, and analyze data that support a scientific finding.

8.2.5.B.1 Examine ethical considerations in the development and production of a product through its life cycle.

8.2.5.C.4 Collaborate and brainstorm with peers to solve a problem evaluating all solutions to provide the best results with supporting sketches or models.

8.2.5.C.5 Explain the functions of a system and subsystems.

8.2.5.D.1 Identify and collect information about a problem that can be solved by technology, generate ideas to solve the problem, and identify constraints and trade-offs to be considered.

8.2.5.D.2 Evaluate and test alternative solutions to a problem using the constraints and trade-offs identified in the design process to evaluate potential solutions.

9.2.4.A.1 Identify reasons why people work, and how work can help a person achieve personal and professional goals.

9.2.4.A.3 Investigate traditional and nontraditional careers and relate information to personal likes and dislikes.

9.2.4.A.4 Explain why knowledge and skills acquired in elementary grades lay the foundation for future academic and career success.

Unit Title: Physical Science

Forces and Interactions

Unit Description:

During this unit of study students will plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. They will make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. Students will ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. In addition, students will define a simple design problem that can be solved by applying scientific ideas about magnets.

Unit Duration: About 2 ½ to 3 weeks (16 lessons, some 2 days)

Desired Results

Standard(s)

Students who demonstrate understanding can:

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

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

3-PS2-3., Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. [Clarification Statement: Examples of an electric force could include the force on hair from an electrically charged balloon and the electrical forces between a charged rod and pieces of paper; examples of a magnetic force could include the force between two permanent magnets, the force between an electromagnet and steel paperclips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of cause and effect relationships could include how the distance between objects affects strength of the force and how the orientation of magnets affects the direction of the magnetic force.] [Assessment Boundary: Assessment is limited to forces produced by objects that can be manipulated by students, and electrical interactions are limited to static electricity.]

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

Indicators:

PS2.A: Forces and Motion

- Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. (Boundary: Qualitative and conceptual, but not quantitative addition of forces are used at this level.) (3-PS2-1)

- The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. (Boundary: Technical terms, such as magnitude, velocity, momentum, and vector quantity, are not introduced at this level, but the concept that some quantities need both size and direction to be described is developed.) (3-PS2-2)

PS2.B: Types of Interactions

- Objects in contact exert forces on each other. (3-PS2-1)
- Electric, and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other. (3-PS2-3),(3-PS2-4)

Understandings:

Students will...

Pushes and Pulls

- Define force as a push or pull of an object.
- Know that every force has a strength and direction.

Balanced Forces

- Recognize that objects in contact exert forces on each other.
- Define balanced force and net force.

Unbalanced Forces

- Define unbalanced forces.
- Describe the effects of net force.

Changing Direction

- Recognize that the forces can change an object's speed or direction.

Plan and Conduct an Investigation (Think Like a Scientist)

- Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces in the motion of an object.

Patterns of Motion

- Identify the pattern of an object's motion.
- Define regular motion.

Motion (Investigate)

- Observe and measure the pattern of an object's motion.
- Predict the future motion of an object moving in a regular pattern.

Make Observations (Think Like a Scientist)

- Make observations and measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

Magnets

- Identify magnetic force as a force that can act at a distance.
- Recognize that the forces between two magnets depend on their orientation relative to each other.

Magnetic Force (Investigate)

- Identify evidence that magnetic forces do not require that objects be in contact.

Essential Questions:

- 1) How can I demonstrate how different objects move and interact with each other?
- 2) How do magnet and electricity interact?

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| <ul style="list-style-type: none"> • Observe the effects of a magnet’s distance apart from an object, and orientation on the force it exerts. <p>Electromagnets (Investigate)</p> <ul style="list-style-type: none"> • Identify evidence that electromagnets can exert a force without being in contact with an object. • Change the size of force produced by an electromagnet. <p>Electric Forces</p> <ul style="list-style-type: none"> • Identify electric forces as a force that can act at a distance. • Recognize that the electric force between two objects depends on the properties of the objects. • Observe the effect of distance on the force exerted by a charged object. <p>Electric Forces (Investigate)</p> <ul style="list-style-type: none"> • Identify evidence that electric forces between a pair of objects do not require that the objects be in contact. • Observe attractive and repulsive effects of electric forces. <p>Determine Cause-and-Effect Relationships (Think Like a Scientist)</p> <ul style="list-style-type: none"> • Ask questions to determine cause-and-effect relationships of electric or magnetic interactions between two objects not in contact with each other. <p>Define and Solve a Problem (Think Like an Engineer)</p> <ul style="list-style-type: none"> • Define a design problem that can be solved by applying scientific ideas about magnets. • Specify criteria for success and constraints on materials, time, or cost. <p>Roller Coaster Design (Science Career)</p> <ul style="list-style-type: none"> • Connect concepts about forces, motion, and patterns to the career of a roller coaster designer. | |
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Assessment Evidence

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| <p>Performance Tasks:</p> <p>Investigate Lessons: Students will practice performance tasks in cooperative groups engaging in the scientific steps of an investigation.</p> <ul style="list-style-type: none"> ➤ Lesson 7: Investigate Motion (pgs. 16-17) <p>Objectives: Observe and measure the pattern of an object’s motion. Predict the future motion of an object moving in a regular pattern.</p> <ul style="list-style-type: none"> ➤ Lesson 10: Investigate Magnetic Force (pgs. 22-23) <p>Objectives: Identify evidence that magnetic forces do not require that objects be in contact. Observe the effects of a magnet’s distance apart from an object, and orientation on the force it exerts.</p> | <p>Other Evidence:</p> <p>Students will demonstrate their understandings through:</p> <ul style="list-style-type: none"> • Science Notebook Entries • Unit Test • Quizzes • Homework • Benchmark |
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➤ **Lesson 11: Investigate
Electromagnets (pgs. 24-25)**

Objectives: Identify evidence that electromagnets can exert a force without being in contact with an object. Change the size of force produced by an electromagnet.

➤ **Lesson 13: Investigate
Electric Forces (pgs. 28-29)**

Objectives: Identify evidence that electric forces between a pair of objects do not require that the objects be in contact. Observe attractive and repulsive effects of electric forces.

Think Like a Scientist: Plan and Investigate Lessons- Students will engage in performance tasks in cooperative groups to plan and conduct an investigation, provide evidence and use that evidence to explain results. These tasks will be recorded in their science notebooks and evaluated by a Teacher Rubric and Student Rubric.

➤ **Lesson 5: *Think Like a Scientist*
Plan and Conduct an Investigation (pgs. 12-13b)**

Objectives: Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces in the motion of an object.

➤ **Lesson 8: *Think Like a Scientist*
Make Observations (pgs. 18-19b)**

Objective: Make observations and measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

➤ **Lesson 14: *Think Like a Scientist*
Determine Cause-and-Effect Relationships
(pgs. 30-31b)**

Objective: Ask questions to determine cause-and-effect relationships of electric or magnetic interactions between two objects not in contact with each other.

Think Like an Engineer: Collaborative work to plan and carry out an investigation. Identify problem needed to be solved and use materials to design a prototype of design solution. Analyze and interpret data to prove success of prototype and if improvements should be made. Construct and explanation about investigation from evidence gathered. These tasks will be recorded in their science notebooks and evaluated by a Teacher Rubric and Student Rubric.

➤ **Lesson 15: *Think Like an Engineer*
Define and Solve a Problem (pgs. 32-33b)**

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| <p>Objectives: Define a design problem that can be solved by applying scientific ideas about magnets. Specify criteria for success and constraints on materials, time, or cost.</p> | |
| <p>Benchmarks: Concepts from this unit will be assessed on the final benchmark</p> | |

| <h2 style="text-align: center; background-color: #1a3d54; color: white; padding: 5px;">Learning Plan</h2> | | |
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| Lesson & Duration | Activities | Materials |
| <p>Lesson 1: Pushes and Pulls pgs. 4-5 NJSLS PS2.A Each force acts on one particular object and has both strength and direction. Objective(s): Define force as a push or pull on an object. Know that every force has a strength and direction</p> <p>1 Day</p> | <p>Engage: Engage in a conversation with students about personal experiences with pushing, stopping, and changing direction of a cart. Explore: Observe the images, ask questions, and read pgs. 4-5 on pushes and pulls. Explain: Define a force as a push or a pull and know that every force has a strength and direction. Elaborate: SNB Students look back at picture on pg. 5 and write different ways the man could change the strength and direction of force he's applying to the straps. Evaluate: <i>Wrap It Up!</i> SNB Define a force, explain how the direction of a push relates to the direction that the object was moved, and infer how the force people apply to a cart can change if more people are pushing the cart.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 2: Balanced Forces pgs. 6-7 NJSLS PS2.A Each force acts on one particular object and has both strength and 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. PS2.B Objects in contact exert forces on each other. Objective(s): Recognize that objects in contact exert forces on each other. Defined balanced force and net force.</p> <p>1 Day</p> | <p>Engage: Discuss what forces are acting on objects in the classroom. Explore: Observe the pictures, ask questions, and read the text on pgs. 6-7 to find out how multiple forces act together on an object. Explain: Identify the effects of forces on objects and define balanced forces and net forces. Elaborate: SNB With a partner, students conduct an experiment on balanced forces and describe their experience in their science notebook. Evaluate: <i>Wrap It Up!</i> SNB Explain what caused the boards to move and infer what causes the other boards to break when a blackbelt's hand hits only the board on top of the stack.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 3: Unbalanced Forces pgs. 8-9</p> | <p>Engage: Review previous lessons; Do forces always cause motion, give examples of a situation which forces</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science |

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| <p>NJSLS PS2.A Each force acts on one particular object and has both strength and 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.</p> <p>PS2.B Objects in contact exert forces on each other.</p> <p>Objective(s): Define unbalanced forces. Describe the effects of net force.</p> <p>1 Day</p> | <p>were applied, but no motion was produced, and define balanced forces.</p> <p>Explore: Observe the image, ask questions, and read the text on pgs. 8-9 on how unbalanced forces cause a motion, or change in a motion.</p> <p>Explain: Define unbalanced forces and describe the effects of net force.</p> <p>Elaborate: SNB Students draw and label three diagrams to describe the forces acting on a rope and the resulting motion.</p> <p>Extend Your Thinking: In groups, research and select an image showing balanced forces. Present to the class describing the effects of the unbalanced force on the object in the image.</p> <p><i>Wrap It Up!</i> SNB Define an unbalanced force, infer what would happen if the rope was moved to the left and in what direction was the net force, and describe a situation in which forces are balanced and a situation in which forces are unbalanced.</p> | <ul style="list-style-type: none"> ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 4: Changing Direction pgs. 10-11</p> <p>NJSLS PS2.A 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.</p> <p>PS2.B Objects in contact exert forces on each other.</p> <p>Objective: Recognize that forces can change an object's speed or direction.</p> <p>1 Day</p> | <p>Engage: Students recall the effects of unbalanced forces on objects.</p> <p>Explore: Observe the image, ask questions, and read the text on pgs. 10-11 to find out how forces change an object's motion.</p> <p>Explain: Recognize that forces can change an object's speed or direction.</p> <p>Science in a SNAP: Changing Direction</p> <p>Elaborate: SNB Students choose a sport and analyze one example of force used by the sport's players. Identify how the forces was applied to the object, whether or not the net force on the object was zero, and the effects of the force on the object's motion.</p> <p>Evaluate: <i>Wrap It Up!</i> SNB Recall balanced and unbalanced forces and describe what ways can forces change an object's motion.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ <i>For each group of 2:</i> Small rubber or plastic ball, unsharpened pencil |
| <p>Lesson 5: Think Like a Scientist Plan and Conduct and Investigation pgs. 12-13b</p> <p>NJSLS PS.2.1 Plan and conduct and investigation to provide evidence of the effect of balanced and unbalanced forces on the motion on an object.</p> <p>Objective: Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.</p> <p>2 Days</p> | <p>Engage: Looking at the photo on pgs. 12-13, discuss how forces are being applied to the ball and its effect on the ball. Discuss how to use air as a force to move a cotton ball.</p> <p>Task: Design an obstacle course that demonstrates the effects of balanced and unbalanced forces on a cotton ball.</p> <p>Explore: Plan and conduct an investigation.</p> <p>Explain: Analyze results and revise, share results, and explain findings.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ <i>For each group of 4:</i> Cotton ball, metric ruler, 4 straws, assortment of materials including but not limited to cardboard boxes, pieces of cardboard, paper towel tubes, and wooden blocks of various shapes |

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| | <p>Elaborate: Revise course to meet all five goals under step 2. Describe how they'll use force to meet each goal. Carry out investigations and record observations.</p> <p>Evaluate: SNB Define evidence, identify evidence in the recorded data that showed how unbalanced forces changed an object's motion, and explain what evidence from the collected data that showed that every force has a strength and direction.</p> | <ul style="list-style-type: none"> ➤ Sample Data Table see pg. 13a (Teacher's Manual) ➤ Evaluation rubric see pg. 13b (Teacher's Manual) <p style="text-align: center;">Suggested SNB for Quiz Grade</p> |
| <p>Lesson 6: Patterns of Motion pgs. 14-15 NJSLS PS2.A The pattern 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. Objective(s): Identify the pattern of an object's motion. Define regular motion.</p> <p>1 Day</p> | <p>Engage: Discuss motion of a swing. Explore: Observe and ask questions about the image on pgs. 14-15 to find out about patterns of motion. Explain: Identify the pattern of an object's motion and define regular motion. Elaborate: Discuss the decreasing pattern of motion on a swing. Evaluate: <i>Wrap It Up!</i> SNB Discuss the contrast of motion of a falling leaf as opposed to a swing, and predict how the person in the photo will move next.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 7: Investigate Motion pgs. 16-17 NJSLS PS2.A 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. Objective(s): Observe and measure the pattern of an object's motion. Predict the future motion of an object moving in a regular pattern.</p> <p>1 Day</p> | <p>Engage: Discuss previous experiences with bouncing a rubber ball. Explore: SNB Read pgs. 16-17 and guide students through the investigation for steps 1-4. Engage: Discuss previous experiences with bouncing a rubber ball. Explore: SNB Read pgs. 16-17 and guide students through the investigation for steps 1-4. Evaluate: <i>Wrap It Up!</i> SNB Discuss whether results supported their predictions and interpret patterns in their collected data.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ <i>For each group of 4:</i> foam tubing (Pipe insulation), cut in half lengthwise (3 m), marble, masking tape, meterstick, two chair, metal mixing bowl ➤ Sample Data Table see pg. 17 (Teacher's Manual) |
| <p>Lesson 8: Think Like a Scientist Make Observations pgs. 18-19 NJSLS 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. Objective: Make observations and measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.</p> <p>2 Days</p> | <p>Engage: Discuss pendulum and read the introductory paragraph on pg. 18. Task: SNB Observe the motion of a swinging object and use the observations to predict its future motion. Share <i>Roller Coasters</i> pp10-13 to discuss energy of motion. Explore: Plan, conduct, document, and help guide students through the investigation. Explain: Analyze, interpret data , and share results. Elaborate: SNB Build a marble roller coaster using what students learned about forces and patterns in motion. Evaluate: SNB Explain how a pendulum's motion is regular motion and identify the evidence from the collected data that showed that a</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ <i>For each group of 4:</i> Metal washer, string, masking tape, meterstick, stopwatch, 2-3 additional washers of various weights ➤ Sample Data Table see pg. 19a (Teacher's Manual) ➤ Evaluation Rubric see pg. 19b (Teacher's Manual) ➤ <i>Roller Coaster</i> (Ladders, small book) <p style="text-align: center;">Suggested SNB for Quiz Grade</p> |

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| | pattern can be used to predict future motion. | |
| <p>Lesson 9: Magnets pgs. 20-21 NJSLS PS2.B 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 to each other. Objective(s): Identify magnetic force as a force that can act at a distance. Recognize that the forces between two magnets depend on their orientation relative to each other.</p> <p>1 Day</p> | <p>Engage: Discuss personal experiences with magnets. Explore: Observe the images, ask questions about the images, and read the text on pgs. 20-21 about magnetic force. Explain; Identify magnetic forces and consider the orientation of magnetic force. Elaborate: SNB Students write about a time they encountered magnets acting at a distance. Evaluate: <i>Wrap It Up!</i> SNB Define attract, contrast the force applied in the kick of a soccer ball to the force magnet exerts on a paper clip, and explain the phrase “opposites attract”.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook |
| <p>Lesson 10: Magnetic Force pgs. 22-23 NJSLS PS2.B 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. Objective(s): Identify evidence that magnetic forces do not require that objects be in contact. Observe the effects of a magnet's distance apart from an object, and orientation on the force it exerts.</p> <p>1 Day</p> | <p>Engage: Discuss attract and repel and how they relate to magnets.</p> <p>Explore: Guide students through the investigate on pgs. 22-23. SNB students construct a table for recording their observations. Explore: Question students to help them interpret their facts. Elaborate: SNB Explore other objects to test for magnetism. Evaluate: <i>Wrap It Up!</i> SNB Identify evidence from investigation that magnets can exert forces without touching, compare and contrast large and small magnets, and explain what would happen if the north pole of a bar magnet was brought to the north pole of another magnet that was attached to a toy car.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ <i>For each group of 4:</i> Metric ruler, 2 strong bar magnets, 5 paper clips, small bar magnet ➤ Sample Data Table see pg. 22 (Teacher's Manual) |
| <p>Lesson 11: Investigate Electromagnets pgs. 24-25 NJSLS PS2.B Electric and magnetic forces between a pair of objects do not require that the objects be in contact. The size 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. Objective(s): Identify evidence that electromagnets can exert a force without being in contact with an object. Change the size of force produced by electromagnet.</p> <p>1 Day</p> | <p>Engage: Discuss things that affect the strength of a magnet's force on an object. Explore: Guide students through the investigate on pgs. 24-25. SNB Students construct a table for recording their observations. Explain: Students share predictions, observations, and ideas within groups. Elaborate: SNB Students to build a model junkyard electromagnet. Draw and label their model in the science notebook. Evaluate: <i>Wrap It Up!</i> SNB Explain how students measured the strength of the electromagnet's forces, explain if an electromagnet can exert a force without touching an object, and explain what could happen if a longer bolt was used and the wire was wrapped around fifty times.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ <i>For each group of 4:</i> iron bolt(3 in.), D-cell battery, battery holder, 20 paper clips, piece of insulated copper wire with ends stripped(about 3 ft.) TEACHER WILL NEED A WIRE STRIPPER AND CUTTER ➤ Sample Data Table see pg. 24 (Teacher's Manual) |

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| <p>Lesson 12: Electric Forces pgs. 26-27 NJSLS PS2.B Electric and magnetic forces between a pair of objects do not require that the objects be in contact. The size 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. Objective(s): Identify electric force as a force that can act at a distance. Recognize that the electric force between two objects depends on the properties of the objects. Observe the effect of distance on the force exerted by a charged object.</p> <p>1 Day</p> | <p>Engage: Share personal experiences with static electricity. Explore: Observe the image, ask questions about, and read the text on pgs. 26-27 to find out about electric force. Explain: Identify electric forces and recognize that electric forces depend on an object's properties. Science in a SNAP: Activity that answers the question, what determines the strength of an electric force between two objects? Elaborate: SNB Perform experiment on electric forces and document observations and explain results. Evaluate: <i>Wrap It Up!</i> SNB Compare how the forces exerted by electric charges are similar to the forces exerted by magnets and identify the observed effects of static electricity at home or at school.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ <u>For each group of 2:</u> tissue paper, scissors, balloon full of air, wool cloth |
| <p>Lesson 13: Investigate Electrical Forces pgs. 28-29 NJSLS PS2.B 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. Objective(s): Identify evidence that electrical forces between a pair of objects do not require that the objects be in contact. Observe attractive and repulsive effects of electric forces.</p> <p>1 Day</p> | <p>Engage: Observe the picture, ask questions, and read pgs. 28-29 about static electricity. Explore: Guide students through the investigate on pgs. 28-29. SNB Students construct a table for recording their observations. Explain: Share predictions and observations within groups. Elaborate: SNB Perform activity on the effect of a charged balloon on running water. Record observations and explanations for what was observed. Evaluate: <i>Wrap It Up!</i> SNB Explain why the hanging balloons were observed first then rubbed, describe what happened when the balloons were hanging freely in steps three and four and what was done to cause the difference, and what can be inferred about the charge on balloons in steps three and four.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ <u>For each group of 4:</u> 2 latex balloons filled with air, 2 pieces of string (1m), masking tape, wool cloth ➤ Sample Data Table see pg. 28 (Teacher's Manual) |
| <p>Lesson 14: Think Like a Scientist Determine Cause-and-Effect Relationships pgs. 30-31b NJSLS PS2.3 Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. Objective: Ask questions to determine cause-and-effect relationships of electric or magnetic interactions between two objects not in contact with each other.</p> <p>2 Days</p> | <p>Engage: Observe and ask questions about the photo on pgs. 30-31. Prepare students for the type of thinking they'll be doing for the activity. Read the introductory paragraph on pg. 30 and identify the task. Discuss with group members which question under step one they'd like to test and record it in their SNB's. Explore: Plan, conduct, and record an investigation. Explain: Analyze, interpret, share, and explain data. Elaborate: SNB Using another electrically charged object, perform a similar test.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ <u>For each group of 4:</u> materials including, but not limited to: metric rulers, graph paper, magnets of varying sizes, strengths, and shapes; plastic bags full of paper clips or steel washers, stopwatches, inflated balloons, wool cloths, string, scissors, masking tape, plastic bags full of shredded paper or packing peanuts. |

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| | <p>Evaluate: SNB Describe how the data showed a cause-and-effect relationship. Explain what evidence the data provided that showed an object can exert magnetic or electric forces on another object without contacting it.</p> | <ul style="list-style-type: none"> ➤ Sample Data Table see pg.31a (Teacher's Manual) ➤ Evaluation Rubric see pg. 31b (Teacher's Manual) <p>Suggested SNB for Quiz Grade</p> |
| <p>Lesson 15: Think Like an Engineer Define and Solve a Problem pgs. 32-33b NJSLS PS2.4 Define a simple design problem that can be solved by applying scientific ideas about magnets. ETS1.1 Define a simple design problem reflecting a need or a want that includes specific criteria for success and constraints on materials, time, or, cost. Objective(s): Define a design problem that can be solved by applying scientific ideas about magnets. Specify criteria for success and constraints on materials, time, or cost.</p> <p>2 Days</p> | <p>Engage: Look at the photos, read the captions, ask questions, and read the text on pgs. 32-33. SNB: Record the question under step 1. Explore: Plan and carry out the investigation. Analyze and interpret data. Explain: Construct an explanation from evidence and communicate information. Elaborate: SNB Conduct phase 2, or beta testing of their final design. Plan the investigation, record observations, interpret results, and share. Evaluate: SNB Define the problem that was to be solved and how they came up with it. Explain what observations from their data was most useful in improving their design and what it taught them.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ <i>For each group of 4:</i> a Variety of materials including, but not limited to: disc magnets, bar magnets, horseshoe magnets, cut sections of a magnetic sheet, and magnets with adhesive backs. String, glue, tape, scissors, cardboard pieces, cardboard boxes, recycled containers, binder clips, and toy cars. ➤ Sample Data Tables see pg. 33a (Teacher's Manual) ➤ Evaluation Rubric see pg. 33b (Teacher's Manual) <p>Suggested SNB for Quiz Grade</p> |
| <p>Lesson 16: Science Career Roller Coaster Designer pgs. 34-35</p> <p>Science investigations use a variety of methods, tool, and techniques. Connect concepts about forces, motion, and patterns to the career of a roller coaster designer.</p> | <p>Engage: Share personal experience with roller coasters. Explore: Observe the photos, ask questions related to, and read pgs. 34-35 in order to describe the career of a roller coaster designer. Explain: Describe the work of a roller coaster designer, connect concepts about forces, motion, and patterns to the career of a roller coaster designed. Elaborate: SNB Research three different roller coasters (When was it built? Location? Number of hills? Highest hill? Maximum speed? What it's made of? Number of loops?) Create a detailed drawing on their roller coaster and write a few sentences explaining how forces, motion, and patterns relate to their illustrations. Use Roller Coasters as part of the students research. Evaluate: SNB Explain what Cynthia Emerick did as a roller coaster designer, what did she study in college to help her make sure that roller coasters are always safe for the riders, and what causes roller coasters to move uphill.</p> | <ul style="list-style-type: none"> ➤ Text Exploring Science or Digital version of Exploring Science ➤ Student Laptop ➤ Science Notebook ➤ <i>Roller Coasters</i> (Ladders, small books) |
| <p>Resources: Text Exploring Science or Digital version of Exploring Science, Student Laptop, Science Notebook</p> | | |

Unit Learning Goal and Scale
(Level 2.0 reflects a minimal level of proficiency)

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

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| 4.0 | Students will be able to: <ul style="list-style-type: none"> In addition to making observations and measurements in 3.0, students will build a marble roller coaster using what they have learned about forces and patterns in motion. |
| 3.0 | Students will be able to: <ul style="list-style-type: none"> Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. [Clarification Statement: Examples of motion with a predictable pattern could include a child swinging in a swing, a ball rolling back and forth in a bowl, and two children on a see-saw.] [Assessment Boundary: Assessment does not include technical terms such as period and frequency.] |
| 2.0 | Students will be able to: <ul style="list-style-type: none"> Make observations and/or measurements of an object's motion. |
| 1.0 | With help, partial success at level 2.0 content and level 3.0 content: |
| 0.0 | Even with help, no success |

Standard(s): 3-PS2-3. Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. [Clarification Statement: Examples of an electric force could include the force on hair from an electrically charged balloon and the electrical forces between a charged rod and pieces of paper; examples of a magnetic force could include the force between two permanent magnets, the force between an electromagnet and steel paperclips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of cause and effect relationships could include how the distance between objects affects strength of the force and how the orientation of magnets affects the direction of the magnetic force.] [Assessment Boundary: Assessment is limited to forces produced by objects that can be manipulated by students, and electrical interactions are limited to static electricity.]

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| 4.0 | Students will be able to: <ul style="list-style-type: none"> In addition to asking questions to determine cause and effect relationships in 3.0, students will use various other materials to obtain the same results of their initial findings and provide data supported evidence. |
| 3.0 | Students will be able to: <ul style="list-style-type: none"> Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. [Clarification Statement: Examples of an electric force could include the force on hair from an electrically charged balloon and the electrical forces between a charged rod and pieces of paper; examples of a magnetic force could include the force between two permanent magnets, the force between an electromagnet and steel paperclips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of cause and effect relationships could include how the distance between objects affects strength of the force and how the orientation of magnets affects the direction of the magnetic force.] [Assessment Boundary: Assessment is limited to forces produced by objects that can be manipulated by students, and electrical interactions are limited to static electricity.] |
| 2.0 | Students will be able to: <ul style="list-style-type: none"> Ask questions and with assistance can discuss cause and effect relationships. |
| 1.0 | With help, partial success at level 2.0 content and level 3.0 content: |
| 0.0 | Even with help, no success |

Unit Modifications for Special Population Students

| | |
|----------------------------------|---|
| Advanced Learners | <ul style="list-style-type: none"> • Prepare a mock interview with roller coaster designer. One person will be interviewer and the other will be the designer. • Extend thinking about balance forces by working on experiments with partner • Draw and label diagrams in their notebooks to describe forces acting on a rope and the resulting motion • Select a sport and analyze examples of force used by the sport's players • Visit playground and discuss observations about applied forces and the resulting impacts when using playground equipment • Build a marble rollercoaster using what has been learned about forces and patterns of motion • Research famous rollercoasters |
| Struggling Learners | <ul style="list-style-type: none"> • Discuss how provided photographs help in understanding of concepts on page • Teaching with Technology: Project lessons on white board, drawing arrows to show forces and help students identify type or force and amount of force • Coach student through planning process for investigations and materials to be used |
| English Language Learners | <ul style="list-style-type: none"> • Ask yes or no questions to help students express their ideas • Use of graphics and pictures to support language learning • Vocabulary- cause-effect, pendulum, magnetism, repel, attract • Help students define problems in Think Like a Scientist lessons |
| Special Needs Learners | <ul style="list-style-type: none"> • Provide Data Collection Tables for Science Notebooks. • Review use of measurement tools and how to record measurements in distances and in time. |

Interdisciplinary Connections

Indicators:

ELA/Literacy - ,

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

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

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

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

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

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

Mathematics - ,

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

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

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

Integration of 21st Century Skills

Indicators:

- 8.1.5.A.1** Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.
- 8.1.5.A.2** Format a document using a word processing application to enhance text and include graphics, symbols and/ or pictures.
- 8.1.5.A.3** Use a graphic organizer to organize information about problem or issue.
- 8.1.5.A.4** Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.
- 8.1.5.C.1** Engage in online discussions with learners of other cultures to investigate a worldwide issue from multiple perspectives and sources, evaluate findings and present possible solutions, using digital tools and online resources for all steps.
- 8.1.5.D.3** Demonstrate an understanding of the need to practice cyber safety, cyber security, and cyber ethics when using technologies and social media.
- 8.1.5.D.4** Understand digital citizenship and demonstrate an understanding of the personal consequences of inappropriate use of technology and social media.
- 8.1.2.E.1** Use digital tools and online resources to explore a problem or issue.
- 8.1.5.F.1** Apply digital tools to collect, organize, and analyze data that support a scientific finding.
- 8.2.5.B.1** Examine ethical considerations in the development and production of a product through its life cycle.
- 8.2.5.C.4** Collaborate and brainstorm with peers to solve a problem evaluating all solutions to provide the best results with supporting sketches or models.
- 8.2.5.C.5** Explain the functions of a system and subsystems.
- 8.2.5.D.1** Identify and collect information about a problem that can be solved by technology, generate ideas to solve the problem, and identify constraints and trade-offs to be considered.
- 8.2.5.D.2** Evaluate and test alternative solutions to a problem using the constraints and trade-offs identified in the design process to evaluate potential solutions.
- 9.2.4.A.1** Identify reasons why people work, and how work can help a person achieve personal and professional goals.
- 9.2.4.A.3** Investigate traditional and nontraditional careers and relate information to personal likes and dislikes.
- 9.2.4.A.4** Explain why knowledge and skills acquired in elementary grades lay the foundation for future academic and career success.