Belvidere Clusterwide Curriculum

Science

3rd Grade

Updated Summer, 2024

All Belvidere Cluster curriculum and instruction areas are aligned to the New Jersey Student Learning Standards (NJSLS) in accordance with the NJ Department of Education's curriculum implementation requirements.

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UNITS	Duration	Essential Questions:
Unit 1: Weather and Climate	1st Trimester	• Can we predict the kind of weather that we will see in the spring, summer, autumn, or winter? • How can climates in different regions of the world be described? • How can we protect people from natural hazards such as flooding, fast wind, or lightening? • Where do clouds come from? • How can we predict when it's going to storm? • Where is the best place to build a snow fort?* optional lesson • Why are some places always hot? • How can you keep a house from blowing away in a windstorm?
Unit 2: Forces, Motion and Magnets	2nd Trimester	• Can we use patterns that we observed to predict the future? • What are the relationships between electrical and magnetic forces? • How can we use our understandings about magnets be used to solve problems? • How could you win a tug-of-war against a bunch of adults? • What makes bridges so strong? • How high can you swing on a flying trapeze? *optional beta test lesson • What can magnets do? • How can you unlock a door using a magnet?* optional lesson
Unit 3: Heredity, Survival, & Selection	2nd Trimester	• What kinds of traits are passed on from parent to offspring? • What environmental factors might influence the traits of a specific organism? • How do you identify a mysterious fruit? • What do dogs and pigeons have in common? • How could a lizard's toes help it survive? • Why do dogs wag their tails? • How long can people (and animals) survive in outer space?
Unit 4: Fossils & Changing	3rd Trimester	• Where can you find whales in a desert? • How do we know what dinosaurs looked like?

Environments		• Can you outrun a dinosaur?
Unit 5: Life Cycles	3rd Trimester	• Do all living things have the same life cycle? • Are there advantages to being different? • How is your life like an alligator's life? • What's the best way to get rid of mosquitos? • Why do plants grow flowers? • Why do plants give us fruit? • Why are there so many different kinds of flowers?

Student Learning

Career Education (NJDOE CTE Clusters)

21st Century Life and Careers

- 9.1.2.CR.1: Recognize ways to volunteer in the classroom, school and community.
- 9.1.2.FP.1: Explain how emotions influence whether a person spends or saves.
- 9.2.2.CAP.1: Make a list of different types of jobs and describe the skills associated with each job.
- 9.2.2.CAP.2: Explain why employers are willing to pay individuals to work.
- 9.4.2.CI.1: Demonstrate openness to new ideas and perspectives
- 9.4.2.CT.3: Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
- 9.4.2.DC.6: Identify respectful and responsible ways to communicate in digital environments

Technology:

- 8.1.2.CS.1: Select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences.
- 8.1.2.NI.1: Model and describe how individuals use computers to connect to other individuals, places, information and ideas through a network.
- 8.1.2.NI.2: Describe how the Internet enables Individuals to connect with others worldwide.
- 8.2.2.ITH.3: Identify how technology impacts or improves life.
- 8.2.2.ITH.4: Identify how various tools reduce work and improve daily tasks.
- 8.2.2.NT.2: Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.
- 8.2.2.ETW.1: Classify products as resulting from nature or produced as a result of technology.
- 8.2.2.EC.1: Identify and compare technology used in different schools, communities, regions, and parts of the world.

Modifications and Accommodations:

<u>Special Education</u>

- Printed copy of board work/notes provided
- Additional time for skill mastery
- Assistive technology
- Behavior management plan
- Center-Based Instruction
- Check work frequently for understanding
- Computer or electronic device utilization
- Extended time on tests/ quizzes
- Have student repeat directions to check for understanding
- Highlighted text visual presentation
- Modified assignment format
- Modified test content
- Modified test format
- Modified test length
- Multiple test sessions
- Multi-sensory presentation
- Preferential seating
- Preview of content, concepts, and vocabulary
- Reduced/shortened written assignments
- Secure attention before giving instruction/directions
- Shortened assignments
- Student working with an assigned partner

- Teacher initiated weekly assignment sheet
- Use open book, study guides, test prototypes
- Cubing activities
- Exploration by interest
- Flexible grouping
- Goal setting with students
- Jigsaw
- Mini workshops to re-teach or extend skills Open-ended activities
- Think-Pair-Share
- Varied supplemental materials
-
- **ELL**
- Allowing students to correct errors (looking for understanding)
- Teaching key aspects of a topic Eliminate nonessential information Using videos, illustrations, pictures, and drawings to explain or clarify
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slideshows, videos, etc.) to demonstrate student's learning
- Allowing students to correct errors (looking for understanding)
- Allowing the use of note cards or open-book during testing
- Decreasing the amount of work presented or required
- Having peers take notes or providing a copy of the teacher's notes
- Modifying tests to reflect selected objectives
- Providing study guides
- Reducing the number of answer choices on a multiple choice test
- Tutoring by peers
- Explain/clarify key vocabulary terms
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- **At Risk**
- Allowing students to correct errors (looking for understanding)
- Teaching key aspects of a topic Eliminate nonessential information allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slideshows, videos, etc.) to demonstrate student's learning
- Allowing students to select from given choices .
- Allowing the use of note cards or open-book during testing
- Collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test
- decreasing the amount of work presented or required .
- Having peers take notes or providing a copy of the teacher's notes
- Marking students' correct and acceptable work, not the mistakes
- Modifying tests to reflect selected objectives
- Providing study guides
- Reducing the number of answer choices on a multiple choice test
- Tutoring by peers
- Using authentic assessments with real-life problem-solving
- Using true/false, matching, or fill in the blank tests in lieu of essay tests
- using videos, illustrations, pictures, and drawings to explain or clarify
- Flexible grouping
- Goal setting with students
- Jigsaw
- Mini workshops to re-teach or extend skills Open-ended activities

- Think-Pair-Share
- Varied supplemental materials
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- **Gifted and Talented**
- Alternative formative and summative assessments
- Choice boards
- Games and tournaments
- Group investigations
- Independent research and projects Interest groups for real world application
- Learning contracts
- Leveled rubrics
- Multiple intelligence options
- Personal agendas
- Project-based learning
- Problem-based learning
- Stations/centers
- Think-Tac-Toes
- Tiered activities/assignments
- Tiered products_____
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- **504**
- Printed copy of board work/notes provided
- Additional time for skill mastery
- Assistive technology
- Behavior management plan
- Center-Based Instruction
- Check work frequently for understanding
- Computer or electronic device utilization
- Extended time on tests/ quizzes
- Have student repeat directions to check for understanding
- Highlighted text visual presentation
- Modified assignment format
- Modified test content
- Modified test format
- Modified test length
- Multiple test sessions
- Multi-sensory presentation
- Preferential seating
- Preview of content, concepts, and vocabulary
- Reduced/shortened written assignments
- Secure attention before giving instruction/directions
- Shortened assignments
- Student working with an assigned partner
- Seacher initiated weekly assignment sheet
- Use open book, study guides, test prototype
- Exploration by interest
- Flexible grouping
- Goal setting with students
- Mini workshops to re-teach or extend skills Open-ended activities
- Think-Pair-Share
- Varied supplemental materials

Unit 1 Overview: Weather and Climate

Unit 1 Summary: Students investigate and make predictions about the weather through careful observation of the clouds and wind. Students also learn to differentiate between weather and climate and use models to reveal global climate patterns.

Essential Questions:

- Can we predict the kind of weather that we will see in the spring, summer, autumn, or winter?
- How can climates in different regions of the world be described?
- How can we protect people from natural hazards such as flooding, fast wind, or lightening?
- Where do clouds come from?
- How can we predict when it's going to storm?
- Where is the best place to build a snow fort?* optional lesson
- Why are some places always hot?
- How can you keep a house from blowing away in a windstorm?

New Jersey Student Learning Standards
(Please Bold all Climate related standards met throughout all Units)

New Jersey Student Learning Standards: Science

- 3-ESS2-1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.[Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.
- 3-ESS2-2 Obtain and combine information to describe climates in different regions of the world.
- 3-ESS3-1 Make a claim about the merit of a design solution that reduces the impacts of climate change and/or a weather-related hazard.*[Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods.]

Interdisciplinary Connections:

- **Speaking and Listening:**
- SL3.1- Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.
- SL3.6- Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.
- **English Language Arts:**
- RI.3.1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
- RI3.3- 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.
- W3.2- Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- W3.10- Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences
- **SEL:**
- SelfAwarenes-Recognize one's personal traits, strengths, and limitations • Recognize the importance of self-confidence in handling daily tasks and challenges
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- **Mathematics**
- 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.MD.B.3 - Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.
- MP.2 - Reason abstractly and quantitatively.
- MP.4 - Model with mathematics.
- MP.5 - Use appropriate tools strategically.

Disciplinary Core Ideas

- **ESS2.D: Weather and Climate**

- Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. (3-ESS2-1)
- Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. (3-ESS2-2)

Science and Engineering Practices

Analyzing and Interpreting Data

- Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.
    - Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. (3-ESS2-1)

Obtaining, Evaluating, and Communicating Information

- Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.
- Obtain and combine information from books and other reliable media to explain phenomena. (3-ESS2-2)

Crosscutting Connections

Patterns

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

Unit 1 Student Learning Objectives

Students will know:

- What clouds are made of and how they form.
- How how weather will change
- The effects of natural hazards, such as tornadoes, hurricanes, and dust storms.
- Seasonal weather conditions across different regions
- What the word climate means and explore the world's five major climates.

Students will be able to:

- Observe what happens when water changes from liquid to gas.
- Make predictions about the weather by observing clouds and their changes
- Record and practice storm prediction..
- Produce a world map and spot patterns in order to discover the various climates.
- Design multiple solutions to keep a house from blowing away in a windstorm, then compare the merits of their solutions.
- Make a claim about the merit of a design solution that reduces the impacts of climate change and/or a weather-related hazard.
- Explore seasonal weather conditions across different regions. They investigate how weather patterns can be used to make predictions about future weather

Unit 1 Assessments

Formative Assessments
- Entrance/Exit Tickets, Slate Work, Science Notebook Entries, Activities

Summative Assessments
- Science Lesson Assessments, Rubrics for Exploration

Benchmark Assessments
- End of Unit Assessment

Alternative Assessment:
- Notebook- Use of composition notebook for a journal

Unit 2 Overview: Forces, Motion and Magnets

Unit 2 Summary: Students explore the forces all around them. They investigate the effects of balanced and unbalanced forces, the pushes and pulls of bridge structures, and the effects of friction on the motion of objects. Students also explore the power of magnetic forces and investigate firsthand how these forces can be used to help us in our everyday lives..

Essential Questions:
- Can we use patterns that we observed to predict the future?
- What are the relationships between electrical and magnetic forces?
- How can we use our understandings about magnets be used to solve problems?
- How could you win a tug-of-war against a bunch of adults?
- What makes bridges so strong?
- How high can you swing on a flying trapeze? *optional beta test lesson
- What can magnets do?
- How can you unlock a door using a magnet?* optional lesson

New Jersey Student Learning Standards

New Jersey Student Learning Standards: Science

- 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.]

Interdisciplinary Connections:

Speaking and Listening:

- SL3.1- Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.
- SL3.6- Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.

English Language Arts:

- RI.3.1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
- RI3.3- 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.
- W3.2- Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- W3.10- Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences

SEL:

- SelfAwarenes-Recognize one's personal traits, strengths, and limitations • Recognize the importance of self-confidence in handling daily tasks and challenges

Mathematics

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

- MP.2 - Reason abstractly and quantitatively.
- MP.5 - Use appropriate tools strategically.

Disciplinary Core Ideas

PS2.A: Forces and Motion

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

Science and Engineering Practices

Asking Questions and Defining Problems

- Asking questions and defining problems in grades 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.
    - Ask questions that can be investigated based on patterns such as cause and effect relationships. (3-PS2-3)
    - Define a simple problem that can be solved through the development of a new or improved object or tool. (3-PS2-4)

Planning and Carrying Out Investigations

- Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.
- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3-PS2-1)
- Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (3-PS2-2)

Connections to Nature of Science

Science Knowledge is Based on Empirical Evidence

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

Scientific Investigations Use a Variety of Methods

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

Crosscutting Connections

Patterns

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

Cause and Effect

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

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology

- Scientific discoveries about the natural world can often lead to new and improved technologies, which are developed through the engineering design process. (3-PS2-4)

Unit 2 Student Learning Objectives

Students will know:

- Students will know that by learning to think about pushes and pulls — forces — they can accomplish extraordinary things!
- That if an object is at rest, two equal forces in opposite directions will cause the object to stay at rest.
- How forces can be used to engineer a strong bridge/structure.
- How to investigate the patterns of motion exhibited by a trapeze. They make observations and take measurements of the motion of that model and use that data to predict the motion of a real trapeze.
- How to explain what kinds of materials magnets attract
- Explain how magnetic force can pass through some non-magnetic materials.
- Explain how/why two like poles repel and how two unlike poles attract.
- Explain magnetic attraction and repulsion

Students will be able to:

- Identify if an action is a push or pull and explain how the amount of force applied to an object can cause different results.
- Use their knowledge of bridge design and forces to engineer a strong bridge made of paper.
- In the activity, Trapeze Tester, students build a model trapeze.
- They make observations and take measurements of the motion of that model and use that data to predict the motion of a real trapeze.
- Demonstrate that like poles of two magnets repel each other
- Demonstrate that opposite poles of two magnets attract each other
- Demonstrate and explain that magnetic force can pass through some non-magnetic materials
- Investigate magnetic attraction and repulsion
- Apply scientific ideas about magnets to create a useful product
- Engage in the engineering design process to test and improve designs

Unit 2 Assessments

Formative Assessments:
- Entrance/Exit Tickets, Science Notebook Entries, Activities

Summative Assessments:
- Science Lesson Assessments, Rubrics for Exploration

Benchmark Assessments:
- End of Unit Assessment

Alternative Assessments:
- Journal
- STEM Activities

Unit 3 Overview: Heredity, Survival, & Selection

Unit 3 Summary: Students compare the structures and functions of traits that enable organisms to survive in a specific environment. Analyzing the traits of animals provides evidence for how those traits vary, how they are inherited, and how they have changed over time through selection. Students also examine how the environment can affect inherited traits and determine which animals will survive in a particular environment.

Essential Questions:

- What kinds of traits are passed on from parent to offspring?
- What environmental factors might influence the traits of a specific organism?
- How do you identify a mysterious fruit?
- What do dogs and pigeons have in common?
- How could a lizard's toes help it survive?
- Why do dogs wag their tails?
- How long can people (and animals) survive in outer space?

New Jersey Student Learning Standards

New Jersey Student Learning Standards: Science

- 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.]

Interdisciplinary Connections:

Speaking and Listening:

- **SL3.1-** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.
- **SL3.6-** Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.

English Language Arts:

- **RI.3.1.** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
- **RI3.3-** 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.
- **W3.2-** Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- **W3.10**- Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences

SEL:

- Recognize one's personal traits, strengths, and limitations • Recognize the importance of self-confidence in handling daily tasks and challenges

Mathematics:

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

Disciplinary Core Ideas

LS1.B: Growth and Development of Organisms

- Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. (3-LS1-1)

Science and Engineering Practices

Developing and Using Models

- Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.
    - Develop models to describe phenomena. (3-LS1-1)

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence

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

Crosscutting Connections

Patterns

- Patterns of change can be used to make predictions. (3-LS1-1)

Unit 3 Student Learning Objectives

Students will know:

- Which fruits are related to each other based on traits of leaves, flowers, and arrangement of seeds
- Students will explore the extreme trait variation of different dog breeds -- and pet pigeon breeds
- How nature, not human beings, can slowly change the appearance of an animal using the process of selection.
- How plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms
- How the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.
- Why dogs' expressions, like tail wagging, are so useful when living in a pack

Students will be able to:

- Explore similarities and differences in the leaves, flowers, and fruits of plants found at the grocery store to sort them into groups and identify patterns of inheritance.
- Analyze trait similarities and differences among parent, offspring, and sibling pigeons. They interpret this data to discover that the variation and inheritance of traits creates a pattern that explains why we see such extreme traits in artificially selected animal breeds.
- Simulate how natural selection affects a group of tree-climbing green lizards when their island is invaded by hungry brown lizards.
- Students gather evidence to explain how a change to the environment can cause a certain trait to become more common in a population over time through the process of natural selection.
- 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.
- Watch videos of different animals that live in groups to simulate observing them in their natural habitats.
- Discuss and record their observations, and construct an explanation of how living in groups helps these animals survive.
- Analyze how a NASA astronaut's traits changed during his "year in space." Then they measure some of their physical traits (arm strength, height, and balance) and predict how their own traits might change after living in space.

Unit 3 Assessments

Formative Assessments
- Entrance/Exit Tickets, Science Notebook, Activities

Summative Assessments
- Science Lesson Assessments, Rubrics for Exploration

Benchmark Assessments
- End of Unit Assessment

Alternative Assessment:
- Seed Observation Activity
- Plant Maze Project Use shoebox to create a maze for your plant to grow up to the light
- Life Cycle of Plants Activities Could be used as a prerequisite lesson/differentiation lesson
- Life Cycle of Plants booklet

Supplemental Materials/References/Links

Unit 4 Overview: Fossils & Changing Environments

Unit 4 Summary: Students develop an understanding of how animals and their environments change through time. Fossils provide a window into the animals and habitats of the past. Analyzing the traits of animals provides evidence for how those traits vary, how they are inherited, and how they have changed over time. Students also examine how the environment can affect inherited traits and determine which animals will survive in a particular environment.

Essential Questions:

- Where can you find whales in a desert?
- How do we know what dinosaurs looked like?
- Can you outrun a dinosaur?

New Jersey Student Learning Standards

New Jersey Student Learning Standards: Science

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

Interdisciplinary Connections:

Speaking and Listening:

- SL3.1- Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.
- SL3.6- Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.

English Language Arts:

- RI.3.1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
- RI3.3- 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.
- W3.2- Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- W3.10- Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences

SEL:

- SelfAwarenes-Recognize one's personal traits, strengths, and limitations • Recognize the importance of self-confidence in handling daily tasks and challenges

Mathematics:

- 3.MD.B.4 - Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate unitsâ€" whole numbers, halves, or quarters. (3-LS3-2)
- MP.2 - Reason abstractly and quantitatively. (3-LS3-2)

- MP.4 - Model with mathematics. (3-LS3-2)

Disciplinary Core Ideas

LS2.D: Social Interactions and Group Behavior

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

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)

LS4.A: Evidence of Common Ancestry and Diversity

- Some kinds of plants and animals that once lived on Earth are no longer found anywhere. (Note: moved from K-2) (3-LS4-1)
- Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. (3-LS4-1)

LS4.B: Natural Selection

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

LS4.C: Adaptation

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

LS4.D: Biodiversity and Humans

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

Science and Engineering Practices

Engaging in Argument from

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

Analyzing and Interpreting Data

- Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.
- Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS4-1)

Constructing Explanations and Designing Solutions

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

Engaging in Argument from Evidence

- Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).
    - Construct an argument with evidence. (3-LS4-3)
    - Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. (3-LS4-4)

Crosscutting Connections

Cause and Effect

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

Scale, Proportion, and Quantity

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

Systems and System Models

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

Connections to Engineering, Technology, and Applications of Science

- **Interdependence of Science, Engineering, and Technology**
  - Knowledge of relevant scientific concepts and research findings is important in engineering. (3-LS4-4)

Connections to Nature of Science

- **Scientific Knowledge Assumes an Order and Consistency in Natural Systems**
  - Science assumes consistent patterns in natural systems. (3-LS4-1)

Unit 4 Student Learning Objectives

Students will know:

- The idea that the rock under our feet sometimes contains fossils of animals you wouldn't necessarily find in the area now.
- How to compare the traits of dinosaur fossils with the traits of modern animals in order to help a paleoartist draw a dinosaur as accurately as possible.
- How a dinosaur's footprints reveal how quickly a dinosaur was running.

Students will be able to:

- Use paper to create a model fossil dig.
- Identify traits of fossils to determine what the habitat looked like when these organisms were alive.
- Analyze data from dinosaur fossils in order to provide evidence about the appearance and behavior of those dinosaurs when they were living.
- Give examples of how nature, not human beings, can slowly change the appearance of an animal using the process of selection.

Unit 4 Assessments

Formative: Entrance/Exit Tickets, Science Notebook Entries, Activities

Summative: Science Lesson Assessments, Rubrics for Exploration

Benchmark: End of Unit Assessment

Alternative Assessment: Interactive Notebook

Supplemental Materials/References/Links

Unit 5 Overview: Life Cycles

Unit 5 Summary: Students compare and contrast the life cycles of both animals and plants. Students create models to build an understanding that all organisms share certain stages in their life cycles: birth, growth, reproduction, and death. Students also explore how an understanding of life cycles can aid in solving problems that occur when there are too many or too few organisms in a particular environment.

Essential Questions:

- Do all living things have the same life cycle?
- Are there advantages to being different?
- How is your life like an alligator's life?
- What's the best way to get rid of mosquitos?
- Why do plants grow flowers?
- Why do plants give us fruit?
- Why are there so many different kinds of flowers?

New Jersey Student Learning Standards

New Jersey Student Learning Standards: Science

- 3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.
- 3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.
- 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- Foundational for 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.
- Foundational for 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.

Interdisciplinary Connections:

- **Speaking and Listening:**
- SL3.1- Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.
- SL3.6- Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.
- **English Language Arts:**
- RI.3.1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
- RI3.3- 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.
- W3.2- Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- W3.10- Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences
- **SEL:**
- SelfAwarenes-Recognize one's personal traits, strengths, and limitations • Recognize the importance of self-confidence in handling daily tasks and challenges
- **Mathematics:**
- 3.MD.B.4 - Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate unitsâ€" whole numbers, halves, or quarters. (3-LS3-2)
- MP.2 - Reason abstractly and quantitatively. (3-LS3-2)
- MP.4 - Model with mathematics. (3-LS3-2)

Disciplinary Core Ideas

- LS1.B: Growth and Development of Organisms Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. (3-LS1-1)
- LS2.C: Ecosystem Dynamics, Functioning, and Resilience
    - When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die. (secondary to 3-LS4-4)

- LS4.A: Evidence of Common Ancestry and Diversity
    - Some kinds of plants and animals that once lived on Earth are no longer found anywhere. (Note: moved from K-2) (3-LS4-1)
    - Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. (3-LS4-1)
- LS4.B: Natural Selection
    - Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (3-LS4-2)
- LS4.C: Adaptation
    - For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)
- LS4.D: Biodiversity and Humans Populations live in a variety of habitats, and change in those habitats affects the organisms living there. (3-LS4-4)

Science and Engineering Practices

Developing and Using Models

- Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.
    - Develop models to describe phenomena. (3-LS1-1**)**

Connections to Nature of Science

- Scientific Knowledge is Based on Empirical Evidence
    - Science findings are based on recognizing patterns. (3-LS1-1)

Analyzing and Interpreting Data

- Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.
    - Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS4-1)

Constructing Explanations and Designing Solutions

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

Engaging in Argument from Evidence

- Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).
    - Construct an argument with evidence. (3-LS4-3)
    - Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. (3-LS4-4)

Crosscutting Concepts

- Patterns of change can be used to make predictions. (3-LS1-1)

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change. (3-LS4-2),(3-LS4-3)

Scale, Proportion, and Quantity

- Observable phenomena exist from very short to very long time periods. (3-LS4-1)
- Systems and System Models A system can be described in terms of its components and their interactions. (3-LS4-4)

Connections to Engineering, Technology, and Applications of Science

- Interdependence of Science, Engineering, and Technology

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

Connections to Nature of Science

- Scientific Knowledge Assumes an Order and Consistency in Natural Systems
  - Science assumes consistent patterns in natural systems. (3-LS4-1)

Unit 5 Student Learning Objectives

Students will know:

- Although the lives of animals can be very different, they all have in common birth, growth, reproduction, and death.
- The role of mosquitoes in carrying diseases such as malaria.
- How and why flowers are pollinated.
- Why plants grow fruit.
- While there is great diversity among flowering plants, they all share similar life cycles.
- That plants start from seeds, grow, and eventually reproduce through the process of pollination.

Students will be able to:

- Develop a model to compare the life stories of different animals.
- Evaluate the merits of different solutions for getting rid of mosquitoes at various locations in a town.
- Design a solution to help the town deal with an abundance of mosquitoes resulting from a very rainy summer.
- Make flower models out of paper and bee models out of pipe cleaners.
- Fly their bees from flower to flower and observe what happens to the flower's pollen during this process.
- Examine common grocery produce and predict if each item is a science fruit or science vegetable.
- Observe and predict how changes to the pollinators affect plant reproduction, which affects the life cycles of those plants.

Unit 5 Assessments

Formative: Entrance/Exit Tickets, Science Notebook Entries, Activities, etc.

Summative: Science Lesson Assessments, Rubrics for Exploration

Benchmark: End of Unit Assessment

Alternate Assessment:
Interactive Notebook

Supplemental Materials/References/Links