CAPE MAY CITY
ELEMENTARY SCHOOL

# Grade 3 Science Curriculum

*This curricula and accompanying instructional materials have been developed to align with the NJSLS and in accordance with the NJ Department of Education's guidelines to include: Curriculum designed to meet grade level expectations, integrated accommodations and modifications for students with IEPs, 504s, ELLs, and gifted and talented students, assessments including benchmarks, formative, summative, and alternative assessments, a list of core instructional and supplemental materials, pacing guide, interdisciplinary connections, integration of 21st century skills, integration of technology, and integration of 21st Century Life and Career standards.*

## About the Standards

In 1996, the New Jersey State Board of Education adopted the state's first set of academic standards called the Core Curriculum Content Standards. The standards described what students should know and be able to do upon completion of a thirteen-year public school education. Over the last twenty years, New Jersey's academic standards have laid the foundation for local district curricula that is used by teachers in their daily lesson plans.

Revised every five years, the standards provide local school districts with clear and specific benchmarks for student achievement in nine content areas. Developed and reviewed by panels of teachers, administrators, parents, students, and representatives from higher education, business, and the community, the standards are influenced by national standards, research-based practice, and student needs. The standards define a "Thorough and Efficient Education" as guaranteed in 1875 by the New Jersey Constitution. Currently the standards are designed to prepare our students for college and careers by emphasizing high-level skills needed for tomorrow's world.

The New Jersey Student Learning Standards include Preschool Teaching and Learning Standards, as well as nine K-12 standards for the following content areas: **21st Century Life and Careers, Comprehensive Health and Physical Education, English Language Arts, Mathematics, Science, Social Studies, Technology, Visual and Performing Arts, World Languages**

The 2020 NJSLS in Science were adopted by the State Board of Education on June 3, 2020. Districts are required to implement by September 2022. The 2020 New Jersey Student Learning Standards webpage provides links to the 2020 NJSLS and information regarding curriculum implementation dates.

**Cape May City Elementary School District Science Curriculum**

**Science Pacing Guide**

**Content Area: Science**

Our elementary science program is founded upon the New Jersey Student Learning Standards for Science, which emphasizes three dimensions to promote scientific literacy for all student scientists. The core three dimensions of science learning, which are integrated into all science learning activities, are: **Science and Engineering Practices, Disciplinary Core Ideas, and Cross Cutting Concepts.** These three dimensions can also be thought of as, **"what scientists do," "what scientists need to know," and "common themes found throughout all science disciplines."**

To implement these standards and corresponding dimensions, our district utilizes highly interactive and engaging activities. These dynamic activities are categorized into three main units of study. and present hands-on, real-world science experiences matched to the developmental level of students.

**Three Main Units of Study:**

1. Physical Science,
2. Earth & Space Science, and
3. Life Science

| **Course Title: Grade 3 Science** | **Grade level: 3** |
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| **Unit I:**<br>**3-PS2: Motion and Stability: Forces and Interactions**<br>**Instructional Days: 15**<br>In this unit of study, students determine the effects of balanced and unbalanced forces on the motion of an object. The crosscutting concepts of patterns and cause and effect are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in planning and carrying out investigations. Students are also expected to use these practices to demonstrate understanding of the core ideas.This unit is based on 3-PS2-1,2, 3, and 4 and 3-5-ETS1-1, 2, and 3. | **Dates for Unit: September to November**<br>**<u>Pacing Guide:</u>**<br>Week 1: Balanced and unbalanced forces<br>Week 2: Observe patterns to predict future motion<br>Week 3:Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.<br>Week 4: Review and build a magnetic device to explain invisible forces. |
| **Unit II:**<br>**Life Science-Molecules to Ecosystems**<br>**3-LS1: From Molecules to Organisms: Structures and Processes,**<br>**3-LS2: Ecosystems: Interactions, Energy, and Dynamics,**<br>**Instructional Days: 15**<br>In this unit of study, students acquire an understanding that organisms have different inherited traits, and that the environment can also affect the traits that an organism develops. The crosscutting concepts of patterns and cause and effect are called out as organizing concepts for these disciplinary core ideas. Students develop an understanding of the idea that when the environment changes, some organisms | **Dates for Unit: November to February**<br>**<u>Pacing Guide: 15 days</u>**<br>Week 1: Birth, growth, reproduction, and death of flowering plants<br>Week 2: Plant adaptations for survival<br>Week 3: Survival and being part of group<br>Week 4: Flowering plant "Life Cycle" poster presentation |

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| survive and reproduce, some move to new locations, some move into the transformed environment, and some die. Students are expected to demonstrate grade-appropriate proficiency in analyzing and interpreting data, constructing explanations, and designing solutions. Students are also expected to use these practices to demonstrate understanding of the core ideas. This unit is based on 3-LS3-1, 3-LS3-2, and 3-LS4-1 | |
| **Unit III:**<br>**Life Science-Heredity & Biological Traits**<br>**3-LS3-1-2: Heredity: Inheritance and Variation of Traits**<br>**3-LS4-1-4: Biological Evolution: Unity and Diversity**<br>**Instructional Days: 15**<br>In this unit, students develop an understanding of the similarities and differences in organisms' life cycles. In addition, students use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. Students will also develop an understanding of how environmental changes affect plants and animals in their habitats. The crosscutting concepts of cause and effect and the interdependence of science, engineering, and technology are called out as organizing concepts for these disciplinary core ideas. This unit is based on 3-LS3-1, LS3-2, 3-LS4-1, 3-LS4-2. 3-LS4-3, and 3-LS4-4. | **Dates for Unit: February to March**<br>**<u>Pacing Guide: 15 days</u>**<br>Week 1: Environmental traits<br>Week 2: Variation of traits<br>Week 3: Patterns: similarities and differences in traits shared by non-human offspring, parents, and other siblings<br>Week 4: Inherited traits<br>Week 5: Surviving and finding mates<br>Week 6: Major fossil types, sizes, and distribution<br>Week 7: Environmental changes for plants and animals: explore cause and effect relationships such as thorns and camouflage.<br>Week 8: Organisms and habitats depend on each other. Construct an argument with a diorama of evidence to show why some animals can survive well, not so well, or not at all in some habitats. |
| **Unit IV:**<br>**Instructional Days: 20**<br>**Earth Science:**<br>**3-ESS2: Earth's Systems**<br>**3-ESS3: Earth and Human Activity**<br>In this unit of study, students use and organize data by creating pictographs and bar graphs to describe typical weather conditions expected during a particular season. Students will also study regional climates of the world to better understand climate changes. By applying their understanding of weather-related hazards, students will be able to make a claim about the merit of a design solution that reduces the impacts of such hazards. The crosscutting concepts of patterns, cause and effect, and the influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in asking questions and defining problems, analyzing and interpreting data, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are also expected to use these practices to demonstrate understanding of the core ideas. This unit is based on 3-ESS2-1 and 2, 3ESS3-1, and 3-5-ETS1-1. | **Dates for Unit: March to May**<br>**<u>Pacing Guide: 20 days</u>**<br>Week 1: Research the regional climates of the world<br>Week 2: Choose a specific region of the world to create pictographs and bar graphs of average seasonal temperature, precipitation, and wind direction. Then make predictions about future weather patterns.<br>Week 2: Study the weather predictions to determine how patterns of change can help us to make predictions.<br>Week 3: Research cause and effect relationships of natural hazards<br>Week 4: Design and sketch out solutions to weather related hazards, such as floods, wind, and lightning. |

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| **Unit V:**<br>**3-5-ETS1: Engineering Design**<br>**Instructional Days: 15**<br>In this unit students will study the influence of engineering, technology, and science on society and the natural world around them. People's needs and wants change over time, as do their demands for new and improved technologies. Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. Students will demonstrate grade-appropriate proficiency in asking questions and defining problems, analyzing and interpreting data, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are also expected to use these practices to demonstrate understanding of the core ideas. This unit is based on 3-5-ETS1, 2, and 3. | **Dates for Unit: May to June**<br>**Pacing Guide: 15 days**<br>Week 1: .How do we define a problem?<br>Week 2:. How do we design a solution?<br>Week 3: .How do we test and improve a solution?<br>Week 4: "What Does My Plant Need?" presentations |
| **Date Created: 04/12/2022** | **Board Approved On: 8/18/22** |

Note: The number of instructional days is an estimate based on the information available at this time. 1 day equals approximately 42 minutes of seat time. Teachers are strongly encouraged to review the entire unit of study carefully and collaboratively to determine whether adjustments to this estimate need to be made.

**Cape May City Elementary School District Grade 3 Science Curriculum**
**Unit I Overview**

**Content Area: Science**

**Unit Title: Unit I**
**3-PS2: Motion and Stability: Forces and Interactions**

**Target Course/Grade Level: 3**

**Unit Summary: Learning Goal**
In this unit of study, students determine the effects of balanced and unbalanced forces on the motion of an object.

**Interdisciplinary Connections:**
- Science, Technology, English / Language Arts, Health, Social Emotional Learning, Mathematics, Social Studies

**Career Readiness: Life Literacies and Key Skills Standards:**
- Career Readiness, Life Literacies and Key Skills
  - These include critical thinking, problem solving, creativity, innovation, collaboration, teamwork and leadership, cross-cultural understanding, and interpersonal communication and science.
  - Incorporation of relevant technologies as tools as part of instruction (i.e. Chromebooks, Touch screen devices, manipulatives, certified assistive technologies for students with special needs, etc.)
  - Developing effective communication
  - Developing Independent Learning Strategies
  - Incorporating Science, Technology, Engineering, and Mathematical themes into daily lessons

**Learning Targets:**

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

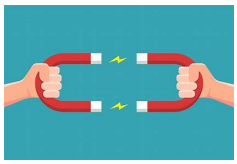
**3-PS2-2** Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. Clarification Statement: Examples of motion with a predictable pattern could include a child swinging in a swing, a ball rolling back and forth in a bowl, and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

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

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

| Unit Activity | Suggested Learning Activities |
|---|---|
| **I.** | **Science and Engineering Practice:** 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)<br><br>**DCI:** 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)<br><br>**Crosscutting Concepts:** Connections to Engineering, Technology, and Applications of Science Interdependence of Science, Engineering, and Technology Scientific discoveries about the natural world can often lead to new and improved technologies, which are developed through the engineering design |

process. (3- PS2-4) Connections to Nature of Science Science Knowledge is Based on Empirical Evidence  Science findings are based on recognizing patterns. (3-PS2-2) Scientific Investigations Use a Variety of Methods, Science investigations use a variety of methods, tools, and techniques. (3-PS2-1)



**Follow That Force-Lesson!-Lesson Plan Activity**

**First watch the video:**
Video

**Discuss six basic facts about magnets:**

1. A magnet has two ends called poles, one of which is called a north pole or north-seeking pole, while the other is called a south pole or south-seeking pole.
2. The north pole of one magnet attracts the south pole of a second magnet, while the north pole of one magnet repels the other magnet's north pole. So we have the common saying: like poles repel, unlike poles attract.
3. A magnet creates an invisible area of magnetism all around it called a magnetic field.
4. The north pole of a magnet points roughly toward Earth's north pole and vice-versa. That's because Earth itself contains magnetic materials and behaves like a gigantic magnet.
5. If you cut a bar magnet in half, you get two brand new, smaller magnets, each with its own north and south pole.
6. If you run a magnet a few times over an unmagnetized piece of a magnetic material (such as an iron nail), you can convert it into a magnet as well. This is called magnetization.

**Materials: One set for each group/individual, or one set to do as a whole group.**

- Ceramic donut magnet
- Rectangle or square ceramic magnets
- Magnetic wand
- 12" skewers or small wooden dowels
- Small rubber bands
- String or yarn

**Instructions:**

1. Connect the ends of two skewers (or wooden dowels), so they overlap slightly with a small rubber band.
2. Connect a third skewer to the first two skewers with rubber bands to make a triangle shape.
3. Cut a piece of string or yarn about eight inches, and tie the end around the ceramic donut magnet.
4. Repeat step one with two additional skewers.
5. Connect the two skewers from step four to the triangle base with rubber bands to form a pyramid.
6. Before connecting the last skewer to the tip of the pyramid, set the string in the middle of the skewers, so the donut magnet hangs from the center of the pyramid about 1.5" from the base.
7. Place two rectangle magnets under the hanging magnet.
8. Gently slide the rectangle magnets around the base of the pyramid.
9. Allow children to move the rectangle magnets around as they please and observe the nature of the donut magnet.

Discuss how the magnets reacted to each other in and out of the magnetic field. Discuss that the magnetic field is an invisible force. Students can write and draw their reaction to this experiment in their science journal or a piece of paper.

## Gifted and Talented: Enrichment Links and Writing Prompts

**Links:**
How Can You Go Faster on a Slide?
Strong Bridges
Raw or Boiled Eggs
Magnetic Canon
Programmable Magnets
Coupled Pendulum
Tug of War
Tug of War-Hopper Popper
Invisible Force-Magnets
Gravity

**Writing Prompts:**
Draw or write sentences to finish the prompts.
"How do equal and unequal forces on an object affect the object?"
"Can an object's motion be predicted?"
"How can our knowledge of magnets be used to solve problems?"
"How can you win a tug of war against a bunch of adults?"
"How can you go faster down a slide?"
"What jobs can magnets do?"
"How can a magnet unlock a door?

## At-Risk, Including ELL: Resources to Enhance Understanding

**Books:** A Beginner's Guide to Electricity and Magnetism by Gill Arbuthnot. Bloomsbury, 2016. A colorful and friendly guide. 64 pages for ages 8–10. The Attractive Story of Magnetism with Max Axiom, Super Scientist by Andrea Gianopoulos. Capstone Press, 2008/2019. A graphic novel with integrated smartphone app that will appeal to reluctant readers. Magnet Science by Glen Vecchione. Sterling Pub. Co, 2007, Magnets: Mind-boggling Experiments You Can Turn Into Science Fair Projects by Janice VanCleave. Sterling Pub. Co, 2007. A classic selection of hands-on activities

**Reading A to Z: Most Books are in English and Spanish**
Gotta Get Away From Gravity, Level P
Galileo, Level S
Life in Space, Level S
Magnetism, Level P
The Power of Magnets, Level P
Faster and Farther, Moving with Force, No Level
Energy in Motion, No Level

**Video Links:**
Simple Gravity
Ryan's World-Gravity
Static Electricity
Six Static Electricity Experiments
Magnetic Forces Lab
Fun with Magnets
Magnetism-Invisible Force

**Cape May City Elementary School District Grade 3 Science Curriculum**
**Unit II Overview**

**Content Area: Science**

**Unit Title: Unit II**
**Life Science-Molecules to Ecosystems:**
**3-LS1: From Molecules to Organisms: Structures and Processes**
**3-LS2: Ecosystems: Interactions, Energy, and Dynamics**

**Target Course/Grade Level: 3**

**Unit Summary: Learning Goal**
In this unit of study, students acquire an understanding that organisms have different inherited traits, and that the environment can also affect the traits that an organism develops.
Students will be able to:

- Study birth, growth, reproduction, and death of flowering plants
- Research plant adaptations for survival
- Study how being part of group is helpful for animal survival
- Develop an understanding of the idea that when the environment changes, some plants and animals survive and reproduce, some move to new locations, some move into the transformed environment, and some die.

**Interdisciplinary Connections:**

- Science, Technology, English / Language Arts, Health, Social Emotional Learning, Mathematics, Social Studies

**Career Readiness: Life Literacies and Key Skills Standards:**

- Career Readiness, Life Literacies and Key Skills
- These include critical thinking, problem solving, creativity, innovation, collaboration, teamwork and leadership, cross-cultural understanding, and interpersonal communication and science.
- Incorporation of relevant technologies as tools as part of instruction (i.e. Chromebooks, Touch screen devices, manipulatives, certified assistive technologies for students with special needs, etc.)
- Developing effective communication
- Developing Independent Learning Strategies
- Incorporating Science, Technology, Engineering, and Mathematical themes into daily lessons

**Learning Targets:**

- **3-LS1-1** Develop models to describe that organisms have unique and diverse life cycles, but all have in common birth, growth, reproduction, and death. [Clarification Statement: Changes organisms go through during their life form a pattern.] [Assessment Boundary: Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.]
- **3-LS2-1** Construct an argument that some animals form groups that help members survive.
- **3-LS3-1** Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. [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.].

| Unit Activity | Suggested Learning Activities |
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| **II.** | Asking Questions and Defining Problems Asking questions and defining problems in grades 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships. Ask questions that can be investigated based on patterns such as cause and effect relationships. (3-PS2-3) Define a simple problem that can be solved through the development of a new or improved object or tool. (3-PS2-4) Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. Develop models to describe phenomena. (3-LS1-1) 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)<br>**DCI:** LS1.B: Growth and Development of Organisms Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. (3-LS1-1) LS2.D: Social Interactions and Group Behavior Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size (3-LS2-1) LS3.A: Inheritance of Traits Many characteristics of organisms are inherited from their parents. (3- LS3-1) Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. (3- LS3-2) LS3.B: Variation of Traits Different organisms vary in how they look and function because they have different inherited information. (3-LS3-1) The environment also affects the traits that an organism develops. (3-LS3-2) 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)<br><br>**Crosscutting Concepts:** Patterns of change can be used to make predictions. (3-LS1-1) Connections to Nature of Science Scientific Knowledge is Based on Empirical Evidence Science findings are based on ecognizing patterns. (3-LS1-1) Cause and effect relationships are routinely identified and used to explain change. (3-LS2-1)Scale, Proportion, and Quantity Observable phenomena exist from very short to very long time periods. (3-LS4-1)<br><br>  **Seed Trait and Dispersal Investigation-Lesson Plan Activity**<br>Preview Video<br>**Overview:**<br>In this two day lesson, students discover the unique adaptations of different seeds! First, introduce students to seeds by distinguishing between a fruit and a vegetable. It seems like an easy topic, but some produce people consider to be a vegetable is actually a fruit!<br>**Materials:**<br>Lay out 7 items and ask students to tell if the items are a fruit or a vegetable. Include some odd items they might not see all the time.<br>A variety of nuts<br>Tub of water or a sink of water<br>Worksheet Print Outs<br><br>**Day 1: Discussion**<br>*Fruit – develops from a flower of a plant and contains seeds*<br>*Vegetable – edible plant or plant part that may or may not have a role in the plant's reproductive cycle.*<br><br>Discuss that a fruit contains seeds, review what a seed is. A seed is a small object produced by a plant from which a new plant can grow. They carry the beginning of plants inside of them. Discuss how seeds can travel. Then, students will estimate how many seeds would be in each fruit. Cut the fruit open and |

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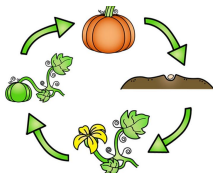
| | students should be ready to explore. Seed Sorting: Worksheet to print! Look at a variety of different seeds to see if you can figure out how they disperse. Observe different nuts too. The students will probably guess that animals probably eat the nuts, because they are too heavy to be carried off by the wind. Put all the seeds in a tub of water to see if they could travel by water. Prior to placing them in the water, make predictions of floating or sinking.<br><br>**Day 2: Help Farmer Joe**<br>Look at the seed traits/dispersal pictures and read the Farmer Joe Letter. Worksheets to print!<br>Work in small groups to fill in the chart, to let Farmer Joe know how the seeds got into his garden.<br><br>Looking at the observable properties/traits of seeds will give students a better understanding of seed adaptations, and dispersal.<br><br>  **Extra Activity-Flowering Plant Life Cycle Poster:**<br>● Students will research a flowering plant of their choice, and create a "Life Cycle" Poster Project to present to the class. |
| **Gifted and Talented: Enrichment Links and Writing Prompts** | |
| **Links:**<br>Animals and Habitats<br>Ice Turns Himalayan Rabbits Black<br>Alligators Survive in Ice<br>Social and Group Behavior<br>Ecosystem Disruptions and Traits<br>Life Cycle of Plants and Animals<br>Life Cycle of a Pumpkin<br>45 Grade 3 Experiments<br>The Grand Canyon: Evidence of Earth's Past<br>**Writing Prompts:**<br>Draw or write sentences to finish the prompts.<br>"What is biodiversity?"<br>"Write about an imaginary animal and a habitat with desirable traits."<br>"What do you know about seed dispersal and adaptations of plants to environments?" | |
| **At-Risk, Including ELL: Resources to Enhance Understanding** | |

**Books:** Tiger Math: Learning to Graph from a Baby Tiger, Ann Whitehead Nagda and Cindy Bickel. Henry Holt (2000),, What's Smaller Than A Pygmy Shrew? Robert E. Wells. Albert Whitman and Co., Whose Tracks are These? A Clue Book of Familiar Forest Animals, Jim Nail. Roberts Rinehart Publishers,

**Reading A to Z: Most Books are in English and Spanish**
Badlands, Level O
The Amazing Amazon, Level U
Woods of Wonders, Level R
Coral Reefs, Level Q
Deserts Dry, Level T
**Video Links:**
BBC Animal Adaptations
Animal Growth and Changes
Animal Life Cycles
PBS Plant Life Cycle Lesson
PBS Sagebrush Sea-Ecosystem

## Cape May City Elementary School District Grade 3 Science Curriculum
## Unit III Overview

**Content Area: Science**

**Unit Title: Unit III**
**Life Science-Heredity & Biological Traits**
**3-LS3: Heredity: Inheritance and Variation of Traits**
**3-LS4: Biological Evolution: Unity and Diversity**

**Target Course/Grade Level: 3**

**Unit Summary: Learning Goal**
In this unit, students develop an understanding of the similarities and differences in organisms' life cycles.
Students will be able to:

- 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.
- Analyze and demonstrate the value of human adaptations, such as feet, eyes, opposable thumbs, and brain.
- Learn about environmental traits
- Learn about variation of traits
- Look for patterns: similarities and differences in traits shared by non-human offspring, parents, and other siblings
- Study inherited traits
- Explore how animals work to find mates and survive
- Research major fossil types, sizes, and distribution
- Look for traits of plants and animals to explore a cause and effect relationship, such as thorns on roses, and camouflage patterns on snakes and other animals.
- Organisms and habitats depend on each other. Construct an argument with a diorama of evidence to show why some animals can survive well, not so well, or not at all in some habitats. Present it to the class.

**Interdisciplinary Connections:**

- Science, Technology, English / Language Arts, Health, Social Emotional Learning, Mathematics, Social Studies

**Career Readiness: Life Literacies and Key Skills Standards:**

- Career Readiness, Life Literacies and Key Skills
  - These include critical thinking, problem solving, creativity, innovation, collaboration, teamwork and leadership, cross-cultural understanding, and interpersonal communication and science.
  - Incorporation of relevant technologies as tools as part of instruction (i.e. Chromebooks, Touch screen devices, manipulatives, certified assistive technologies for students with special needs, etc.)
  - Developing effective communication
  - Developing Independent Learning Strategies
  - Incorporating Science, Technology, Engineering, and Mathematical themes into daily lessons

**Learning Targets:**

**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-LS4-1** Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. [Clarification Statement: Examples of data could include type, size, and distributions of fossil organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.] [Assessment Boundary: Assessment does not include identification of specific fossils or present plants and animals. Assessment is limited to major fossil types and relative ages.]

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

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

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

| Unit Activity | Suggested Learning Activities |
|---|---|
| **III.** | **Science and Engineering Practice:** 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. Clarification: When possible and feasible, digital tools should be used. Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS3-1) Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. Use evidence (e.g., observations, patterns) to support an explanation. (3-LS3-2)<br>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 |

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| | 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)<br>**DCI:**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)<br>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. (3-LS4-1)<br>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)<br><br>**Crosscutting Concepts:** Patterns Similarities and differences in patterns can be used to sort and classify natural phenomena. (3- LS3-1) Cause and Effect Cause and effect relationships are routinely identified and used to explain change. (3-LS3-2)<br>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)<br>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) |

**III.**

**Creative Critter Diorama-Lesson Plan Activity #1**

**Background Information:** An adaptation is a characteristic that makes a plant or animal more suited to its environment, thus improving its chance for survival.

Most living things have a variety of adaptations. These are classified as either behavioral or physical adaptations. Behavioral adaptations include what an animal does and how it behaves in order to survive in a specific environment. Examples of behavioral adaptations include migration, hibernation, gathering and storing food, defense behaviors, and rearing young.

Instinctive behavior is an unlearned, inborn tendency to behave in a way characteristic of a species, i.e. migration.

Learned behavior is gained through observation, experience, or instruction, i.e. stalking prey.

Physical adaptations are the body structures or forms that a plant or animal has that help it survive in a specific environment. These include body coverings, colors and patterns for mimicry or camouflage, and specific physical characteristics of body parts.

Organisms are dependent upon other living things and the nonliving components of the environment for survival. Nonliving factors include water, oxygen, nutrients, space, and sunlight. Populations may adapt (over long periods of time) due to changes in the environment.

Human practices and natural occurrences can influence both living and nonliving components of an ecosystem. Pollution, litter, waste, as well as fires, floods, and erosion can drastically alter an ecosystem. Such changes can impact the ability of organisms to use their adaptations and threaten their survival. If any one component is damaged or lost, it can have far-reaching effects on the other living things in that web of life.

Conservation practices and resource protection are important for the well-being of the environment. People can have a positive influence on ecosystems by learning and practicing responsible environmental stewardship behaviors.

**Lesson Overview:**
Discuss how negative impacts can threaten habitats. If pollution, pesticides, global warming, climate change, fire, flood, litter, or depletion of resources changes a habitat, how could plants or animals survive?
**Objective:**
Students will be able to define physical and behavioral adaptations, and use at least two examples of each in their critter. Students will be able to describe how living organisms use adaptations, instincts, and learned behaviors to get food, find shelter, and provide protection in their diorama habitat. Students will be able to explain how natural and human influences on a habitat can impact an organism's ability to use adaptations to survive. Students will be able to determine how people can contribute to the health of the environment to make a positive change to their diorama habitat.
**Directions:**
Students will make a shoebox diorama representing a habitat scenario with a harmful human or natural impact using clay and other craft materials.

Have them create a "critter" with imaginative adaptations that would help it survive in that habitat. Encourage class discussion and journal writing about human responsibility for the environment.

How can people take better care of habitats and the environment? How does having national parks show care for the environment?

Conclude with a positive message, realizing that caring citizens can make a positive difference in our world. Brainstorm some ways that your class could have a positive effect on the local environment. Present habitats and information to the class!

**Fossils!-Lesson Plan Activity #2: Click the blue link below for lesson details.**

Make Your Own Fossils:

**Instructions:**

Step One:

In the bowl, mix 1 cup of flour and ½ cup of salt. Add 1 cup of used coffee grounds. *Hint: Let the grounds dry out or use a bit less liquid.*

Step Two:

Add 1 cup of cold coffee or water and mix well to create your “sediment”.

During the Eocene there were many different organisms living in the Florissant Valley. The delicate plant and insect fossils in Florissant Fossil Beds National Monument were formed by compression. The plants and insects would fall into the ancient Lake Florissant and settle to the bottom. As the organisms were buried, more sediment was deposited on top and squished them.

Step Three:

Lay out you leaves and sticks on a sheet of wax paper or tin foil. Make sure there’s a bit of space between each item.

Step Four:

Cover your leaves and sticks in the "sediment" mixture you made. It might help to use the spoon to spread it over them bit by bit. Leave some space as you do this to create separate fossils, or you'll get a huge sheet!

Step Five:

Let your fossils dry completely. You can leave them in a widow to let the sunlight help. As the organisms decomposed they left behind a thin carbon film resulting in a dark stain from the organism. This is called carbonization. The carbon films can be thought of as a micro-cast of the organisms. Some of the more sturdy plants, insects, and even mollusks (such as snails or clams) were hard enough to leave behind an impression along with a carbon film.

Step Six:

When your fossils are completely dry, flip them over and carefully remove the remaining leaves and sticks. You should be left with an imprint of them in your new fossils.

Step Seven (Optional):
If you want, you can use brown or tan paint to color the imprints of your fossils to look like carbon left behind by the leaves.

**New Words!**

- **Fossil**: *noun;* a trace or print or the remains of a plant or animal of a past age preserved in earth or rock
- **Cast**: *noun;* the sediment that fills in a mold and takes the shape of the original organism
- **Mold**: *noun;* the frame in which something is constructed or shaped; the sediment that formed around the organism and remains after the organism decays away retaining its form
- **Compression**: *noun;* the act, process, or result of becoming pressed together or reduced in size, amount, or volume by pressure
- **Permineralization**: *noun;* in which minerals are deposited by water and form internal casts of organisms by filling in the spaces inside the organic materials
- **Replacement**: *noun;* the act of new minerals taking the place of the original minerals
- **Trace fossil**: *noun;* the fossil of a footprint, trail, burrow, or other evidence left by a past organism while it was living
- **Carbonization**: *noun;* the process of being changed into or becoming carbon
- **Regurgitalite**: *noun;* fossilized vomit
- **Coprolite**: *noun;* fossilized feces
- **Freezing**: *verb;* to harden into or be hardened into a solid by the loss of heat; to become fixed or motionless.

## Gifted and Talented: Enrichment Links and Writing Prompts

**Links:**
Trait Variations and Heredity
Strange Physical Adaptations
Plant Adaptations to Environments
Heredity
DNA Ancestors
Inherited Traits with Dr. Jeff
Different Types of Fossils
Fossils Rocking the Earth
Laetoli Footprints
The Value of Fossils
Oddest Animal Adaptations
Top 20 Extinct Animals

**Writing Prompts:**
Draw or write sentences to finish the prompts."
"Why do wolves travel as a pack?"
"Compare and contrast the world today to the world when dinosaurs lived. How is the land the same, and how is it different? How did it change?"
"How does human civilization affect the environment and the animals and plants that live there?"
"Why do birds fly south for the winter?
"Why does the peacock show his feathers?
"Why do bees work together to create honey?
"Why do evergreen trees have needles with a thick outer coating (cuticle)?
"Why do most trees have leaves and cacti in the desert have needles?
"Why does an animal have to grow more hair during winter months than summer months?
"What happens if many of the predators in an area prey on the same thing?
"What is the benefit of a plant having thorns?
"How do we know what dinosaurs looked like?"
"Where can you find whales in a desert?"
"Could you outrun a dinosaur?"
"What do fossils tell us about the organisms and the environments in which they lived?"
"What happens to the plants and animals when the environment changes?"

## At-Risk, Including ELL: Resources to Enhance Understanding

**Books:** How the Fawn, Got His Spots, Why Opossum Has a Naked Tail, Dinosaur Lady, by Linda Skeers, Science Comics: Dinosaurs (Facts and Feathers): MK Reed/Joe Flood/This is a graphic novel series with historically accurate information and stories about dinosaurs and their discovery

**Reading A to Z: Most Books are in English and Spanish**
Discovering Dinosaurs, Level O
Early Birds, Fossils and Feathers, Level Y
Dino Duel, Level Z

**Video Links:**
Inherited Traits Song
So Many Habitats!
All About Dinosaurs
Variations of Traits
Inheritance of Traits
Biological Defense Mechanisms of the Regal Horned Lizard

## Cape May City Elementary School District Grade 3 Science Curriculum
## Unit IV Overview

**Content Area: Science**

**Unit Title: Unit IV**

**Earth Science:**

**3-ESS2: Earth's Systems**

**3-ESS3: Earth and Human Activity**

**Target Course/Grade Level: 3**

**Unit Summary: Learning Goal**
In this unit of study, students use and organize data by studying pictographs and bar grapsh, to describe typical weather conditions expected during a particular season.
Students will be able to:

- Research the regional climates of the world
- Choose a specific region of the world to study pictographs and bar graphs of average seasonal temperature, precipitation, and wind direction. Then make predictions about future weather patterns.
- Study the weather predictions to determine how patterns of change can help us to make predictions
- Research cause and effect relationships of natural hazards.
- Design and sketch out solutions to weather related hazards, such as floods, wind, and lightning.

**Interdisciplinary Connections:**

- Science, Technology, English / Language Arts, Health, Social Emotional Learning, Mathematics, Social Studies

**Career Readiness: Life Literacies and Key Skills Standards:**

- Career Readiness, Life Literacies and Key Skills
  - These include critical thinking, problem solving, creativity, innovation, collaboration, teamwork and leadership, cross-cultural understanding, and interpersonal communication and science.
  - Incorporation of relevant technologies as tools as part of instruction (i.e. Chromebooks, Touch screen devices, manipulatives, certified assistive technologies for students with special needs, etc.)
  - Developing effective communication
  - Developing Independent Learning Strategies
  - Incorporating Science, Technology, Engineering, and Mathematical themes into daily lessons

**Learning Targets:**

- 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.]

| Unit Activity | Suggested Learning Activities |
|---|---|
| **IV.** |  **The Hurricane Proof Challenge-Lesson Plan Activity:**<br>Homes all along the Atlantic and Gulf coast are susceptible to wind damage during a hurricane. Some hurricanes can top 150 mph. After the devastation of the last hurricane, home builders in the region have been forced to meet the demands of homeowners and build more damage-resistant housing. You are the lead architect for the largest home builder on the Texas coastline.<br>Your task is to design a house that can withstand hurricane force winds, yet still appeal to homeowners. You will have to be budget conscious with your design and have a house strong enough to stand up to the deadliest hurricanes.<br>● Where will you focus your efforts?<br>● What materials will hold up best to forceful winds?<br>● In what areas of the home will you spend the most money?<br>● Be sure to research some ideas about real hurricane proof homes.<br>Good Luck.<br>**Site to preview and discuss before building the house.**<br><br>**Materials:**<br>This project has a suggested supply list that includes: Cardboard, Glue, Toilet paper/paper towel tubes, Pipe cleaners, Scissors, Paper, Tape, Plastic baggies, Funnels, Paperclips, Rubber bands, |

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| | Toothpicks, Popsicle Sticks or Tongue Depressors The supply list can be adjusted to your situation.<br>Directions:<br>Students could do this as an at home activity or do it in class as a multiple day small group lesson. Students or groups will present them to the class, and give details of how they were made, and why they chose their materials.<br><br>After the house presentation, take them to an area outside of your classroom and use a leaf blower to try and blow them down. The students will then examine each house to see which one survived the best, and determine why it was a survivor of the hurricane winds. Students should take notes in a science journal. Return to the classroom to do a whole group discussion of their observations. |

**Gifted and Talented: Enrichment Links and Writing Prompts**

**Links:**
Habitat Animal Homes
Water Cycle
Ryan's World Weather Experiments
NOAA Education Resource
**Writing Prompts:**
Draw or write sentences to finish the prompts.
How is the weather measured?
How can we predict weather?
What are some severe weather impacts?
What are some types of climates?
How can weather impact the livelihood of people in society?
What role does data collection and meteorology play in the functioning of society?
What are weather patterns that can be observed?

**At-Risk, Including ELL: Resources to Enhance Understanding**

**Books:** Climate and Weather, Baby Professor, Professor Figgy's Weather and Climate Science Lab for Kids: 52 Family-Friendly Activities Exploring Meteorology, Earth Systems, and Climate Change, by Jim Noonan, Martha Stewart, Weather and Climate!: With 25 Science Projects for Kids (Explore Your World) Paperback – by Kathleen M. Reilly (Author), Tom Casteel (Illustrator)
**Reading A to Z: Most Books are in English and Spanish**
Severe Weather, Level T
Weather Wizards, High Winds, Level W
Tornados, Level P
Explorer's Guide to World Weather, Level R
**Video Links:**
Where Does Water Come From?
How Rain is Formed
Be a Weather Watcher
What is a pictograph?
What is a bar graph?

**Cape May City Elementary School District Grade 3 Science Curriculum**

**Unit V Overview**

**Content Area: Science**

**Unit Title: Unit V**
**3-5-ETS1: Engineering Design**

**Target Course/Grade Level: 3**

**Unit Summary: Learning Goal**
In this unit students will study the influence of engineering, technology, and science on society and the natural world around them.

- Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands.
- This unit focuses on the engineering processes. Students will learn how to define problems and design solutions to those problems. Students will learn how to test solutions and make improvements to solutions.

**Interdisciplinary Connections:**

- Science, Technology, English / Language Arts, Health, Social Emotional Learning, Mathematics, Social Studies

**Career Readiness: Life Literacies and Key Skills Standards:**

- Career Readiness, Life Literacies and Key Skills
  - These include critical thinking, problem solving, creativity, innovation, collaboration, teamwork and leadership, cross-cultural understanding, and interpersonal communication and science.
  - Incorporation of relevant technologies as tools as part of instruction (i.e. Chromebooks, Touch screen devices, manipulatives, certified assistive technologies for students with special needs, etc.)
  - Developing effective communication
  - Developing Independent Learning Strategies
- Incorporating Science, Technology, Engineering, and Mathematical themes into daily lessons

**Learning Targets:**
• **3-5-ETS1-1** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
• **3-5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
• **3-5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

| Unit Activity | Suggested Learning Activities |
|---|---|
| **V.** | **Science and Engineering Practices:** Asking Questions and Defining Problems Asking questions and defining problems in 3–5 builds on K–2 experiences and progresses to specifying qualitative relationships. Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1) 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. (3-5-ETS1-3) 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. Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3-5-ETS1-2)

**DCI:** ETS1.A: Defining and Delimiting Engineering Problems Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3-5-ETS1-1) ETS1.B: Developing Possible Solutions Research on a problem, such as climate change, should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2) At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-5-ETS1-2) Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5- ETS1-3) Influence of Engineering, Technology, and Science on Society and the Natural World People's needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1) Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2) ETS1.C: Optimizing the Design Solution Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3)

**Crosscutting Concepts:** Influence of Engineering, Technology, and Science on Society and the Natural World People's needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1) Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2)

**What Does My Plant Need?-Lesson Plan Activity:**

**Overview:**

Engineers design solutions to meet a want or need. Technology is human-made devices or systems that meet a want or need. Brainstorming, planning, designing, modeling, and prototyping are all parts of the engineering process. Engineers must do a lot of pre-work before any final product (technology) is ready for use.

The first step in a design process is to find a problem. Criteria is the desirable features of the solution to an engineering problem. Constraints are the limits on the resources that can be used to solve a problem. Researching past solutions will help you understand problems and avoid making mistakes. Engineers pay close attention to detail, constraints, criteria, and many important aspects. Engineers work to design and test solutions. This plant activity seems very simple, but it encompasses the concept of finding a problem, observing, recording details, and solving the problem.

**Materials:** One plant for each group of 3 to 4 students in your class, One control plant for the teacher who will provide all the needs of that plant, science journals or recording sheets, foil to cover leaves, and masking tape to cover drainage holes

**Anticipatory Set:** Show an image of a plant on the whiteboard, and ask: What are the needs of a plant? Have students do a Think-Pair-Share to discuss their thoughts.(Correct answers include, watering the plant, proper drainage, sufficient sun exposure, etc.)

**Objective:** Students will create a way to test for one of the needs for their group plant, and eventually propose a solution in their science journals.

**Learning Activity:** Using actual plants students will work in groups to choose/create a test situation for the plant they have been given by you. Next, in their journals they will write a hypothesis of what they think the test will do to the plant.

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| | Each group will create one way to test the plant using the tape and/or the foil. They could cover the leaves or the whole plant with foil to test lack of sunlight, they could tape the drainage hole to test lack of drainage, they could never water the plant for a minimum of two weeks to observe what happens. Each group must work together to choose one test for their plant. Students will also record observations of the teacher's plan which will be getting all of its needs met during the two week minimum period of time.<br><br>Over a minimum two week period, students will spend about 5 minutes each day recording their observations, and drawing pictures of their plant. After the observation period the groups will report their problem and proposed solution to the class, then they will compare their plan to the teacher's plan. They will also report if their hypothesis was correct.<br><br>**Note:** Plants without air holes for drainage will cause the roots to die, so they might not see the problem right away. They might have to examine the plant roots to determine why drainage is important.<br><br>**Additional Activity:** Write a paragraph or more about the best way to care for a houseplant. |

## Gifted and Talented: Enrichment Links and Writing Prompts

**Links:**
Crash Course Kids Engineering
Slingshot Straw Rockets
Engineering Projects
Rubberband Helicopter

**Writing Prompts:**
Draw or write sentences to finish the prompts.
How do we define a problem?
Where do solutions come from?
How can we design a solution?
How do we test and improve a solution?
Why do failures make your design better?

## At-Risk, Including ELL: Resources to Enhance Understanding

**Books:** Engaging Young Engineers, by Angi Stone MacDonald, How to be an Engineer, by Carol Vorderman, Awesome Engineering Activities for Kids: 50+ Exciting STEAM Projects to Design and Build (Awesome STEAM Activities for Kids) Paperback

**Reading A to Z: Most Books are in English and Spanish**
Building Big Dreams, Level S
Building Tunnels, Level Q

**Video Links:**
Engineering Test Process
Engineering Design Process
Simplified Engineering
Engineering is Like Making Tacos

**Cape May City Elementary School District Grade 1 Science Curriculum**

**Evidence of Learning**

**Specific Formative Assessments Utilized in Daily Lessons:**

- Suggested Formative Assessment
- Daily independent practice
- Peer Discussions
- Student Portfolio
- Reading/Writing Conferences
- Self-Evaluations
- Anecdotal Notes
- Open-Ended Responses
- Journal Entries
- Reading Logs
- Exit Tickets

**Summative Assessment Utilized throughout Units:**

- Performance Task
- Technology Task

**Benchmarks:**

- Quarterly Benchmarks Generated by the Teacher / Curriculum Committee

**Modifications for English Language Learner's [ELL]**

- Teacher tutoring
- Peer tutoring
- Online Resources
- Cooperative Learning Groups
- Modified Assignments
- Differentiated Instruction
- Response to Intervention (www.help4teachers.com)
- Provide additional examples and opportunities for additional problems for repetition with visuals and manipulatives
- Picture vocabulary
- Picture books
- Simplified language for understanding
- Reader's Theater
- Modify Homework, Assignments and Assessment (can be oral if necessary)
- Cooperative learning
- Retell stories using props
- Additional Center work focusing on alphabet and HFW
- Additional Phonemic Awareness teaching and practice
- Re-teach alphabet and alphabet sounds
- Sentence frames with word bank and pictures
- Songs
- Total Physical Response
- Picture word wall

**Modifications for Special Education Students [IEPs]:**

- Follow all IEP accommodations for each student as to meet each student's individual need
- For extra strategies please review list above in the ELL category for students who have IEPs
- Provide instructional breaks / practice chunking
- Circling back to original topic
- Lexile score modifications

**Modifications for students with 504s:**

- Adhere to the modifications of the 504

- For extra strategies please review list above in the ELL category for students who have IEPs
- Provide instructional breaks / practice chunking
- Circling back to original topic
- Lexile score modifications

**Modifications Gifted and Talented Students:**

- Advanced Lexile Resources
- Independent Study
- Advanced Assignments

**Modifications At-Risk/Basic Skills:**

- Teacher tutoring
- Supplemental / Pull Out Teaching
- Peer tutoring
- Cooperative Learning Groups / Centers
- Modified Assignments
- Differentiated Instruction
- Response to Intervention (www.help4teachers.com)
- Provide additional examples and opportunities for additional problems for repetition with visuals and manipulatives
- Picture vocabulary
- Picture books
- Simplified language for understanding
- Reader's Theater
- Modify Homework, Assignments and Assessment (can be oral if necessary)
- Cooperative learning
- Retell stories using props
- Additional Center work focusing on alphabet and HFW
- Additional Phonemic Awareness teaching and practice
- Re-teach alphabet and alphabet sounds
- Sentence frames with word bank and pictures
- Songs
- Total Physical Response
- Picture word wall

**Teacher Notes:**

- **Career Readiness, Life Literacies, and Key Skills:** Rapid advancements in technology and subsequent changes in the economy have created opportunities for individuals to compete and connect on a global scale. In this increasingly diverse and complex world, the successful entrepreneur or employee must not only possess the requisite education for specific industry pathways but also employability skills necessary to collaborate with others and manage resources effectively in order to establish and maintain stability and independence. This document outlines concepts and skills necessary for New Jersey's students to thrive in an ever-changing world. Intended for integration throughout all K–12 academic and technical content areas, the New Jersey Student Learning Standards- Career Readiness, Life Literacies, and Key Skills (NJSLS-CLKS) provides the framework for students to learn the concepts, skills, and practices essential to the successful navigation of career exploration and preparation, personal finances and digital literacy that rewards innovation, creativity, and adaptation to change.

**Project-based Learning Tasks:**

- Ongoing student portfolio assessments [created by faculty] to monitor student progress.

**Vocabulary:**

- In-text vocabulary should be incorporated into every unit. Word journals, vocabulary walls, and/or various other activities should be utilized by the instructor to teach vocabulary.
- Story, key details, retell, describe, main topic, rhyming words, syllables, story elements, character, setting, question,

question words, front cover, back cover, title page, narrative, favorite, informational text, rules, connection, discuss, conversation, information, illustrator, author, illustrate, picture

**The Research Process:**

- The research process must be integrated within each course curriculum. Student will be provided with opportunities to investigate issues from thematic units of study. As the NJSLS indicate, students will develop proficiency with MLA or APA format as applicable.
- https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/general_format.html
- https://owl.purdue.edu/owl/research_and_citation/mla_style/mla_formatting_and_style_guide/mla_formatting_and_style_guide.html

**Technology:**

- Students must engage in technology applications integrated throughout the curriculum, though technology provided by us in their individual classroom, and in our technology centered classrooms.
- BrainPop
- Time for Kids Magazine online
- Scholastic Magazine online
- Google Earth
- Nationalgeographic.com

**Resources:**

- Ancillary resources and materials used to deliver instruction are included below:
- Learning New Jersey Model Curriculum
- ThinkCentral
- Achieve3000
- Reading A-Z.com
- Abcmouse .com
- EnchantedLearning,Com
- Sing Along Songs
- Scholastic.com
- Bilingualplanet.com
- Frog street
- Press.com
- 122 teachme.com
- Starfall
- www.teacherspayteachers.com
- www.udl.org
- http://www.state.nj.us/education/aps/cccs/ss/
- www.macmillanmh.com –downloadable graphic organizers

**Career Education & Resources:**

- **NJDOE CTE (https://www.nj.gov/education/cte/)**
- Careers are Everywhere Workbook (https://lmci.state.tx.us/shared/careersareeverywhere.asp)
- Career Bingo (http://www.breitlinks.com/careers/career_pdfs/careerbingo.pdf)
- Vocational Information Center / Career Exploration Guides and Resources for Younger Students (http://www.khake.com/page64.html)

**Differentiation Strategies**

Differentiation strategies can require varied amounts of preparation time. High-prep strategies often require a teacher to both create multiple pathways to process information/demonstrate learning and to assign students to those pathways. Hence, more ongoing monitoring and assessment is often required. In contrast, low-prep strategies might require a teacher to strategically create process and product choices for students, but students are allowed to choose which option to pursue given their learning profile or readiness level. Also, a low-prep strategy might be focused on a discrete skill (such as vocabulary words), so there are fewer details to consider. Most teachers find that integration of one to two new low-prep strategies and one high-prep

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| strategy each quarter is a reasonable goal. | |
| **Low Prep Strategies** | |
| **Varied journal prompts, spelling or vocabulary lists** | Students are given a choice of different journal prompts, spelling lists or vocabulary lists depending on level of proficiency/assessment results. |
| **Anchor activities** | Anchor activities provide meaningful options for students when they are not actively engaged in classroom activities (e.g., when they finish early, are waiting for further directions, are stumped, first enter class, or when the teacher is working with other students). Anchors should be directly related to the current learning goals. |
| **Choices of books** | Different textbooks or novels (often at different levels) that students are allowed to choose from for content study or for literature circles. |
| **Choices of review activities** | Different review or extension activities are made available to students during a specific section of the class (such as at the beginning or end of the period). |
| **Homework options** | Students are provided with choices about the assignments they complete as homework. Or, students are directed to specific homework based on student needs. |
| **Student-teacher goal setting** | The teacher and student work together to develop individual learning goals for the student. |
| **Flexible grouping** | Students might be instructed as a whole group, in small groups of various permutations (homogeneous or heterogeneous by skill or interest), in pairs or individuals. Any small groups or pairs change over time based on assessment data. |
| **Varied computer programs** | The computer is used as an additional center in the classroom, and students are directed to specific websites or software that allows them to work on skills at their level. |
| **Multiple Intelligence or Learning Style options** | Students select activities or are assigned an activity that is designed for learning a specific area of content through their strong intelligence (verbal-linguistic, interpersonal, musical, etc.) |
| **Varying scaffolding of same organizer** | Provide graphic organizers that require students to complete various amounts of information. Some will be more filled out (by the teacher) than others. |
| **Think-Pair-Share by readiness, interest, and/or learning profile** | Students are placed in predetermined pairs, asked to think about a question for a specific amount of time, then are asked to share their answers first with their partner and then with the whole group. |
| **Mini workshops to re-teach or extend skills** | A short, specific lesson with a student or group of students that focuses on one area of interest or reinforcement of a specific skill. |
| **Orbitals** | Students conduct independent investigations generally lasting 3-6 weeks. The investigations “orbit” or revolve around some facet of the curriculum. |
| **Games to practice mastery of information and skill** | Use games as a way to review and reinforce concepts. Include questions and tasks that are on a variety of cognitive levels. |

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| **Multiple levels of questions** | Teachers vary the sorts of questions posed to different students based on their ability to handle them. Varying questions is an excellent way to build the confidence (and motivation) of students who are reluctant to contribute to class discourse. Note: Most teachers would probably admit that without even thinking about it they tend to address particular types of questions to particular students. In some cases, such tendencies may need to be corrected. (For example, a teacher may be unknowingly addressing all of the more challenging questions to one student, thereby inhibiting other students' learning and fostering class resentment of that student.) |
| **High Prep Strategies** | |
| **Cubing** | Designed to help students think about a topic or idea from many different angles or perspectives. The tasks are placed on the six sides of a cube and use commands that help support thinking (justify, describe, evaluate, connect, etc.). The students complete the task on the side that ends face up, either independently or in homogenous groups. |
| **Tiered assignment/ product** | The content and objective are the same, but the process and/or the products that students must create to demonstrate mastery are varied according to the students' readiness level. |
| **Independent studies** | Students choose a topic of interest that they are curious about and wants to discover new information on. Research is done from questions developed by the student and/or teacher. The researcher produces a product to share learning with classmates. |
| **4MAT** | Teachers plan instruction for each of four learning preferences over the course of several days on a given topic. Some lessons focus on mastery, some on understanding, some on personal involvement, and some on synthesis. Each learner has a chance to approach the topic through preferred modes and to strengthen weaker areas |
| **Jigsaw** | Students are grouped based on their reading proficiency and each group is given an appropriate text on a specific aspect of a topic (the economic, political and social impact of the Civil War, for example). Students later get into heterogeneous groups to share their findings with their peers, who have read about different areas of study from source texts on their own reading levels. The jigsaw technique allows you to tackle the same subject with all of your students while discreetly providing them the different tools they need to get there. |
| **Multiple texts** | The teacher obtains or creates a variety of texts at different reading levels to assign strategically to students. |
| **Alternative assessments** | After completing a learning experience via the same content or process, the student may have a choice of products to show what has been learned. This differentiation creates possibilities for students who excel in different modalities over others (verbal versus visual). |
| **Modified Assessments** | Assessments can be modified in a variety of ways – for example by formatting the document differently (e.g. more space between questions) or by using different types of questions (matching vs. open ended) or by asking only the truly essential questions. |
| **Learning contracts or Personal** | A contract is a negotiated agreement between teacher and student that may have a |

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| **Agendas** | mix of requirements and choice based on skills and understandings considered important by the teacher. A personal agenda could be quite similar, as it would list the tasks the teacher wants each student to accomplish in a given day/lesson/unit. Both Learning contracts and personal agendas will likely vary between students within a classroom. |
| **Compacting** | This strategy begins with a student assessment to determine level of knowledge or skill already attained (i.e. pretest). Students who demonstrate proficiency before the unit even begins are given the opportunity to work at a higher level (either independently or in a group). |
| **Literature circles** | Flexible grouping of students who engage in different studies of a piece of literature. Groups can be heterogeneous and homogeneous. |
| **Learning Centers** | A station (or simply a collection of materials) that students might use independently to explore topics or practice skills. Centers allow individuals or groups of students to work at their own pace. Students are constantly reassessed to determine which centers are appropriate for students at a particular time, and to plan activities at those centers to build the most pressing skills. |
| **Tic-Tac-Toe Choice Board (sometimes called "Think-Tac-Toe"** | The tic-tac-toe choice board is a strategy that enables students to choose multiple tasks to practice a skill, or demonstrate and extend understanding of a process or concept. From the board, students choose (or the teacher assigns) three adjacent or diagonal. To design a tic-tac-toe board: - Identify the outcomes and instructional focus - Design 9 different tasks - Use assessment data to determine student levels - Arrange the tasks on a tic-tac-toe board either randomly, in rows according to level of difficulty, or you may want to select one critical task to place in the center of the board for all students to complete. |

**Curriculum Development Resources/Instructional Materials:**

List or Link Ancillary Resources and Curriculum Materials Here:

- New Jersey Student Learning Standards (https://www.nj.gov/education/cccs/)
    - NJSLS Science (https://www.nj.gov/education/modelcurriculum/sci//)

**Board of Education Approved Text(s)**

Scholastic Magazine
National Geographic for Kids
Time Magazine for Kids
STEMScopes