Science Curriculum

Grade Two Unit Two
Insects and Plants
Course Description

In unit one, students engage in an engineering challenge to develop habits of mind and classroom practices that will be reinforced throughout the school year. In unit two, students build on the science concepts of growth and development of plants and animals from grades K–1 by observing new organisms over time. Students see the life cycles of insects unfold in real time and compare the stages exhibited by each species to reveal patterns. At the same time, students grow one type of plant from seed and observe it through its life cycle to produce new seeds. They gain experience with the ways that plants and insects interact in feeding relationships, seed dispersal, and pollination, and students develop models to communicate their understanding. In unit three, students build on the science concepts of matter and its interactions developed in kindergarten using new tools to enrich observations. Students observe, describe, and compare properties of solids and liquids. They conduct investigations to find out what happens when solids and water are mixed and when liquids and water are mixed. They use their knowledge of solids and liquids to conduct an investigation on an unknown material (toothpaste). They gain firsthand experience with reversible changes caused by heating or cooling, and read about changes caused by heating that are irreversible. In unit four, students use simple tools to observe, describe, analyze, and sort solid earth materials and learn how the properties of the materials are suited to different purposes. The investigations complement the students’ experiences in the Solids and Liquids Module with a focus on earth materials and the influence of engineering and science on society and the natural world. Students explore how wind and water change the shape of the land and compare ways to slow the process of erosion. Students learn about the important role that earth materials have as natural resources. Throughout all units, students engage in science and engineering practices to collect and interpret data to answer science questions, develop models to communicate interactions and processes, and define problems in order to compare solutions. Students gain experiences that will contribute to understanding of crosscutting concepts of cause and effect; scale, proportion, and quantity; energy and matter; and stability and change.
Teachers may choose from a variety of instructional approaches that are aligned with 3 dimensional learning to achieve this goal. These approaches include:

<table>
<thead>
<tr>
<th>Inquiry Kit Instruction (modified)</th>
<th>Challenge Based Instruction</th>
<th>5 E Instructional Model (BSCS)</th>
<th>Culturally Relevant Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project-Based Instruction</td>
<td>Tinkering Pedagogy</td>
<td>Learning Progressions</td>
<td>Knowledge Integration</td>
</tr>
<tr>
<td>Model-based Reasoning</td>
<td>Place-based Instruction</td>
<td>Meaningful Expertise Instruction</td>
<td>Emergent Investigations (RSS)</td>
</tr>
</tbody>
</table>
### Pacing Chart

*This pacing chart is based upon 160 minutes of instruction per cycle.*

<table>
<thead>
<tr>
<th>Unit</th>
<th>Topic</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Engineering Challenge</td>
<td>2 weeks</td>
</tr>
<tr>
<td>2</td>
<td>FOSS Insects &amp; Plants</td>
<td>11 weeks</td>
</tr>
<tr>
<td>3</td>
<td>FOSS Solids &amp; Liquids</td>
<td>11 weeks</td>
</tr>
<tr>
<td>4</td>
<td>FOSS Pebbles, Sand &amp; Silt</td>
<td>10 weeks</td>
</tr>
<tr>
<td></td>
<td>Culminating Projects</td>
<td>2 weeks</td>
</tr>
</tbody>
</table>
## Unit Summary

The **Insects and Plants** unit provides experiences that heighten students' awareness of the living world. They come to know firsthand the life cycles of a number of insects. Students see the life cycles of insects unfold in real time and compare the stages exhibited by each species. At the same time, students grow one type of plant from seed and observe it through its life cycle to produce new seeds. In this module, students will

- Provide for the needs of living insects and growing.
- Observe beetles, moths, and butterflies change from larvae to pupae to adult. Observe insect mating and egg laying.
- Compare structures on milkweed bugs to other kinds of insects.
- Observe incomplete and complete metamorphosis.
- Compare plant and animal life cycles.
- Make predictions about the moth and butterfly life cycles, based on observations of other insects.
- Communicate observations of the life cycle of plants and the structure, behavior, and life cycle of insects in words and drawings.

## Student Learning Objectives

2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.]

2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.*

2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats. [Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats.] [Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats.]

K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be
solved through the development of a new or improved object or tool.

**K-2-ETS1-2.** Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

**K-2-ETS1-3.** Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

<table>
<thead>
<tr>
<th>NJDOE Student Learning Objective</th>
<th>Essential Questions</th>
<th>Content Related to DCI’s</th>
<th>Sample Activities</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Investigation 1: Mealworms</strong></td>
<td>What do mealworms need to live? How do mealworms grow and change? What are the stages of a beetle’s life cycle?</td>
<td>● Insects need air, food, water, and space. ● The life cycle of the beetle is egg, larva, pupa, and adult, which produces eggs. ● Insects have characteristic structures and behaviors. ● Adult insects have a head, thorax, and abdomen. ● Insects have predictable characteristics at different stages of development.</td>
<td>Each student receives two larval mealworms in a vial to care for and observe. Over 10 weeks, students observe the larvae grow, molt, pupate, and turn into beetles (adults), which mate, lay eggs, and die. They read an article about insects in the environment. Observe mealworm larvae, pupae, and adults over time. Describe and record changes in mealworm structure and behavior over time. Students act as reporters and bring home the latest news to</td>
<td><strong>Science Resources Book</strong> - “Animals and Plants in Their Habitats” <strong>Embedded Assessment</strong> - Science notebook entries Scientific practices <strong>NGSS Evidence Statements</strong> <strong>Benchmark Assessment</strong> - Investigation 1 I-Check <strong>Additional Resources</strong> <em>Lifetimes</em> by Bryan Mellonie and Robert Ingpen</td>
</tr>
<tr>
<td>Investigation 2: Brassica Seeds</td>
<td>How did we plant the brassica seeds? How does a young plant change as it grows? What will happen to the flowers on the brassica plants? Where is a good outdoor place for growing young plants?</td>
<td>● Plants need water, air, nutrients, light, and space. ● As plants grow, they develop roots, stems, leaves, buds, flowers, and seeds in a sequence called a life cycle. Seeds develop into new plants that look like the parent plant. ● Bees and other insects help some plants by moving pollen from flower to flower.</td>
<td>Each student plants tiny rapid-cycling brassica seeds in a planter cup. The brassica plants grow under continuous light and develop for a month. Students observe and record the complete life cycle from seed to seed. They plant seeds or transplant seedlings outdoors. Observe the growth of seeds, charting growth rate of plant, and observe patterns. Record and communicate observations in words and drawings. Plants Breathe! Compare the development of brassica plants. Identify the parts of growing plants as they develop.</td>
<td>Science Resources Book - “Flowers and Seeds” Media - How Plants Grow Embedded Assessment - Science notebook entries Scientific practices NGSS Evidence Statements Benchmark Assessment - Investigation 2 I-Check</td>
</tr>
</tbody>
</table>

| Investigation 3: Milkweed Bugs | How do the yellow objects change? What do milkweed bugs need in their | ● Insects need air, food, water, and appropriate space including shelter; different insects meet these needs in different ways. | Groups of students receive vials of milkweed bug eggs. Each group prepares a habitat for the bugs, providing air, food, water, and space, | Science Resources Book - “So Many Kinds, So Many Places” “Variation” |
| compare the diversity of life in different habitats. 2-LS4-1 | habitat? How do milkweed bugs grow and change? Where do insects live? | ● The life cycle of some insects is egg, nymph stages, and adult, which produces eggs. ● Variations exist within a group of related organisms. ● As insects grow, they molt their hard, external covering. | including shelter. They observe structure, pattern, and behavior as the insects advance through simple metamorphosis. Students go outdoors to search for insects living naturally on the ground and on plants in the schoolyard. Observe the sequence of changes that bugs go through as they mature into adults. Observe, describe, and communicate the structures, patterns, and behaviors of insects. Design habitat for milkweed bugs. Observe and record which habitats they prefer. Change your habitat based on your observations. You can have a store and include money/budget for a math connection. Life Cycle Play Color pictures of Bugs | Embedded Assessment - Science notebook entries NGSS Evidence Statements Benchmark Assessment - Investigation 3 I-Check |
**Investigation 4: Silkworms**

I can make observations of plants and animals to compare the diversity of life in different habitats.

**2-LS4-1**

<table>
<thead>
<tr>
<th>What do silkworms need to live?</th>
</tr>
</thead>
<tbody>
<tr>
<td>How does a silkworm compare to a mealworm?</td>
</tr>
<tr>
<td>What is the life cycle of the silkworm?</td>
</tr>
<tr>
<td>What evidence is there that insects are eating plants in the schoolyard?</td>
</tr>
</tbody>
</table>

- Insects need air, food, water, and space including shelter; different insects meet these needs in different ways.
- The life cycle of some insects involves complete metamorphosis—egg, larva, pupa, and adult, which produces eggs.

Students observe the life history of one of the most commercially successful insects, silkworms. They start with eggs and observe the growth and changes to larvae, pupae, and adults, which produce eggs. They search the schoolyard for evidence of plants being eaten by insects or other animals.

- Paterson - Silk City

Observe and compare the structures of an insect larva and adult.

Describe and record changes over time.

Compare different insects’ structures and behaviors.

Look for evidence that insects or related small animals are eating plants in the schoolyard.

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**Science Resources Book** - “Insect Shapes and Colors” “Insect Life Cycles”

**Embedded Assessment** - Science notebook entries

**Science Practices**

**NGSS Evidence Statements**

**Benchmark Assessment** - Investigation 4 I-Check
### Investigation 5: Butterflies

I can make observations of plants and animals to compare the diversity of life in different habitats.

**2-LS4-1**

<table>
<thead>
<tr>
<th>What do caterpillars do?</th>
<th>The life cycle of the butterfly involves complete metamorphosis. Butterflies construct chrysalises when they pupate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>How is a painted lady pupa different from a silkworm pupa?</td>
<td>Insects pollinate plants.</td>
</tr>
<tr>
<td>What is the life cycle of a painted lady butterfly?</td>
<td>Life cycles are different for different animals.</td>
</tr>
<tr>
<td>What plants in our schoolyard have pollen?</td>
<td>The class observes painted lady larvae grow, pupate, and emerge as adult butterflies. Students observe the stages of complete metamorphosis and compare the behaviors of moths and butterflies. Students study pollination through video clips and outdoor plant observations. Charting growth rate of caterpillar/butterflies.</td>
</tr>
</tbody>
</table>

- Observe structures and behavior of a butterfly. Compare the structures and behavior of the butterfly to other insects.
- Describe and record changes over time.
- Create an imaginary insect

**Science Resources Book - “Life Goes Around” “Fossils”**

**Embedded Assessment - Teacher Observations Science notebook entries Science Practices NGSS Evidence Statements**

**Benchmark Assessment - Investigation 5 I-Check**
with craft supplies. Write a story about the life of this insect. Compare and contrast life cycles.

Diagram different life cycles: people, plants, birds, fish, insects, mammals

Observe the symmetry on a butterfly drawing and work with a partner to draw their own.

### Unit Project (Choose 1)

**Engineering Challenge - Design a Hand Pollinator**
- Becoming a Butterfly book
- Who are agricultural engineers?
- Exploring the properties of pollination materials
- Designing a hand pollinator

**RAFT Project:**

<table>
<thead>
<tr>
<th>Role</th>
<th>Audience</th>
<th>Format</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growing Caterpillar</td>
<td>From plant to caterpillar/butterfly OR From caterpillar/Butterfly to plant</td>
<td>Picture Book, Poster, Thank You Card</td>
<td>“Friends”</td>
</tr>
<tr>
<td>Pillar or Plant</td>
<td>Scientist = Botanist (studies plants) or Ento</td>
<td>Speaking at Caterpillar Conference to fellow scientists or teaching class?</td>
<td>Lab Journal</td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------------------------------</td>
<td>------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Lab Journal</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
People using pesticides

iMovie/Video/Commercial/PSA or Poster

Gardner
In this unit of study, students explore and compare the diversity of life in different habitats. They develop an understanding of what plants need to grow and how plants depend on animals for seed dispersal and pollination. Students learn about cause-and-effect relationships and how an organism’s structures are related to the function that each structure performs. Developing and using models plays an important role in students’ understanding of structure/function relationships.

To begin this unit’s progression of learning, students observe a variety of plants and animals from a variety of habitats in order to compare the diversity of life. Using firsthand observations and media resources, students explore and collect data about different habitats that exist in the world and how plants and animals have structures that help them survive in their habitats. Students need many opportunities to observe that plants depend on water and light to grow. As they begin to understand that changes in the amount of water and light can affect...
the growth of plants, they begin to understand that all cause-and-effect relationships generate observable patterns. For example, some plants require very little water to survive, most plants will not grow without sunlight, and most plants need an adequate amount of water to thrive. Students might also observe patterns such as the effects of too much or too little water on a plant and too much or too little light on a plant. In order for students to develop these understandings, they should plan and conduct investigations and collect data, which should be used as evidence to support the idea that all events have causes that generate observable patterns.

Finally, students investigate the roles that animals play in plant reproduction. Students learn that many types of plants depend on animals for pollination and/or for the dispersal of seeds. As students begin to explore the interdependent relationships among plants and animals, they learn that the shape and stability of the structures of organisms are related to their function. For example,

- As bees collect nectar, portions of their body are designed to collect and then carry pollen from plant to plant.
- Some seeds are designed to stick to animal fur so that animals can carry them from place to place.
- Animals eat fruits containing seeds, which are then dispersed through the animal’s body waste.

Second graders will need multiple opportunities to develop an understanding of the important relationship between structure and function, because they are expected to use engineering design to plan and develop simple models that mimic the function of an animal in dispersing seeds or pollinating plants. Students can use sketches, drawings or physical models to illustrate how the shape of the model helps it function as needed, and they should use evidence to support their design choices. Some common examples of models could include the following:

- Using Velcro “seeds” and furry material to model how seeds with hooks adhere to animal fur.
- Using pipe cleaners to gather and distribute “pollen” in a way similar to bees pollinate flowers.

In this unit of study, students learn that designs can be conveyed through sketches, drawings, or physical models, and that these representations are useful in communicating ideas for a problem’s solutions to other people. As described in the narrative above, students develop simple sketches, drawings, or models that mimic the function of an animal in dispersing seeds or pollinating plants in order to illustrate how the shape of an object helps it function as needed to solve a given problem.

**Modifications**
(Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: All Standards, All Students/Case Studies for vignettes and explanations of the modifications.)

- Structure lessons around questions that are authentic, relate to students’ interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies.
- Collaborate with after-school programs or clubs to extend learning opportunities.
- Restructure lesson using UDL principles (http://www.cast.org/our-work/about.udl.html#.VXmoXcfD_UA).

Research on Student Learning

Lower elementary-school students can understand simple food links involving two organisms. Yet they often think of organisms as independent of each other but dependent on people to supply them with food and shelter. Students of all ages think that some populations of organisms are numerous in order to fulfill a demand for food by another population (NSDL, 2015).
### Prior Learning

#### Kindergarten Engineering
- A situation that people want to change or create can be approached as a problem to be solved through engineering.
- Asking questions, making observations, and gathering information are helpful in thinking about problems.
- Before beginning to design a solution, it is important to clearly understand the problem.

#### Kindergarten Life Science
- Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.
- All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.

### Future Learning

#### Grade 3 Life Science
- For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.
- Populations live in a variety of habitats, and change in those habitats affects the organisms living there.

#### Grade 5 Life Science
- Plants acquire their material for growth chiefly from air and water.
- The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as “decomposers.” Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem.
### Interdisciplinary Connections

**English Language Arts/Literacy**

English Language Arts can be leveraged in this unit in a number of ways. Students can participate in shared research using trade books and online resources to learn about the diversity of life in different habitats or to discover ways in which animals help pollinate plants or distribute seeds. Students can record their findings in science journals or use the research to write and illustrate their own books. Students can also learn to take notes in their journals in order to help them recall information from experiences or gather information from provided sources. They can add drawings or other visual displays to their work, when appropriate, to clarify ideas, thoughts, and feelings.

**Mathematics**

Throughout this unit of study, students need opportunities to represent and interpret categorical data by drawing picture graphs and/or bar graphs (with a single-unit scale) to represent a data set with up to four categories. This will lead to opportunities to solve simple put-together, take-apart, and compare problems using information presented in these types of graphs. For example, students could create bar graphs that show the number of seedlings that sprout with and without watering or that document plant growth. They could also create a picture graph showing the number of plant species, vertebrate animal species, and invertebrate animal species observed during a field trip or in a nature photograph. As students analyze the data in these types of graphs, they can use the data to answer simple put-together, take apart, and compare problems. This unit also presents opportunities for students to model with mathematics. They can diagram situations mathematically or solve a one-step addition or subtraction word problems. Data collected in bar graphs and picture graphs can easily be used for this purpose.

### Unit Vocabulary

<table>
<thead>
<tr>
<th>Investigation 1: Mealworms</th>
<th>Investigation 2: Brassica Seeds</th>
<th>Investigation 3: Milkweed Bugs</th>
<th>Investigation 4: Silkworms</th>
<th>Investigation 5: Butterflies</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>brassica</td>
<td>bug</td>
<td>clasper</td>
<td>butterfly</td>
</tr>
<tr>
<td>adult</td>
<td>bud</td>
<td>female</td>
<td>cocoon</td>
<td>caterpillar</td>
</tr>
<tr>
<td>air</td>
<td>fertilizer</td>
<td>hatch</td>
<td>evidence</td>
<td>chrysalis</td>
</tr>
<tr>
<td>antenna</td>
<td>bran</td>
<td>darkling beetle</td>
<td>dead</td>
<td>dropping</td>
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<tr>
<td>flower</td>
<td>fruit</td>
<td>germinate</td>
<td>leaf</td>
<td>light</td>
</tr>
<tr>
<td>male</td>
<td>mating</td>
<td>milkweed</td>
<td>bug</td>
<td>nymph</td>
</tr>
<tr>
<td>eyespot</td>
<td>metamorphosis</td>
<td>mulberry</td>
<td>leaf</td>
<td>proleg</td>
</tr>
<tr>
<td>nectar</td>
<td>offspring</td>
<td>painted lady</td>
<td>waste</td>
<td></td>
</tr>
</tbody>
</table>

**Educational Technology Standards**

8.1.2.A.1, 8.1.2.A.2, 8.1.2.A.3, 8.1.2.A.5, 8.1.2.B.1, 8.1.2.C.1, 8.1.2.D.1, 8.1.2.E.1, 8.1.2.F.1
Technology Operations and Concepts
- Identify the basic features of a computer and explain how to use them effectively.
- Create a document using a word processing application.
- Compare the common uses of at least two different digital applications and identify the advantages and disadvantages of using each.
- Enter information into a spreadsheet and sort the information.

Creativity and Innovation
- Illustrate and communicate original ideas and stories using multiple digital tools and resources.

Communication and Collaboration
- Engage in a variety of developmentally appropriate learning activities with students in other classes, schools, or countries using various media formats such as online collaborative tools and social media.

Digital Citizenship
- Develop an understanding of ownership of print and non-print information.

Research and Information Literacy
- Use digital tools and online resources to explore a problem or issue.

Critical Thinking, Problem Solving, and Decision-Making
- Use geographic mapping tools to plan and solve problems.

## Career Ready Practices

Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

<table>
<thead>
<tr>
<th>CRP1. Act as a responsible and contributing citizen and employee</th>
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<tbody>
<tr>
<td>Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.</td>
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<table>
<thead>
<tr>
<th>CRP2. Apply appropriate academic and technical skills.</th>
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<tr>
<td>Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an...</td>
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</tbody>
</table>
academic skill in a workplace situation.

**CRP4. Communicate clearly and effectively and with reason.**
Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others’ time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.

**CRP6. Demonstrate creativity and innovation.**
Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.

**CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.**
Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.

**CRP9. Model integrity, ethical leadership and effective management.**
Career-ready individuals consistently act in ways that align personal and community-held ideals and principles while employing strategies to positively influence others in the workplace. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the directions and actions of a team or organization, and they apply insights into human behavior to change others’ action, attitudes and/or beliefs. They recognize the near-term and long-term effects that management’s actions and attitudes can have on productivity, morals and organizational culture.

**CRP11. Use technology to enhance productivity.**
Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.
CRP12. Work productively in teams while using cultural global competence.
Career-ready individuals positively contribute to every team, whether formal or informal. They apply an awareness of cultural difference to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.

Appendix A: NGSS and Foundations for the Unit

Make observations of plants and animals to compare the diversity of life in different habitats. [Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats.] [Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats.] (2-LS4-1)

Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.] (2-LS2-1)

Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.* (2-LS2-2)

Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

<table>
<thead>
<tr>
<th>Science and Engineering Practices</th>
<th>Disciplinary Core Ideas</th>
<th>Crosscutting Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning and Carrying Out Investigations</td>
<td>LS4.D: Biodiversity and Humans</td>
<td>Cause and Effect</td>
</tr>
<tr>
<td>· Plan and conduct investigations</td>
<td>· There are many different kinds of living things in</td>
<td>· Events have causes that generate observable</td>
</tr>
</tbody>
</table>
collaboratively to produce evidence to answer a question. (1-PS4-1),(2-LS2-1)

**Planning and Carrying Out Investigations**
- Make observations (firsthand or from media) to collect data that can be used to make comparisons. (2-LS4-1)

**Developing and Using Models**
- Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2)

**Asking Questions and Defining Problems**
- Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1)
- Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)

<table>
<thead>
<tr>
<th>any area, and they exist in different places on land and in water. (2-LS4-1)</th>
<th>patterns. (2-LS2-1)</th>
</tr>
</thead>
</table>

**LS2.A: Interdependent Relationships in Ecosystems**
- Plants depend on water and light to grow. (2-LS2-1)
- Plants depend on animals for pollination or to move their seeds around. (2-LS2-2)

**ETS1.B: Developing Possible Solutions**
- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people. (*secondary to 2-LS2-2*)

**ETS1.A: Defining and Delimiting Engineering Problems**
- A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1)
- Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1)
- Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)

**Connections to Nature of Science**

**Scientific Knowledge is Based on Empirical Evidence**
- Scientists look for patterns and order when making observations about the world. (2-LS4-1)
<table>
<thead>
<tr>
<th>English Language Arts</th>
<th>Mathematics</th>
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</thead>
<tbody>
<tr>
<td>Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-LS2-1) W.2.7</td>
<td>Reason abstractly and quantitatively. (2-LS2-1),(K-2-ETS1-1) MP.2</td>
</tr>
<tr>
<td>Recall information from experiences or gather information from provided sources to answer a question. (2-LS2-1),(K-2-ETS1-1) W.2.8</td>
<td>Model with mathematics. (2-LS2-1),(2-LS2-2),(K-2-ETS1-1) MP.4</td>
</tr>
<tr>
<td>Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (2-LS2-2) SL.2.5</td>
<td>Use appropriate tools strategically. (2-LS2-1),(K-2-ETS1-1) MP.5</td>
</tr>
<tr>
<td>With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1) W.2.6</td>
<td>Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (2-LS2-2) 2.MD.D.10</td>
</tr>
<tr>
<td>Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1) RI.2.1</td>
<td></td>
</tr>
</tbody>
</table>


**Field Trip Ideas:** New York Botanical Garden, City Green Garden at Eastside Park or Schuyler Farm, American Museum of Natural History, Bronx Zoo, Turtleback Zoo, Van Saun Park Zoo, Insectropolis - The Bugseum of New Jersey