

## School Garden to Cafeteria

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| <b>Learning Target</b>                                          | Students understand how scientific and literacy standards apply in their school gardens.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Colorado Academic Standards (CAS)</b>                        | <p><b>Grade 3</b><br/>                     SC09-GR.3-S.2-GLE.1: Duration and timing of life cycle events, such as reproduction and longevity, vary across organisms and species.</p> <p>a. Use evidence to develop scientific explanations regarding the stages of how organisms develop and change over time.</p> <p><b>Grade 4</b><br/>                     SC09-GR.4-S.2-GLE.1: All living things share similar characteristics, but they also have differences that can be described and classified.</p> <p>b. Use evidence to develop scientific explanations for similarities and/or differences among different organisms (species).</p> <p><b>Grade 5</b><br/>                     SC09-GR.5-S.2-GLE.1: All organisms have structures and systems with separate functions.</p> <p>b. Analyze and interpret data to generate evidence that all plant and animal organisms have structures required for survival.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Next Generation Science Standards (NGSS)</b>                 | <p><b>Grade 3</b><br/>                     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.</p> <p><b>Grade 4</b><br/>                     4-LS1-1: Construct arguments that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.</p> <p><b>Grade 5</b><br/>                     5-LS1-1: Support an argument that plants get materials they need for growth chiefly from air and water.<br/>                     5-LS2-1: Develop models to describe movements of matter among plants, animals, decomposers, and the environment.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>English Language Arts Common Core State Standards (CCSS)</b> | <p><b>Grade 3</b><br/>                     CCSS.ELA-LITERACY.W.3.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.</p> <p>b. Develop topics with facts, definitions, and details.<br/> <i>Students use specific seed characteristics to explain how seeds spread.</i><br/> <i>Students use specific plant characteristics to explain how plants are companion plants.</i></p> <p>c. Use linking words and phrases (for example, <i>also, another, and, more, but</i>) to connect ideas within categories of information.<br/> <i>Students use linking words and phrases to show the process of photosynthesis.</i><br/> <i>Students use linking words and phrases to explain differences between soil types.</i><br/> <i>Students use linking words and phrases to show the beneficial relationship between companion plants.</i></p> <p><b>Grade 4</b><br/>                     CCSS.ELA-LITERACY.W.4.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.</p> <p>b. Develop topics with facts, definitions, concrete details, quotations, or other information and examples related to topics.<br/> <i>Students use specific seed characteristics to explain how seeds spread.</i><br/> <i>Students use specific plant characteristics to explain how plants are companion plants.</i></p> <p>c. Link ideas within categories of information using words and phrases (for example, <i>another, for example, also, because</i>).</p> <p>d. Use precise language and domain-specific vocabulary to inform about or explain topics.<br/> <i>Students use linking words and phrases to show the process of photosynthesis and use scientific names of plant parts and processes in photosynthesis.</i><br/> <i>Students use domain-specific vocabulary to explain differences between soil types.</i><br/> <i>Students use linking words to show relationships between plant characteristics and use domain-specific vocabulary to explain benefits of companion planting.</i></p> |

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|                           | <p><b>Grade 5</b><br/>         CCSS.ELA-LITERACY.W.5.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.</p> <p>b. Develop topics with facts, definitions, concrete details, quotations, or other information and examples related to topics.<br/> <i>Students use specific seed characteristics to explain how seeds spread.</i><br/> <i>Students use specific plant characteristics to explain how plants are companion plants.</i></p> <p>c. Link ideas within and across categories of information using words, phrases, and clauses (for example, <i>in contrast, especially</i>).</p> <p>d. Use precise language and domain-specific vocabulary to inform about or explain topics.<br/> <i>Students use linking words and phrases to show the process of photosynthesis and use scientific names of plant parts and processes in photosynthesis.</i><br/> <i>Students use domain-specific vocabulary to explain differences between soil types.</i><br/> <i>Students use linking words to show relationships between plant characteristics and use domain-specific vocabulary to explain benefits of companion planting.</i></p> |
| <b>Books</b>              | <ul style="list-style-type: none"> <li>• <i>From Seed to Plant</i> by Gail Gibbons</li> <li>• <i>The Iroquois</i> by Emily Dolbear and Peter Benoit</li> <li>• <i>The Reason for a Flower</i> by Ruth Heller</li> <li>• <i>Seeds Go, Seeds Grow</i> by Mark Weakland</li> <li>• <i>Straight from the Bear’s Mouth: The Story of Photosynthesis</i> by Bill Ross</li> <li>• <i>Top Secret</i> by John Reynolds Gardiner</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Technology</b>         | <ul style="list-style-type: none"> <li>• <a href="#">“The Beauty of Pollination” YouTube video</a></li> <li>• PBS video, <a href="#">“Colorado Kids Act as Citizen Scientists in National Ladybug Search”</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Vocabulary</b>         | <p>internal and external plant structures, survival, growth, behavior, reproduction<br/>         dissect, petal, sepal, stamen, anther, filament, pollen, pistil, stigma, style, ovary, ovule<br/>         hypothesis, scientific practices, investigation, data, claim, evidence, reasoning, control, variable, observation<br/>         photosynthesis, sunlight, chlorophyll, chloroplast, sugar, oxygen, carbon dioxide, air, water<br/>         seed dispersal mechanism, ejector, helicopter, air passenger, parachute, hitchhiker, animal express, boat<br/>         companion planting, physical characteristics of plants, three sisters, benefit, squash, corn, bean, nitrogen, shade, prickly hairs<br/>         clay, sand, silt, loam, humus, structure, function, fertilizer, nitrogen, phosphorus, potassium, nutrient and water transport in plants/animals, nutrient absorption in plants/animals<br/>         nutrient, habitat, survival, microorganism, mineral</p>                                                                                                                                                                                               |
| <b>Writing Connection</b> | <p>Although writing is incorporated into lessons, writing can be further incorporated by using these lessons with a narrative literacy unit. Lessons are intended to be taught in the fall.</p> <p><b>Narrative Writing Topics</b></p> <ul style="list-style-type: none"> <li>• Students pick a plant and tell an imaginative story about how this plant’s seed grows into a plant.</li> <li>• Students write about a memorable meal in their families.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## Lesson Overview

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| <p><b><u>Life Cycles</u></b></p> <ul style="list-style-type: none"> <li>I will explain orally the main components of a plant's life cycle.</li> <li>I will identify in writing life cycle stages of five plants in our school garden.</li> </ul> | <p><b><u>Flowers</u></b></p> <p>I will explain in writing the reason for a flower and different flower parts' purposes.</p>                                                             | <p><b><u>Investigation</u></b></p> <p>As a result of the scientific investigation, I will describe in writing seeds' needs and why it matters in our school garden.</p> | <p><b><u>Basic Photosynthesis</u></b></p> <p>I will explain orally and in writing why photosynthesis is important for plants in our garden.</p>  | <p><b><u>Seed Dispersal, Part 1</u></b></p> <p>I will explain orally and in writing how seeds of three plants in the school garden spread.</p>                                                                        |
| <p><b><u>Seed Dispersal, Part 2</u></b></p> <p>I will explain in writing how seeds of three plants in the school garden spread.</p>                                                                                                              | <p><b><u>Companion Planting, Part 1</u></b></p> <p>I will define in writing companion planting and explain in writing why corn, squash, and beans are examples of companion plants.</p> | <p><b><u>Soil</u></b></p> <p>I will examine in writing different types of soil at my school.</p>                                                                        | <p><b><u>Composting and Decomposition</u></b></p> <p>I will explain in writing the importance of composting and decomposition in our garden.</p> | <p><b><u>Companion Planting, Part 2</u></b></p> <p>I will identify orally examples of companion planting in our garden and explain in writing how each plant's characteristics benefit other plants in the group.</p> |

# Life Cycles

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| <b>Standards</b>                           | <p style="text-align: center;"><b>Colorado Academic Standards (CAS)</b></p> <p><b>Grade 3</b><br/>SC09-GR.3-S.2-GLE.1: Duration and timing of life cycle events, such as reproduction and longevity, vary across organisms and species.</p> <p>a. Use evidence to develop scientific explanations regarding the stages of how organisms develop and change over time.</p> <p><b>Grade 5</b><br/>SC09-GR.5-S.2-GLE.1: All organisms have structures and systems with separate functions.</p> <p>b. Analyze and interpret data to generate evidence that all plant and animal organisms have structures required for survival.</p> <p style="text-align: center;"><b>Next Generation Science Standards (NGSS)</b></p> <p><b>Grade 4</b><br/>4-LS1-1: Construct arguments that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.</p> <p style="text-align: center;"><b>English Language Arts Common Core State Standards (CCSS)</b></p> <p><b>Grade 3</b><br/>CCSS.ELA-LITERACY.W.3.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.</p> <p>c. Use linking words and phrases (for example, <i>also, another, and, more, but</i>) to connect ideas within categories of information.</p> <p><b>Grade 4</b><br/>CCSS.ELA-LITERACY.W.4.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.</p> <p>c. Link ideas within categories of information using words and phrases (for example, <i>another, for example, also, because</i>).</p> <p><b>Grade 5</b><br/>CCSS.ELA-LITERACY.W.5.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.</p> <p>c. Link ideas within and across categories of information using words, phrases, and clauses (for example, <i>in contrast, especially</i>).</p> |
| <b>Background</b>                          | <ul style="list-style-type: none"> <li>• Grade 2 TRACKS Unit: Investigating Plants</li> <li>• Grade 3 TRACKS Unit: Investigating Life Cycles</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Content/<br/>Language<br/>Objective</b> | <ul style="list-style-type: none"> <li>• I will explain orally the main components of a plant’s life cycle.</li> <li>• I will identify in writing life cycle stages of five plants in our school garden.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Vocabulary</b>                          | internal and external plant structures, survival, growth, behavior, reproduction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Materials</b>                           | <ul style="list-style-type: none"> <li>• Science notebooks (one per student)             <ul style="list-style-type: none"> <li>• For Do Now writing prompts</li> <li>• Claims and evidence from past experiences</li> <li>• Claims and evidence from school garden excursions</li> </ul> </li> <li>• Teacher-created life cycle pre-assessment</li> <li>• <i>From Seed to Plant</i> by Gail Gibbons</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Do Now</b>                              | Students answer the following prompt in their science notebooks: <i>Have you ever planted a seed with your family or in the garden? Draw or describe what it resembled when you first planted it. What did it look like about a month later? If you never planted a seed, picture a tree in your backyard or the schoolyard. Draw what you think this tree looked like when it was very young. Draw or describe what it looked like</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

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|                   | <i>when it was a little older. What does it look like now? Do you think it will change?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Hook</b>       | <ul style="list-style-type: none"> <li>• After students write for about 5 minutes, partners share experiences. Choose a few students to share.</li> <li>• Explain that students will revise their understanding of a plant's life cycle, as well as understand the cycle more deeply and how it relates to their school garden.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Activity</b>   | <ul style="list-style-type: none"> <li>• Read aloud <i>From Seed to Plant</i> as students revise their plant cycle pre-assessments.</li> <li>• Students record different stages in a plant's life cycle by drawing a picture and describing the stage's importance in the plant's life cycle and any specific information about what plants need.</li> <li>• <i>Do plants in the garden go through the life cycle at the same rate?</i></li> <li>• Pairs discuss their claims.</li> <li>• Students independently write claims, supporting their claims with evidence from their experiences.<br/>Example: <i>I claim plants do not go through the life cycle stages at the same rate. My evidence is that last year, I planted tomatoes and peppers at the same time. My peppers were ready to eat in August, but the tomatoes were not ready until September.</i></li> <li>• Students visit the school garden to search for plants at different life cycle stages, taking notes in their science notebooks as they observe plants in the garden.</li> <li>• After students return from the garden, they revisit their claims and explain whether the evidence they collected from the garden supported or rejected their predictions.</li> <li>• As a class, students make a giant life cycle, including where plants in the garden are currently in the life cycle.</li> <li>• Students discuss in writing or orally: <i>From our observations, we agree that plants are at different life cycle stages. Explain to your partner (or write in your science notebook) why you think it might be a positive (or negative) thing for the garden to have plants at different life cycle stages.</i></li> </ul> |
| <b>Assessment</b> | Students use evidence from the garden to support the claim that plants are at different life cycle stages.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

# Flowers

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| <b>Background</b>                          | <ul style="list-style-type: none"> <li>• Grade 2 Unit: Investigating Plants (TRACKS)</li> <li>• Grade 3 Unit: Investigating Life Cycles (TRACKS)</li> </ul> <p>This two-hour lesson can be divided into two sessions.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Content/<br/>Language<br/>Objective</b> | I will explain in writing the reason for a flower and different flower parts' purposes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Vocabulary</b>                          | dissect, petal, sepal, stamen, anther, filament, pollen, pistil, stigma, style, ovary, ovule                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Materials</b>                           | <ul style="list-style-type: none"> <li>• Students' science notebooks</li> <li>• <i>The Reason for a Flower</i> by Ruth Heller</li> <li>• Flower illustration</li> <li>• Large flowers with male and female parts, such as roses or daylilies, from school garden if possible</li> <li>• Colored pencils</li> <li>• Hand lenses or magnifying lenses</li> <li>• Clear tape</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Do Now</b>                              | In their science notebooks, students draw the plant cycle, then label where in the plant cycle the flower starts to blossom.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

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| <b>Hook</b>       | <ul style="list-style-type: none"> <li>• Review plant cycle.</li> <li>• Read <i>The Reason for a Flower</i>. <i>Flowers are an important part of plants and have many important roles.</i></li> <li>• Demonstrate how to carefully pick flowers from the school garden.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Activity</b>   | <ul style="list-style-type: none"> <li>• Define dissection: <i>Dissect means to carefully take apart things from nature to learn how they work.</i></li> <li>• Observe a whole flower, then draw a picture and write your observations.</li> <li>• Identify and examine sepals. Look through hand lens to observe shape, color, size, smell, feel, and any other characteristics. Record observations and draw a picture of sepals.</li> <li>• Make a prediction: <i>What do you think sepals do for plants?</i></li> <li>• Repeat the process for petals.</li> <li>• Repeat the process for stamens.</li> <li>• Observe the two parts of stamens. <ol style="list-style-type: none"> <li>1. Stem-like filaments</li> <li>2. Anthers, at the top of filaments, that hold pollen</li> </ol> </li> <li>• Students tap a stamen on the sticky side of a piece of tape to observe the pollen, then write any observations in their science notebooks.</li> <li>• Repeat the process for pistils.</li> <li>• Model carefully dissecting a pistil to identify and understand the four parts' purposes. <ol style="list-style-type: none"> <li>1. Sticky stigma that catches pollen that comes off anther</li> <li>2. Tube-like style down which pollen travels to reach ovary</li> <li>3. Ovary, where seeds are made</li> <li>4. Tiny ovules in the ovary, which are eggs that turn into seeds after pollen reaches them</li> </ol> </li> </ul> |
| <b>Extension</b>  | <p>Students make flower parts books. Using about five index cards, students use Modge Podge glue to affix each flower part to an index card, then write each flower part's name and purpose.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Assessment</b> | <ul style="list-style-type: none"> <li>• Students match parts of a flower to flower's purpose.</li> <li>• Students pick, then explain in writing the purpose of one part of flower.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

# Investigation

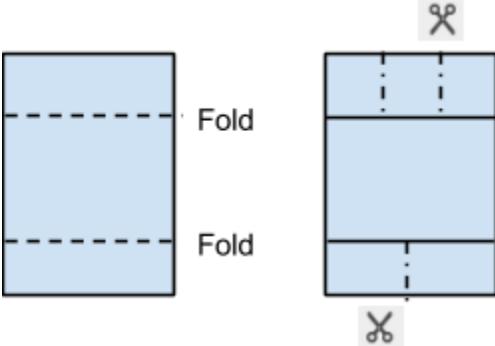
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| <b>Standards</b>                           | <p style="text-align: center;"><i>Colorado Academic Standards (CAS)</i></p> <p><b>Grade 5</b><br/>SC09-GR.5-S.2-GLE.1: All organisms have structures and systems with separate functions.<br/>b. Analyze and interpret data to generate evidence that all plant and animal organisms have structures required for survival.</p> <p style="text-align: center;"><i>Next Generation Science Standards (NGSS)</i></p> <p><b>Grade 3</b><br/>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.</p> <p><b>Grade 4</b><br/>4-LS1-1: Construct arguments that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.</p> <p><b>Grade 5</b><br/>5-LS1-1: Support an argument that plants get materials they need for growth chiefly from air and water.</p> <p style="text-align: center;"><i>English Language Arts Common Core State Standards (CCSS)</i></p> <p><b>Grade 3</b><br/>CCSS.ELA-LITERACY.W.3.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.<br/>b. Develop topics with facts, definitions, and details.</p> <p><b>Grade 4</b><br/>CCSS.ELA-LITERACY.W.4.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.<br/>b. Develop topics with facts, definitions, concrete details, quotations, or other information and examples related to topics.<br/><i>Students use specific seed characteristics to explain how seeds spread.</i></p> <p><b>Grade 5</b><br/>CCSS.ELA-LITERACY.W.5.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.<br/>b. Develop topics with facts, definitions, concrete details, quotations, or other information and examples related to topics.</p> |
| <b>Background</b>                          | <ul style="list-style-type: none"> <li>• Grade 2 Unit: Investigating Plants (TRACKS)</li> </ul> <p>The lesson emphasizes the scientific practices, 37% of the science CMAS test.</p> <ol style="list-style-type: none"> <li>1. Ask questions and define problems.</li> <li>2. Develop and use models.</li> <li>3. Plan and carry out investigations.</li> <li>4. Analyze and interpret data (e.g., observations, graphs).</li> <li>5. Use mathematics and computational thinking.</li> <li>6. Construct explanations (claims, evidence, reasoning) and design solutions.</li> <li>7. Engage in arguments (rebuttal) from evidence.</li> <li>8. Obtain, evaluate, and communicate information.</li> </ol> <p>As students ask questions related to the school garden, guide them to design investigations to answer their questions, collecting data and writing scientific explanations using claims, evidence, and reasoning. Depending on space and resources, this two-week long investigation can be done in different ways: The class, each student group, each student pair, or each student can plant nine seeds, but the lesson is written for pairs to conduct the experiment.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Content/<br/>Language<br/>Objective</b> | <p>As a result of the scientific investigation, I will describe in writing seeds' needs and why it matters in our school garden.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

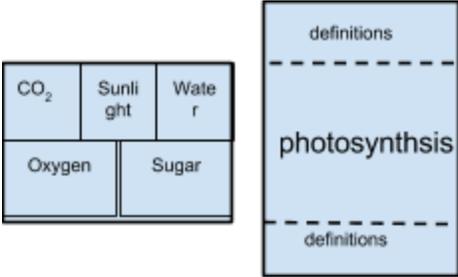
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| <b>Vocabulary</b> | hypothesis, scientific practices, investigation, data, claim, evidence, reasoning, control, variable, observation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Materials</b>  | <ul style="list-style-type: none"> <li>• PBS video, <a href="#">“Colorado Kids Act as Citizen Scientists in National Ladybug Search”</a></li> <li>• Clear cups or other small clear containers (three per pair)</li> <li>• Markers to label cups</li> <li>• Soil to fill cups <math>\frac{3}{4}</math> full</li> <li>• Seeds (nine per pair)</li> <li>• Containers to cover cups (one per cup) or dark space for cups</li> <li>• Paper towels (two per pair)</li> <li>• Water to wet paper towels</li> <li>• Sunny, dry location for cups</li> <li>• Students’ science notebooks</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Do Now</b>     | Review a flower’s parts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Hook</b>       | Show PBS video, <a href="#">“Colorado Kids Act as Citizen Scientists in National Ladybug Search”</a> (5 minutes), about a Colorado Springs third grade class that is part of a national ladybug study. The video shows how scientific investigations can benefit society and encourages students to pursue science careers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Activity</b>   | <ul style="list-style-type: none"> <li>• Review and connect the scientific practices to the video. (10 minutes) <ol style="list-style-type: none"> <li>1. Ask questions and define problems.</li> <li>2. Develop and use models.</li> <li>3. Plan and carry out investigations.</li> <li>4. Analyze and interpret data (e.g., observations, graphs).</li> <li>5. Use mathematics and computational thinking.</li> <li>6. Construct explanations (claims, evidence, reasoning) and design solutions.</li> <li>7. Engage in arguments (rebuttal) from evidence.</li> <li>8. Obtain, evaluate, and communicate information.</li> </ol> </li> <li>• <i>We will conduct an investigation to answer the question: Why is it important for gardeners to know what seeds need to sprout?</i></li> <li>• Students Think-Pair-Share (3 minutes—30 second Think, 30 seconds Pair, 1½ minute Share).</li> <li>• For 1 minute, partners brainstorm what they think seeds need to sprout.</li> <li>• As a class, share and list what plants need: soil, water, sun/warmth, air/oxygen.</li> <li>• Students record this question, <i>Which element is needed for plants to sprout?</i> in their science notebooks.</li> <li>• Students write hypotheses about what seeds need to sprout, <b>not</b> what plants need to grow: <i>Given what you already know about plants, predict what you think seeds need to sprout.</i><br/>Example: <i>Our seeds will sprout if we give them water. Our seeds will sprout if we give them sunlight. Our seeds will sprout if we give them soil.</i></li> <li>• <i>A hypothesis is not just a guess; it is based on prior observations. For example, I think our seeds will sprout if we give them soil because we have always made sure our seeds at home have good soil before we plant them, and I know that plants get nutrients from the soil so I think seeds need soil to sprout.</i></li> <li>• Think-Pair-Share: Students justify their thinking to a classmate or the class.</li> <li>• <i>In scientific investigations, we use controls to figure out which element seeds need to sprout. So we will set up an investigation that controls the other two elements and leaves one to test. In Test 1, we give the seed just soil, but not water and sunlight. In Test 2, we give the seed just water, but not soil and sunlight. In Test 3, we give the seed sunlight, but not soil and water. We need keep the tests as similar as possible. The control plant gets all the elements.</i></li> <li>• To begin the investigation, each student pair gets three clear cups and labels the cups Test 1, Test 2, and Test 3.</li> <li>• Test 1—Just Soil: Pairs fill their Test 1 cups <math>\frac{3}{4}</math> full of soil, poke three holes in the soil, put one seed in each hole, and gently cover the holes with soil.</li> <li>• Place each Test 1 cup under a container or all cups in a dark space.</li> <li>• Test 2—Just Water: Students fold and put one paper towel in the bottom of their Test 2 cups. They wet the paper towel and put three seeds in it, then cover with another wet paper towel.</li> </ul> |

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|                   | <ul style="list-style-type: none"> <li>• Place each Test 2 cup under a container or all cups in a dark space.</li> <li>• Test 3—Just Sunlight: Students place three seeds in their Test 3 cups, but do not put any water or soil in the cups.</li> <li>• Place Test 3 cups in a sunny, dry place.</li> <li>• Students record preliminary data in their science notebooks.</li> <li>• Students record data daily.</li> <li>• After two weeks, students write claims answering the question and support their claims with evidence. <i>I claim...My evidence is...I know because...</i>(scientific concept).</li> <li>• Students revisit their hypotheses, explaining how their hypotheses were correct or incorrect, using experiment data to justify their results.</li> </ul> |
| <b>Extensions</b> | <ul style="list-style-type: none"> <li>• Depending on when investigation is conducted, plant seedlings outdoors or send home to continue growing.</li> <li>• Students graph their data.</li> <li>• Students replicate the process after seeds sprout to answer the question, <i>What do plants need to grow?</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Assessment</b> | <p>Check students' scientific explanations.</p> <ul style="list-style-type: none"> <li>• Do students' claims answer focus question?</li> <li>• Does evidence support claims?</li> <li>• Is reasoning a big idea in science?</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## Basic Photosynthesis

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| <b>Standards</b>                           | <p style="text-align: center;"><i>Colorado Academic Standards (CAS)</i></p> <p><b>Grade 5</b><br/>SC09-GR.5-S.2-GLE.1: All organisms have structures and systems with separate functions.<br/>b. Analyze and interpret data to generate evidence that all plant and animal organisms have structures required for survival.</p> <p style="text-align: center;"><i>Next Generation Science Standards (NGSS)</i></p> <p><b>Grade 3</b><br/>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.</p> <p><b>Grade 4</b><br/>4-LS1-1: Construct arguments that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.</p> <p><b>Grade 5</b><br/>5-LS1-1: Support an argument that plants get materials they need for growth chiefly from air and water.</p> <p style="text-align: center;"><i>English Language Arts Common Core State Standards (CCSS)</i></p> <p><b>Grade 3</b><br/>CCSS.ELA-LITERACY.W.3.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.<br/>c. Use linking words and phrases (for example, <i>also, another, and, more, but</i>) to connect ideas within categories of information.<br/><i>Students use linking words and phrases to show the process of photosynthesis.</i></p> <p><b>Grade 4</b><br/>CCSS.ELA-LITERACY.W.4.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.<br/>c. Link ideas within categories of information using words and phrases (for example, <i>another, for example, also, because</i>).<br/>d. Use precise language and domain-specific vocabulary to inform about or explain topics.<br/><i>Students use linking words and phrases to show the process of photosynthesis and use scientific names of plant parts and processes in photosynthesis.</i></p> <p><b>Grade 5</b><br/>CCSS.ELA-LITERACY.W.5.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.<br/>c. Link ideas within and across categories of information using words, phrases, and clauses (for example, <i>in contrast, especially</i>).<br/>d. Use precise language and domain-specific vocabulary to inform about or explain topics.<br/><i>Students use linking words and phrases to show the process of photosynthesis and use scientific names of plant parts and processes in photosynthesis.</i></p> |
| <b>Background</b>                          | Grade 2 Unit: Investigating Plants (TRACKS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Content/<br/>Language<br/>Objective</b> | I will explain orally and in writing why photosynthesis is important for plants in our garden.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Vocabulary</b>                          | photosynthesis, sunlight, chlorophyll, chloroplast, sugar, oxygen, carbon dioxide, air, water                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

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| <b>Materials</b> | <ul style="list-style-type: none"> <li>• <i>Straight from the Bear's Mouth: The Story of Photosynthesis</i> by Bill Ross</li> <li>• <i>Top Secret</i> by John Reynolds Gardiner</li> <li>• Two balloons</li> <li>• Coat hanger</li> <li>• Zippered plastic bag</li> <li>• <a href="#">Flippity Flaps</a> foldables idea</li> <li>• 8.5" x 11" sheet of paper for demonstration</li> <li>• Scissors</li> <li>• Colored pencils</li> <li>• Construction paper</li> <li>• Glue</li> <li>• <a href="#">Photosynthesis: Fall's Most Valuable Lesson</a> provides more activities to solidify the concept of photosynthesis</li> <li>• Students' science notebooks</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Do Now</b>    | <p><i>What do humans need to live?</i> Students should brainstorm water, food, and shelter. Discuss how we get energy from food.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hook</b>      | <p>Read <i>Straight from the Bear's Mouth: The Story of Photosynthesis</i> and <i>Top Secret</i>. <i>Top Secret</i> helps elementary and middle schoolers learn about photosynthesis. Written by the author of <i>Stone Fox</i> at about a fourth grade level, the book tells about Allen Brewster, a boy who solves the mystery of photosynthesis for a school science project.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Activity</b>  | <ul style="list-style-type: none"> <li>• Helping students understand that carbon dioxide (CO<sub>2</sub>) is a gas is challenging. Help students recognize that "air" is all around them, and one gas in the air is called CO<sub>2</sub>. When students understand that "gas has mass," they can recognize gases in their everyday environment. Conduct these two simple demonstrations to convince students that gases have mass. <ul style="list-style-type: none"> <li>• Blow air into a balloon and suspend it on one end of a hanger. Suspend a non-inflated balloon on the other end. The inflated balloon end drops to show it has more weight (or mass) than the non-inflated balloon.</li> <li>• Blow into a small zippered plastic bag and seal it. Ask a student to sit on the inflated bag. Since the bag does not break, this additional evidence shows that air has weight (or mass).</li> </ul> </li> <li>• After reading about photosynthesis, students create their own foldables to show their understanding.</li> <li>• Model creating a five-door foldable by folding a 8.5" x 11" sheet of paper into thirds and making two equal cuts in the top third and one cut in the middle of the bottom third.</li> </ul> <div style="text-align: center;">  </div> <ul style="list-style-type: none"> <li>• On the three upper flaps, students write the words Sunlight, Water, and Carbon Dioxide, then fill in the underside of each flap with details about where that resource comes from.</li> <li>• On the two lower flaps, students the words Sugar and Oxygen, explaining that sugar is a building block of a plant's leaves, stems, and petals. Just like Lego blocks, the more sugars plants produce, the more plants can grow and build structure.</li> <li>• In the center of the drawing, students write the word Photosynthesis and draw pictures of plants, as well as the connection between humans and plants.</li> </ul> |

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| <b>Assessment</b> | Evaluate student foldables by quality of information written and ability to communicate each part of the photosynthesis process. |

## Seed Dispersal, Part 1

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| <b>Background</b>                          | Grade 2 Unit: Investigating Plants (TRACKS)<br>Adapted from <a href="#">Denver Urban Gardens (DUG)</a> Adapt a Seed lesson                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Content/<br/>Language<br/>Objective</b> | I will explain orally and in writing how seeds of three plants in the school garden spread.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Vocabulary</b>                          | seed dispersal mechanism, ejector, helicopter, air passenger, parachute, hitchhiker, animal express, boat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Materials</b>                           | <ul style="list-style-type: none"> <li>• <a href="#">Traveling Seed Cards</a>, cut out (one card per table group)</li> <li>• Paper scraps</li> <li>• Glue</li> <li>• Scissors</li> <li>• Tape</li> <li>• Tissue paper</li> <li>• Seeds or pictures of seeds that travel in the way listed on each traveling seed card             <ul style="list-style-type: none"> <li>• Helicopter—maple and ash samaras</li> <li>• Parachute—milkweed and dandelions</li> <li>• Air Passenger—cherries, berries, and grapes</li> <li>• Hitchhiker—burdock and bidens</li> <li>• Animal Express—blueberries, raspberries, and apples</li> <li>• Boat—coconuts and cranberries</li> <li>• Ejector—peas</li> </ul> </li> <li>• <a href="#">Venn Diagram</a> for seed design vs. real seed</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

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|                    | <ul style="list-style-type: none"> <li>• Reference list of each seed type’s characteristics from Traveling Seed Cards</li> <li>• Students’ science notebooks</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Do Now/Hook</b> | <ul style="list-style-type: none"> <li>• <i>Here is a mystery to solve: Plants do not move on their own, but seeds travel. How do seeds travel?</i></li> <li>• Give each table group a traveling seed card. Each group designs a seed that meets its traveling seed card’s requirements.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Activity</b>    | <ul style="list-style-type: none"> <li>• After 15 minutes, or after groups design their seeds, give each group a seed or picture of a seed that travels like its traveling seed card. <ul style="list-style-type: none"> <li>• Helicopter—maple and ash samaras</li> <li>• Parachute—milkweed and dandelions</li> <li>• Air Passenger—cherries, berries, and grapes</li> <li>• Hitchhiker—burdock and bidens</li> <li>• Animal Express—blueberries, raspberries, and apples</li> <li>• Boat—coconuts and cranberries</li> <li>• Ejector—peas</li> </ul> </li> <li>• Students complete Venn diagrams to compare and contrast seeds they designed and real seeds.</li> <li>• Each group presents its Venn diagram.</li> <li>• As a class, list characteristics for each seed type, using reference list of seed type characteristics.</li> </ul> |
| <b>Assessment</b>  | Exit ticket: Students compare and contrast one statement between their seed designs and real seeds, then explain the importance of one seed characteristic.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## Traveling Seed Cards

**Make a seed like a helicopter, which can spin, twirl, or fly through the air when dropped from a height of 8 to 10 feet and land at least one foot away.**

**Make a seed that is carried by the wind like a parachute for at least 10 seconds.**

**Make a seed that can hitchhike on a person or animal by sticking to it and going wherever it goes.**

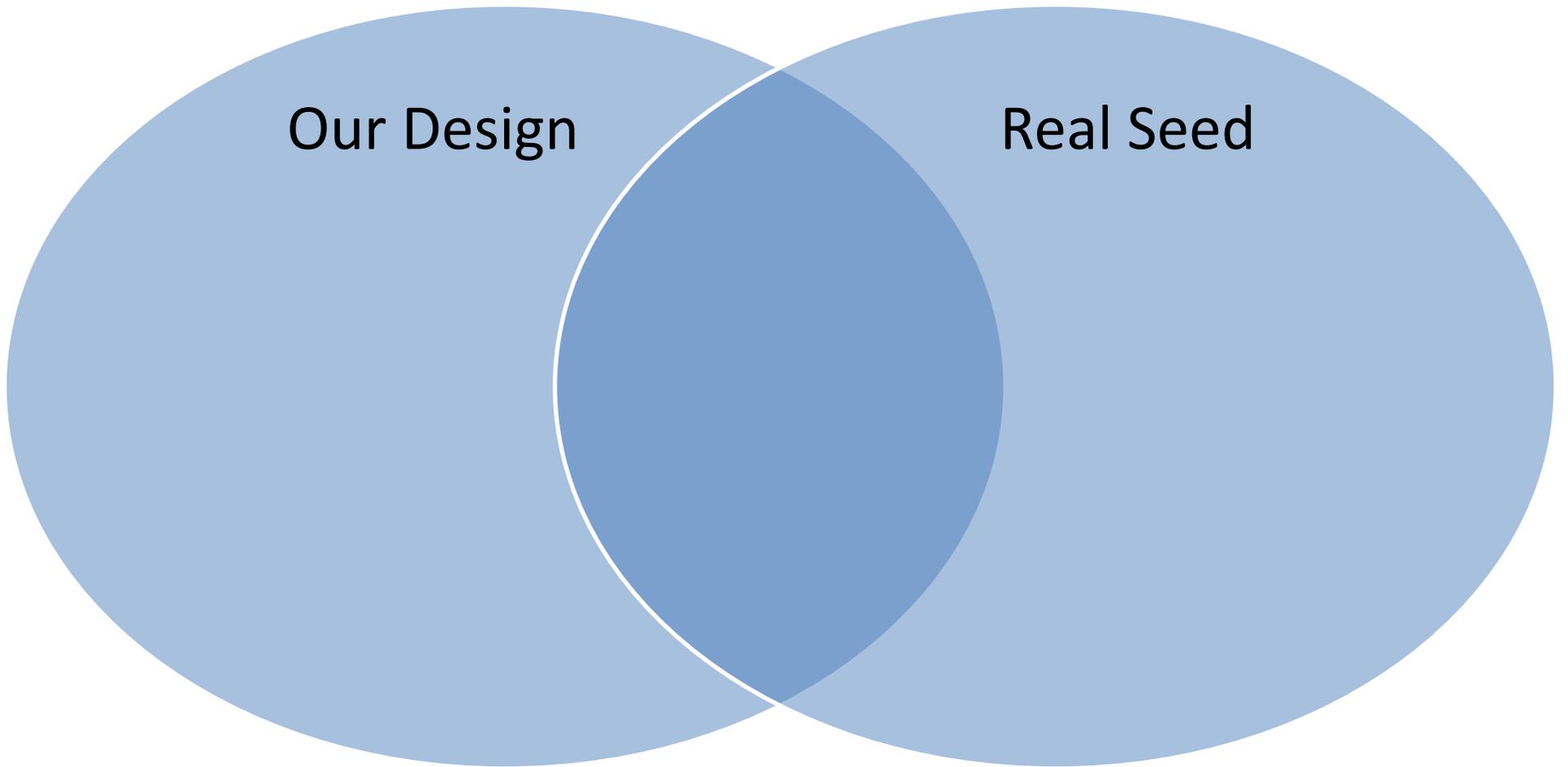
**Make a seed that looks good enough for a bear to eat.**

**Make a seed that is thrown through the air like a cannonball and lands at least two feet away.**

**Make a seed that can float like a boat for at least one minute.**

**Make a seed that a bird might eat. This seed travels as an air passenger.**

Venn Diagram



## Seed Dispersal, Part 2

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| <b>Standards</b>                           | <p style="text-align: center;"><i>Colorado Academic Standards (CAS)</i></p> <p><b>Grade 4</b><br/>SC09-GR.4-S.2-GLE.1: All living things share similar characteristics, but they also have differences that can be described and classified.<br/>b. Use evidence to develop scientific explanations for similarities and/or differences among different organisms (species).</p> <p style="text-align: center;"><i>Next Generation Science Standards (NGSS)</i></p> <p><b>Grade 3</b><br/>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.</p> <p><b>Grade 4</b><br/>4-LS1-1: Construct arguments that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.</p> <p style="text-align: center;"><i>English Language Arts Common Core State Standards (CCSS)</i></p> <p><b>Grade 3</b><br/>CCSS.ELA-LITERACY.W.3.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.<br/>b. Develop topics with facts, definitions, and details.<br/><i>Students use specific seed characteristics to explain how seeds spread.</i></p> <p><b>Grade 4</b><br/>CCSS.ELA-LITERACY.W.4.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.<br/>b. Develop topics with facts, definitions, concrete details, quotations, or other information and examples related to topics.<br/><i>Students use specific seed characteristics to explain how seeds spread.</i></p> <p><b>Grade 5</b><br/>CCSS.ELA-LITERACY.W.5.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.<br/>b. Develop topics with facts, definitions, concrete details, quotations, or other information and examples related to topics.<br/><i>Students use specific seed characteristics to explain how seeds spread.</i></p> |
| <b>Background</b>                          | Grade 2 Unit: Investigating Plants (TRACKS)<br>Adapted from <a href="#">Denver Urban Gardens (DUG)</a> Adapt a Seed lesson                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Content/<br/>Language<br/>Objective</b> | I will explain in writing how seeds of three plants in the school garden spread.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Vocabulary</b>                          | seed dispersal mechanism, ejector, helicopter, air passenger, parachute, hitchhiker, animal express, boat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Materials</b>                           | <ul style="list-style-type: none"> <li>• Class list of seed characteristics from Seed Dispersal, Part 1 lesson</li> <li>• Examples of seeds or pictures of seeds             <ul style="list-style-type: none"> <li>• Helicopter—maple and ash samaras</li> <li>• Parachute—milkweed and dandelions</li> <li>• Air Passenger—cherries, berries, and grapes</li> <li>• Hitchhiker—burdock and bidens</li> <li>• Animal Express—blueberries, raspberries, and apples</li> <li>• Boat—coconuts and cranberries</li> <li>• Ejector—peas</li> </ul> </li> <li>• Classroom plant or photograph of plant</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

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|                    | <ul style="list-style-type: none"> <li>• Students' Venn diagrams for seed design vs. real seed from Seed Dispersal, Part 1 lesson</li> <li>• Students' science notebooks</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Do Now/Hook</b> | Using the class seed characteristics list from Seed Dispersal, Part 1 lesson, students match characteristics with examples of seeds or pictures of seeds that spread in that way.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Activity</b>    | <ul style="list-style-type: none"> <li>• Model answering the information below for a plant in the classroom or photograph of a plant.</li> <li>• Pairs find three plants in the garden, then record the information below in their science notebooks. <ul style="list-style-type: none"> <li>• <i>Draw the plant. Write its name if you know it.</i></li> <li>• <i>Draw its seed.</i></li> <li>• <i>Answer the claim: How do you think this seed is spread?</i></li> <li>• <i>Provide evidence: Using the list of characteristics of seeds that spread, what evidence do you have to support this claim?</i></li> </ul> </li> <li>• Create a class chart of plant and seed dispersal mechanisms and characteristics of seeds they observed in the garden.</li> <li>• Students make connections on the class chart. <ul style="list-style-type: none"> <li>• <i>Which plants have seeds that travel using the same mechanisms?</i></li> <li>• <i>Are there similarities between plants that have seeds that travel using the same mechanisms?</i></li> </ul> </li> </ul> |
| <b>Assessment</b>  | <p>Use students' claims and evidence to assess:</p> <ul style="list-style-type: none"> <li>• Whether students can make reasonable claims.</li> <li>• If students can cite specific characteristics as evidence to support their claims.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## Companion Planting, Part 1

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| <b>Standards</b>                           | <p style="text-align: center;"><i>Next Generation Science Standards (NGSS)</i></p> <p><b>Grade 3</b><br/>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.</p> <p><b>Grade 4</b><br/>4-LS1-1: Construct arguments that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.</p> <p><b>Grade 5</b><br/>5-LS1-1: Support an argument that plants get materials they need for growth chiefly from air and water.</p> <p style="text-align: center;"><i>English Language Arts Common Core State Standards (CCSS)</i></p> <p><b>Grade 3</b><br/>CCSS.ELA-LITERACY.W.3.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.<br/>b. Develop topics with facts, definitions, and details.<br/><i>Students use specific plant characteristics to explain how plants are companion plants.</i></p> <p><b>Grade 4</b><br/>CCSS.ELA-LITERACY.W.4.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.<br/>b. Develop topics with facts, definitions, concrete details, quotations, or other information and examples related to topics.<br/><i>Students use specific plant characteristics to explain how plants are companion plants.</i></p> <p><b>Grade 5</b><br/>CCSS.ELA-LITERACY.W.5.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.<br/>b. Develop topics with facts, definitions, concrete details, quotations, or other information and examples related to topics.<br/><i>Students use specific plant characteristics to explain how plants are companion plants.</i></p> |
| <b>Background</b>                          | <ul style="list-style-type: none"> <li>• Grade 1 Unit: Investigating Properties (TRACKS)</li> <li>• Grade 2 Unit: Investigating Plants (TRACKS)</li> </ul> <p>This lesson can be taught during reading as part of a fictional unit, especially one about fables and folklore.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Content/<br/>Language<br/>Objective</b> | I will define in writing companion planting and explain in writing why corn, squash, and beans are examples of companion plants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Vocabulary</b>                          | companion planting, physical characteristics of plants, three sisters, benefit, squash, corn, bean, nitrogen, shade, prickly hairs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Materials</b>                           | <ul style="list-style-type: none"> <li>• Squash, corn, and bean</li> <li>• Photographs of squash, corn, and bean plants</li> <li>• Graphic organizer to compare physical characteristics (one per student) (optional)</li> <li>• Native American legend, <a href="#">“The Three Sisters”</a></li> <li>• <a href="#">“Celebrate the Three Sisters: Corn, Beans, and Squash”</a> by Alice Formiga</li> <li>• <i>The Iroquois</i> by Emily Dolbear and Peter Benoit, page 29</li> <li>• <a href="#">Companion Planting list</a></li> <li>• Students’ science notebooks</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Do Now/Hook</b>                         | <ul style="list-style-type: none"> <li>• Show squash, corn, and a bean, both the actual vegetables and photographs of the whole plants.</li> <li>• Students compare and contrast squash, corn, and bean physical characteristics.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

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| <b>Activity</b>   | <ul style="list-style-type: none"> <li>• Students read the Native American legend, “The Three Sisters,” focusing on a relevant aspect of reading comprehension, such as: <ul style="list-style-type: none"> <li>• Identifying story elements,</li> <li>• Analyzing one sister’s character traits, and/or</li> <li>• Identifying the story’s central theme.</li> </ul> </li> <li>• Students read “Celebrate the Three Sisters: Corn, Beans, and Squash” about how these vegetables work together and how their characteristics complement each other. See also <i>The Iroquois</i>, page 29.</li> <li>• Show the vegetables and the plant photographs again so students make connections to the information they read. Label relevant parts on the plant photographs.</li> <li>• Define companion planting, a gardening technique where certain plants are planted near each other in close proximity to take advantage of nearby plants’ benefits. Use Companion Planting list for reference.</li> </ul> |
| <b>Assessment</b> | <p>Students answer the writing prompt: <i>What is companion planting? Why are corn, squash, and beans a good example of companion planting? Cite the plants’ specific characteristics to answer your question.</i></p> <p>If students used graphic organizers to compare plant characteristics, allow them use the same graphic organizer here to plan their responses.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

# Soil

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| <b>Standards</b>                           | <p style="text-align: center;"><b><i>Next Generation Science Standards (NGSS)</i></b></p> <p><b>Grade 3</b><br/>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.</p> <p><b>Grade 4</b><br/>4-LS1-1: Construct arguments that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.</p> <p><b>Grade 5</b><br/>5-LS1-1: Support an argument that plants get materials they need for growth chiefly from air and water.<br/>5-LS2-1: Develop models to describe movements of matter among plants, animals, decomposers, and the environment.</p> <p style="text-align: center;"><b><i>English Language Arts Common Core State Standards (CCSS)</i></b></p> <p><b>Grade 3</b><br/>CCSS.ELA-LITERACY.W.3.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.<br/>c. Use linking words and phrases (for example, <i>also, another, and, more, but</i>) to connect ideas within categories of information.<br/><i>Students use linking words and phrases to explain differences between soil types.</i></p> <p><b>Grade 4</b><br/>CCSS.ELA-LITERACY.W.4.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.<br/>b. Develop topics with facts, definitions, concrete details, quotations, or other information and examples related to topics.<br/><i>Students use specific seed characteristics to explain how seeds spread.</i><br/>d. Use precise language and domain-specific vocabulary to inform about or explain topics.<br/><i>Students use domain-specific vocabulary to explain differences between soil types.</i></p> <p><b>Grade 5</b><br/>CCSS.ELA-LITERACY.W.5.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.<br/>d. Use precise language and domain-specific vocabulary to inform about or explain topics.<br/><i>Students use domain-specific vocabulary to explain differences between soil types.</i></p> |
| <b>Background</b>                          | <p>Grade 2 Unit: Investigating Earth Materials (TRACKS)<br/>Adapted from Eat. Think. Grow.'s <a href="#">Soil Composition Exploration</a> and Elementary Globe's <a href="#">Getting to Know Soil</a> lessons<br/><a href="#">"Properties of the Different Kinds of Soil"</a> by Moira Whitehouse</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Content/<br/>Language<br/>Objective</b> | <p>I will examine in writing different types of soil at my school.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Vocabulary</b>                          | <p>clay, sand, silt, loam, humus, structure, function, fertilizer, nitrogen, phosphorus, potassium, nutrient and water transport in plants/animals, nutrient absorption in plants/animals</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Materials</b>                           | <ul style="list-style-type: none"> <li>• Students' science notebooks</li> <li>• <a href="#">"DIY Soil Texture Test for Your Yard"</a> by Julie Day</li> <li>• Shovel or trowel (one per group)</li> <li>• Jars taller than 6 inches (one per group)</li> <li>• Pitchers of water</li> <li>• Dish detergent (less than a drop per jar)</li> <li>• <a href="#">Getting to Know Soil</a> worksheets (one per student)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

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| <b>Do Now</b>     | <i>What will we find in soil? Brainstorm four different things we might find in your science notebook.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Hook</b>       | <ul style="list-style-type: none"> <li>• Introduce the concept of soil quality and the three types of soil: clay, sand, and silt. Loam is the combination of all three types of soil, and humus is the organic (decomposed matter of other plants) matter that helps plants grow.</li> <li>• Students predict what types of soil their groups will find in their soil samples.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Activity</b>   | <ul style="list-style-type: none"> <li>• In groups of three to five, students collect soil from different parts of school, including gardens, playground, sports fields, and additional teacher-selected locations. Students try to find soils that look noticeably different or display obvious differences in plant life. At each location, students note conditions before they dig, such as presence or absence of plant life in that location, evidence of human activity, and any other factors that may affect the soil.</li> <li>• Ask questions, such as: <i>When we take soil samples, does it matter how we dig? Why is it important to dig below the surface in each location? Why would it be important to dig to the same depth at each location?</i></li> <li>• Students use the directions and visuals at “DIY Soil Texture Test for Your Yard” to sample and observe soil. <ol style="list-style-type: none"> <li>1. Remove the top 2” of soil and all the roots. Dig a small, straight-sided hole at least 8” deep. Pointing the shovel straight down, slice off a chunk of soil about 1” thick and carefully lift it out of the hole. Remove any roots, twigs, or rocks.</li> <li>2. Use the shovel to slice off a small cross section of the soil sample. Place the soil in the jar, so the jar is about 1/3 full of soil.</li> <li>3. Fill the jar with water, add a teaspoon of detergent, and shake for several minutes until the soil is thoroughly suspended in the water.</li> <li>4. Coarse sand particles settle first, followed by darker, finer silt. Last is the lighter, superfine clay, while organic matter floats. If you wait until everything settles, it can be hard to sort which is which. To make identification easier, mark the sand level on the jar after one minute, the silt level after 4–6 hours, and the clay level after two days.</li> </ol> </li> <li>• Students record in descriptive sentences different textures and types of soil, using Getting to Know Soil worksheets.</li> <li>• Students can identify soil in a couple of ways. <ul style="list-style-type: none"> <li>• They can note colors, as soil comes in red, gray, black, and brown. Darker colors generally mean the soil has more nutrients and minerals.</li> <li>• They can look at how many plants are growing in the soil, how water flows through the soil, and how well the soil holds water.</li> </ul> </li> <li>• Have students try to roll ribbons of the soil: If the soil holds the shape of their hands squeezing it, the soil is clay; if not, it is silt or sand. Make versions of each these soil types available for students to compare to their samples.</li> </ul> |
| <b>Assessment</b> | Exit ticket: Students describe each soil type.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## Composting and Decomposition

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| <b>Standards</b>                           | <p style="text-align: center;"><i>Next Generation Science Standards (NGSS)</i></p> <p><b>Grade 3</b><br/>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.</p> <p><b>Grade 4</b><br/>4-LS1-1: Construct arguments that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.</p> <p><b>Grade 5</b><br/>5-LS1-1: Support an argument that plants get materials they need for growth chiefly from air and water.</p>                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Background</b>                          | Grade 4 Unit: Investigating Ecosystems (TRACKS)<br><a href="#">Life Lab</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Content/<br/>Language<br/>Objective</b> | I will explain in writing the importance of composting and decomposition in our garden.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Vocabulary</b>                          | nutrient, habitat, survival, microorganism, mineral                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Materials</b>                           | <ul style="list-style-type: none"> <li>• Posterboard (one per student)</li> <li>• Markers or colored pencils</li> <li>• Directions and materials for worm bin from <a href="#">Composting: Worm Recycling</a></li> <li>• Directions and materials for composting pile from <a href="#">How to Build a Compost Pile</a></li> <li>• Students' science notebooks</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Do Now/<br/>Hook</b>                    | <ul style="list-style-type: none"> <li>• <i>Where does your garbage go? What happens to cardboard boxes? Banana peels? Leaves? Plastic bottles or soda cans?</i></li> <li>• <i>Decomposition is the process whereby natural materials break down and turn into soil that can be used to grow plants. Almost all materials break down over time; things that are natural break down quickly in a matter of days or weeks. Some things, such as plastics and Styrofoam, take thousands to millions of years.</i></li> <li>• <i>Bacteria, worms, and mushrooms are among the organisms that break down food scraps, leaves, dead animals, and paper products. As these organisms break down things, the soil created is rich in minerals and other nutrients that plants need to grow. By composting our garbage, we reduce the strain on landfills and help our school garden.</i></li> </ul>                                                                                                          |
| <b>Activity</b>                            | <ul style="list-style-type: none"> <li>• Each student creates one of three types of posters about starting a composting pile in the school garden or a worm bin in the classroom.             <ul style="list-style-type: none"> <li>• What types of foods can and cannot be collected in the compost pile<br/>For example: <i>Feed worms vegetable scraps, grains, fruit scraps including rinds and peels, breads, coffee grounds and filters, and tea bags.</i><br/><i>Do not feed worms meat, fish, cheese, oily foods, butter, or animal products.</i></li> <li>• How to care for composting pile and worms<br/>For example: <i>Always bury food wastes.</i></li> <li>• Why composting and decomposition are important to the cycle of matter in our world</li> </ul> </li> <li>• Using either Composting: Worm Recycling or How to Build a Compost Pile directions, create a worm bin in the classroom or composting pile in the garden to maintain, turn, and fertilize the garden.</li> </ul> |
| <b>Assessment</b>                          | <p>Exit ticket: Students list different types of materials they throw away, such as banana peels, paper napkins, plastic cups, soda bottles, and/or glass jars from peanut butter, and organize into compostable and non-compostable.</p> <p>Students list two reasons why it is beneficial to compost and why plants need decomposers to grow.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## Companion Planting, Part 2

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| <b>Standards</b>                           | <p style="text-align: center;"><i>Colorado Academic Standards (CAS)</i></p> <p><b>Grade 5</b><br/>SC09-GR.5-S.2-GLE.1: All organisms have structures and systems with separate functions.<br/>b. Analyze and interpret data to generate evidence that all plant and animal organisms have structures required for survival.</p> <p style="text-align: center;"><i>Next Generation Science Standards (NGSS)</i></p> <p><b>Grade 3</b><br/>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.</p> <p><b>Grade 4</b><br/>4-LS1-1: Construct arguments that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.</p> <p style="text-align: center;"><i>English Language Arts Common Core State Standards (CCSS)</i></p> <p><b>Grade 3</b><br/>CCSS.ELA-LITERACY.W.3.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.<br/>c. Use linking words and phrases (for example, <i>also, another, and, more, but</i>) to connect ideas within categories of information.<br/><i>Students use linking words and phrases to show the beneficial relationship between companion plants.</i></p> <p><b>Grade 4</b><br/>CCSS.ELA-LITERACY.W.4.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.<br/>c. Link ideas within categories of information using words and phrases (for example, <i>another, for example, also, because</i>).<br/>d. Use precise language and domain-specific vocabulary to inform about or explain topics.<br/><i>Students use linking words to show relationships between plant characteristics and use domain-specific vocabulary to explain benefits of companion planting.</i></p> <p><b>Grade 5</b><br/>CCSS.ELA-LITERACY.W.5.2: Write informative/explanatory texts to examine topics and convey ideas and information clearly.<br/>c. Link ideas within and across categories of information using words, phrases, and clauses (for example, <i>in contrast, especially</i>).<br/>d. Use precise language and domain-specific vocabulary to inform about or explain topics.<br/><i>Students use linking words to show relationships between plant characteristics and use domain-specific vocabulary to explain benefits of companion planting.</i></p> |
| <b>Background</b>                          | <ul style="list-style-type: none"> <li>• Grade 1 Unit: Investigating Properties (TRACKS)</li> <li>• Grade 2 Unit: Investigating Plants (TRACKS)</li> </ul> <p>Lesson adapted from <a href="http://eatthinkgrow.org">eatthinkgrow.org</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Content/<br/>Language<br/>Objective</b> | I will identify orally examples of companion planting in our garden and explain in writing how each plant’s characteristics benefit other plants in the group.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Vocabulary</b>                          | companion planting, physical characteristics of plants, three sisters, benefit, squash, corn, bean, nitrogen, shade, prickly hairs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

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| <b>Materials</b>  | <ul style="list-style-type: none"> <li>• Students' science notebooks</li> <li>• <i>The Iroquois</i> by Emily Dolbear and Peter Benoit, page 29</li> <li>• Chart paper or online document to list benefits of companion planting</li> <li>• Plant Groups Game from <a href="#">Companion Plants</a> lesson <ul style="list-style-type: none"> <li>• Directions</li> <li>• Plant Like and Dislike Cards, cut out</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Do Now</b>     | <ul style="list-style-type: none"> <li>• Students review their science notebooks for information about the three plants (bean, squash, corn) they studied in Companion Planting, Part 1.</li> <li>• Partners explain how each plant helps the others grow. See also <i>The Iroquois</i>, page 29.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Hook</b>       | <ul style="list-style-type: none"> <li>• Review definition of companion planting and remind students that beans, corn, and squash are an example of companion plants. Explain that companion planting happens intentionally in the garden, but also naturally in forests.</li> <li>• Partners brainstorm possible benefits of companion planting using <i>The Iroquois</i>, page 29, then share responses.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Activity</b>   | <ul style="list-style-type: none"> <li>• Record responses for class to reference later, correcting or adding to suggestions as necessary so list accurately reflects benefits of companion planting, such as: <ul style="list-style-type: none"> <li>• Prickly hairs on the squash plant discourage bugs and other pests that would damage the corn and beans, reducing the need for pesticides.</li> <li>• The shade of the squash leaves discourages weed growth, reducing the need for weeding.</li> <li>• Beans add nitrogen to the soil, making it richer the next season, which especially helps corn.</li> </ul> </li> <li>• Give students this scenario, then they brainstorm good companion plant characteristics: <i>Taproot grows deep into the soil. Its leaves are thin and feathery, and its soaks up sunshine. The gardener wants to plant another plant next the taproot.</i> <ul style="list-style-type: none"> <li>• <i>What if the plant has deep roots? Will the new plant compete with the taproot for water and soil nutrients?</i></li> <li>• <i>If the new plant's leaves are taller, will they shade the taproot from getting the sun it needs?</i></li> <li>• <i>What characteristics would be good in a plant that will live right next to the taproot?</i></li> </ul> </li> <li>• Allow students time to discuss, listening for these options: <i>A plant with shallow roots, such a lettuce, is a good companion plant. A plant without huge, broad leaves that does not block the sun might also work. Gardeners, farmers, and researchers have thought about these kinds of scenarios for years.</i></li> <li>• Play the Plant Groups Game, using the directions and Plant Like and Dislike Cards in the Companion Plants lesson. <ul style="list-style-type: none"> <li>• Plants “like” each other if the plants grow well together.</li> <li>• Plants “dislike” each other if the plants cannot grow well together because they have the same needs and compete with each other for sunlight, soil, etc.</li> </ul> </li> <li>• As groups play, or after the game finishes, record plant groups that grow well together. Students record plant groups in their science notebooks to take the garden.</li> <li>• Students search the garden for any examples of the plant groups they found in the Plant Groups Game.</li> <li>• Challenge students to identify other examples of companion planting and justify their predictions using characteristics of plants they see.</li> </ul> |
| <b>Assessment</b> | <p>Students select one plant group from the Plant Groups Game and explain why the plants are companion plants, citing specific plant characteristics and explaining how each characteristic benefits other plants in the group.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |