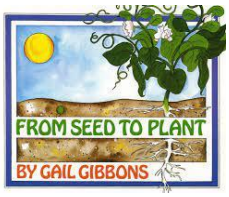
## WEEKS 1-8 Day 1




# STEM Investigation 1: Mini Gardens

Children plant lettuce, radish seeds, and/or bean seeds and observe the growth of the plants over the course of the unit.

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| **Big Ideas** | People, other animals and plants depend on and impact the environment.<br>Plants grow and change over time. They need light, water, and air to live and grow. |
| **Guiding Question** | How do plants grow and change over time? What do plants need to survive? |
| **Vocabulary** | **bury:**<br>**harvest:**<br>**sprout:** |
| **Materials and Preparation** | • *From Seed to Plant*, Gail Gibbons<br>• *Dirt the Scoop on Soil*, Natalie Myra Rosinsky<br>• soil<br>Put the soil in an open container so it is easy for the children to scoop.<br>• plastic rectangular containers (e.g., the lettuce containers from the grocery store), large enough for children to work in small groups, 4-6<br>Punch 8−10 holes at the bottom of each container for drainage.<br>• trays to place under the rectangular containers<br>• plastic spoons or scoops<br>• lettuce seeds, 1-2 packets<br>• radish seeds, 1−2 packets<br>• bean seeds, 1−2 packets<br>• tray, paper plates, or shallow dishes, 2-3<br>Place the seeds on the trays (one for lettuce seeds, one for radish |

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| | seeds, one for bean seeds).<br>● Mini Garden Notebook sheets 1 and 2<br>To create Mini Garden Notebooks for each small group, staple together sheet 1 with several copies of sheet 2.<br>● writing tools<br>● spray bottle filled with water and/or watering can<br>● non−fiction texts about planting<br>● gloves, optional<br>● chart paper and markers<br>● On one piece of chart paper, write the focus question*, What do you notice about how radish, lettuce, and bean plants grow over time?*<br><br>This Investigation unfolds over the course of the unit. Children experiment with planting several types of seeds: lettuce, radish and beans. Children will plant, make decisions in caring for their seeds, and to see what happens with the seeds over time. It is not expected that all seeds will grow successfully. Typically, radish and lettuce seeds both grow rapidly, therefore, children are likely to be able to harvest and taste these crops within the span of the unit. Bean seeds are unlikely to produce bean pods in this amount of time, or grow indoors; however, the size of the larger seeds and their rapid germination time make them an interesting addition to the garden.<br><br>If an outdoor classroom or gardening space is available, consider conducting this Investigation outdoors. If indoors, make space near a sunny window area where the seeds can grow undisturbed and remain visible to the children for observation.<br><br>Small groups will each plant a mini garden that they will tend together. If necessary, plan these small groups. Think carefully about who will compliment one another's strengths and will benefit from collaborating together. Write the names of children in each group to make a small groups list, to be used in launching the activity.<br><br>Set up the STEM table for planting.<br><br>Some children may be adverse to touching soil, therefore, provide gloves or plastic spoons for scooping the soil.<br><br>Bring to Intro to Centers: *From Seed to Plant*, *Dirt the Scoop on Soil*, seeds, chart paper with focus question, Mini Garden Notebook, small groups list |

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| **Intro to Centers** | *In our new Unit of study, we are learning about how plants grow.*<br>Hold up From *Seed to Plant* and *Dirt the Scoop on Soil*. In *From Seed to Plant* show the page with the different types of seeds.<br><br>*Today, we have three different kinds of seeds in the STEM Center. What do you notice about these seeds?.... These are radish, lettuce, and bean seeds.*<br>Pass around the different types of seeds. Harvest responses.<br><br>*Over the next several weeks, you will investigate this focus question, What do you notice about how radish, lettuce, and bean plants grow over time?*<br>Point to the focus question and read it aloud.<br><br>*What are some important words that we need to understand in order to answer this question?*<br>Circle the words children are unfamiliar with and discuss.<br><br>*As scientists, we will work in small groups to plant a mini garden, or a very small garden in a box. For our experiment, we have these materials: soil, seeds, and water. Together, your group will need to decide three things. First, how deep to put the seeds in the soil. Second, how much water to put on the seeds, and third, where to put your mini garden in our classroom so the seeds can grow.*<br><br>*Of course, it's important to record the information about each decision you make. Your group will have a Mini Garden Notebook where you can write and draw about what happens with your garden. Here is the page from the notebook we will use today.*<br>Show the Mini Garden Notebook and flip to sheet 1. Model working through it.<br><br>Show children the small groups list.<br><br>*We will be caring for our garden for the next several weeks.* |
| **During Centers** | Support the assigned small groups.<br>● Show the materials and model to use the scoops to put soil into the container. Show the seeds. Do not name the types of seeds they are planting yet, figuring this out is part of the inquiry. Before planting, remind the children of the decisions that the group needs to make by referring to the Mini Garden |

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| | Journal Sheet 1. Leave the group for a while and challenge them to make decisions without a teacher. Refrain from providing answers, rather, listen to the children's questions and support them in thinking about how they could find more information. Remind children to reference the non fiction texts, ask an expert, or experiment with materials to inform their decision making.<br>● When the group has decided on a plan, support them in planting the seeds in soil, watering with the amount of water they choose, and placing the container in a location of their choice.<br>● Once the gardens are planted, have the children complete the Mini–Garden Journal Sheet 1 and put them into the notebook. They could write one sheet for the group, or each write individual sheets.<br>Remind the groups that it will be their job to care for the seeds, and to water them when they think the seeds need water.<br><br>Expect that some groups will make decisions that may result in a failed experiment, but allow them to test this. For example, a group might plant the seeds too deep in the soil, or water too much or too little, or place the mini garden in a dark corner of the room. If ALL groups make these decisions, plant your own mini garden, so that one garden models a successful growing experience. The goal of the Investigation is for children to observe differences in growth, and think about why things might have happened based on the decisions made in planting and caring for their mini gardens.<br><br>**Continuing the Investigation:**<br>Each day or two, remind the small groups to tend to their gardens in the ways they see fit. Written observations should be added to the notebook regularly.<br><br>In addition to the children's written observations and notes, document changes to the mini gardens over time using photographs. Consider having children take part in the documentation. If possible, print photographs and add them to the groups' binders, or display in the classroom digitally or in printed form. Children should be able to reference the photographs along with their own notes to reflect on changes over time. |
| **Facilitation** | ● What kind of seeds do you think these are? How could you find out? |

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| | ● Where will you put your mini garden? Why do you think this is a good spot?<br>● What do you think will happen to these seeds after they are planted?<br>● What do the seeds need to survive and grow?<br>● How will you care for your mini garden?<br>● How much water will you add? How will you know when your mini garden needs more water?<br>● Where could you get more information to answer your questions? |
| **Sharing Our Research** | Use the suggestions below to hold Sharing our Research meetings approximately every other week until lettuce and radishes are ready to harvest. Depending on growing conditions, this could take several weeks.<br><br>*What do you notice about how radish, lettuce, and bean plants grow over time?*<br><br>**After the mini-gardens have been planted:** Have 1–2 groups bring their mini garden and notebook to the meeting. Have a representative from each group explain the decisions they made about planting, watering, and garden placement, by referring to their written work and drawings in the notebook. Ask the whole group, "Did all the groups make the same decisions about their gardens, or did groups make different decisions?" Invite groups to give feedback to each other, with suggestions about how they might learn from each other's decisions. Groups may decide to revise their plans for their garden aGer this conversation, or might continue with their original plan.<br><br>**Once seeds have started to sprout:** Select two gardens to compare, perhaps one that has sprouted and another that has not sprouted yet. Ask the whole group, "Why do you think the seeds are germinating at different rates? Would you like to make any changes to your plan for your garden? Water more, or less? Move the garden to a new location? Try planting new seeds?"<br><br>**If problems arise** (e.g., one garden does not grow, or plants wilt after sprouting, or garden dries out, etc.): Bring the problematic mini garden to the meeting and have the small group present their problem by showing the garden and referring to documentation from their notebook. Ask the whole group what ideas they have about why the problem arose, and what the small group could do to help their garden grow. |

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| | **When it is time to harvest lettuce leaves and radishes**: Celebrate the success of any crops that are ready to harvest! This will likely happen for some, but not all mini gardens. Invite all interested children to help harvest these, not just the children who planted that garden. Invite children to taste the crops. It may only be a bite of radish or a tiny leaf of lettuce, but this experience is powerful for children to see the proces, "from seed to plant." This might be when the class discovers what kind of seeds they have planted. If the children are unsure, encourage them to use non−fiction texts or consult an expert (perhaps a parent or school community member who gardens) to help identify the plants. |
| **Standards** | **K−ESS3−1.** Use a model to represent the relationship between the needs of different plants and animals and the places they live.<br>**Further explanation:** Examples of relationships could include that deer eat buds and leaves and therefore usually live in forested areas and that grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system. Examples could include coastal tidepools, humans in Maine live in insulated buildings for protection during cold months, or uninsulated structures during warm months (e.g. camping in a tent). Examples of animals that migrate include monarch butterflies, ducks, Canada geese, etc. Developing and Using Models, Natural Resources, Systems and System Models<br>**K−LS1−1** Use observations to describe patterns of what plants and animals (including humans) need to survive.<br>**Further explanation:** Examples of patterns could include that animals need to take in food but plants do not, the different kinds of food needed by different types of animals, the requirement of plants to have light, and that all living things need water. Examples could include the pattern a bear makes when preparing to hibernate for winter, the seasonal patterns of trees losing and/or keeping their leaves. Analyzing and Interpreting Data, Organization for Matter and Energy Flow in Organisms, Patterns |