WEEK 1 Lesson 3

Science and Engineering: Life Sciences

Ecosystems: Setting Up Germination Investigations

Big Idea	Living things grow and change over time.
Guiding Question	Why is it important to understand how living things grow and change over time?
Content Objective	I can design investigations to determine in what conditions seeds germinate. (2-LS2-3(MA), Practice 3)
Language Objective	I can exchange ideas with my partners for testing conditions for seed germination. (SL.1.2.b)
Vocabulary	**condition**: a characteristic of the environment (that allows seeds to germinate or not) **germinate**: to begin to develop into a plant **sprout**: to begin to grow
Materials and Preparation	For the lesson: ● chart paper At the top of this paper write the question, What conditions do seeds need to germinate? ● About Plants chart, from previous lessons ● Science and Engineering packets ● Writing and drawing tools Ahead of the lesson, assign children to small groups, and a specific investigation to each group. Investigations can be led by the questions children have articulated previously, if applicable. To the extent possible, each investigation should have only one variable. Some possibilities for investigations are: 1. Do seeds need dirt to sprout? Set up one bag with seeds and a paper towel, and another with

	seeds in dirt. Keep them both moist. 2. Do seeds need light to sprout? Set up one bag in a dark place and another in a light-filled place. Keep both moist, and both with paper towels or with dirt. 3. Do seeds need water to sprout? Set up two sets of seeds in plastic bags, one that will be watered and one that will be kept dry. Both should be with paper towels or with dirt, and both in similar light conditions. 4. Do seeds need warm (or cool) temperatures to sprout? Set up one set of seeds in a cool or cold location and one in a warm location. Keep them both moist, both with paper towels or with dirt, and both in similar light conditions. (If one bag will be in a refrigerator, the other should also be in a dark place.) Organize materials according to the investigations planned, and arrange them at each work station, as indicated below. For all investigations: ● bean seeds, 4 for each group (please make sure you have extras) ● 1 spray bottle or small container with water, 1 for each group ● Investigation Labels, copied and cut apart, enough for each group to have 2 For investigations starting seeds in bags: ● Starting Seeds in Bags procedure, 1 copy for each group ● sandwich-size plastic bags, 2 for each group ● paper towels, 3 for each group For investigations starting seeds in soil: ● Starting Seeds in Soil procedure, 1 copy for each group ● small containers for planting, 4 for each group Punch one hole in the bottom of each container. ● small saucers or plastic lids, to place under each container ● soil, enough to fill all the containers ● popsicle sticks, 1 for each group
Opening 12 minutes	*What conditions do seeds need to germinate?* Read the question on the chart and define **conditions** and **germinate**. Invite children to suggest initial answers to the question, drawing on their ideas from previous discussions. Refer to the About Plants chart as useful. Some possible questions to extend the discussion: *Do you think seeds need light to sprout, or not?*

	Do you think seeds need dirt to germinate, or not? *Do you think seeds need water to sprout, or not?* *Do you think seeds will sprout at any temperature?* Encourage children to cite evidence from personal experience by asking *What makes you say that?* as they offer ideas. Add any new ideas and questions to the About Plants chart. *You have lots of ideas about what seeds need to start growing.* Think, Pair, Share. *How might we investigate these ideas?* *You're going to set up some investigations to answer your questions about what seeds need to start growing. Everyone will use bean seeds, and we'll start some in plastic bags and some in containers with soil. These investigations will test the conditions needed for seeds to* ***germinate*** *or* ***sprout****—to start growing into a plant.* *Here are two procedures, one for starting seeds in plastic bags, and one for planting seeds in soil.* Briefly walk through the main points of each procedure. Note that the plastic bag procedure will vary slightly, depending on the investigations children conduct. *Make sure you label your plastic bags so we know which group each one belongs to and what the investigation is about.* [Show labels.] *Once your investigations are set up, be sure to record them in your packets.* [Refer to the appropriate page in the packet.] Assign children to groups and send them to work.
Investigation 13 minutes	Circulate as children work, assisting as needed with setting up investigations, supporting recording, checking that investigations are properly labeled, and confirming locations for each bag or pot.
Discussion 5 minutes	Gather children in the whole group. Ask each group to share the investigation they set up and what they think they will learn from it. *What question do you hope we will answer with this investigation?* *What do you think might happen?* *Why do you think that?*
Closing	*Today we set up some investigations to test ideas about what seeds need to germinate, or start growing. You will be checking on the*

	seeds every day. You have already recorded the setup of your investigation in your Science and Engineering packets. You'll record any changes you notice, and next week you'll all report on your investigations.
Standards and Practices	**SL.1.2.b** Build on others' talk in conversations by linking their comments to the remarks of others. **2-LS2-1** Plan and conduct an investigation to determine if plants need sunlight and water to grow**.** **2-LS2-2** Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.
Ongoing assessment	Reflect on children's work during the investigation, and review their packets. How do children talk with each other about growing conditions? What do they already understand about seed germination? What misconceptions are revealed? How do children work together to set up their investigations? Do children have a clear purpose for their investigations?

Notes