Radish Seed Garden
5th Grade
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References:

- Columbus Public Schools Science Curriculum Guide

Benchmarks:

LS-4: Summarize that organisms can survive only in ecosystems in which their needs can be met (e.g., food, water, shelter, air, carrying capacity and waste disposal). The world has different ecosystems and distinct ecosystems support the lives of different types of organisms.

SI-3: Use evidence and observations to explain and communicate the results of investigations.

SI-4: Identify one or two variables in a simple experiment.

Objectives:

Students will understand the effects of overpopulation in an ecosystem while enhancing their ability to apply the scientific method.

Materials:

- Shoe box-sized plastic boxes
- Potting soil
- Pencil
- Paper
- Craft sticks
- Tape
- Radish seeds (1 packet for each group)
- Science journals (1 per student)

Initial Demonstration:

Place students into groups of four or five. Engage them in a conversation about overpopulation and find out what it means to them, prompting with questions related to the following: How might organisms adapt to overpopulation? Will these strategies always work? Will they be in competition? What might be a limiting factor for organisms in an overpopulated situation?

Target Observations:

- A basic need of an organism is adequate space.
**Target Model:**

- Organisms in an overpopulated living situation must compete for the limited resources that are available.
- Quality of life is poor under overpopulated conditions and some organisms will die.

**Procedure:**

Ask the students to head a page in their science journals appropriately for this lesson. Introduce them to the question of the day: “Do radishes grow better with 6 seeds per hole or with 2 seeds per hole?”; they should write this in their science journals. Ask each student to individually record their hypothesis for the question.

Involve the class in designing an experiment for demonstrating the effects of overpopulation using radish seeds. Ask them to summarize the experiment that the class agrees upon (in alignment with the planned experiment) in their science journals.

**Experimental execution:** Give each group a plastic container and a packet of radish seeds. Instruct one student from each group to come to the front of the room and fill his/her group’s container ¾ full with potting soil. Ask students to poke 2 rows of five equally-spaced, 1”-deep holes into the soil. They should now, in one row, place two seeds in each hole and label the row as “2 seeds”. In the second row, they should place six seeds in each hole and label this row as “6 seeds”. They should label each seed with a number for future reference (See Figure 1). Ask them to cover the seeds with soil.

![Seed labeling for radish seed garden lesson](image)

Give each student a *Radish Seed Garden Growth Data Table* and explain how to use it. Tell them that over the next few weeks, the plants should be watered equally and be well-illuminated to an equal extent.

**Target Observations:**

- All other variables, besides number of seeds per hole, should be kept equal for each of the growth sites.
**Target Revised Model:**

- If the scientist does not control his/her experimental variables, the experiment may fail to yield useful information.

**Procedure:**

During the next few weeks, water and illuminate all plants sufficiently and equally. Students should record data pertaining to their radishes in the *Radish Seed Garden Growth Data Table* (maybe 2 observations per week for three weeks). Comments, observations, and inferences not appropriate for the data table should be recorded in science journals.

At the end of the lesson, ask them a series of questions about the activity, such as “How do the two rows of seeds differ?”, “What do you think is the cause of the rows’ growth difference?”, and “What does space have to do with the way the seeds grew?”. Ask them if their hypotheses were correct and if not, why not. Ask them to write an appropriate conclusion in their science journals.

**Target Observations:**

- The growth sites with only 2 seeds grew larger radishes than those with 6 seeds.

**Target Revised Model:**

- Due to overcrowding, the 6/hole radishes grew to be less healthy than the 2/hole radishes.

**Summary:**

The students have directly applied the scientific method to learn about the impact of overcrowding on populations.