

SNWA Goal 1 Objective 1.1 CCSD Curriculum Essentials Framework

Science

It is expected that students will:

(5)2.6 investigate and describe how some environmental conditions are more favorable than others to living things [NS 7.5.3]

(5)2.12 investigate and describe how environmental changes allow some plants and animals to survive and reproduce, but others may die [NS 9.5.2]

(5)4.2 investigate and describe how, for any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all [NS 15.5.2]

(5)6.3 keep records of investigations and observations in a science notebook/journal, without changing those records later [NS 21.5.1]

(5)6.4 make careful observations and test things more than once [NS 21.5.2]

(5)6.9 collaborate on a group project [NS 22.5.3]

(5)6.21 manipulate objects and observe events in an experiment [NS 24.5.6]

English Language Arts

It is expected that students will:

(5)11.1 formulate research questions and establish a focus and purpose for inquiry [NS 11.5.1]

Purpose: This is an investigation into how different plants may require a different amount of water to help them thrive (conservation of water).

Time: This entire investigation takes 11 days to complete; however, it does not require class time each day. Session one may take 50-75 minutes; follow-up sessions may take 30-45 minutes each.

You will need:

- 4 plastic pint containers per group
- 12 of each of the following seeds per group:
 - ◆ radishes
 - ◆ squash
 - ◆ marigolds
 - ◆ sunflowers
- potting soil
- measuring cup for water
- 4 plastic zip bags per group

Introduction

1. Tell students, “Living in the Mojave Desert, we have been told that it is important to conserve water, and yet many of us enjoy having grass,

trees and plants around us. I wonder which plants will thrive best with the least amount of water? How can we find out?" Allow students to discuss.

Making Discoveries

2. Show students the four different kinds of seeds you have and suggest that the class set up an experiment of planting these seeds with everything exactly the same except for the amount of water (control of variables).
3. Hold a class discussion, asking the students to help you design how you will make certain that all variables remain the same except for the amount of water. Students record the agreed-upon experimental design in their notebooks.

Teacher Note:

Students can discuss and agree on the amount of dirt to place in the containers, the amount of water to be added, how many different environments to test, how to identify those environments, which seed types and how many of each to plant, and how to keep track of the seed types.

Following is one way of setting up a controlled experiment.

Place 1 cup of soil into each of four containers. Draw a line in the soil to divide the container in half, then again, so that there are 4 quadrants. Place 3 seeds of 1 kind in one of the quadrants, 3 in another, and so on, until each quadrant has 3 seeds. Label the quadrants with the name of the type of seed planted in each one.

Identify the placement of each seed type in some way. Have students draw a planting map in their notebooks. Add 1/4 cup of soil on top of the seeds and tamp gently. Add water to the 2 wet environments listed below, place each container into a gallon size zip bag and seal.

Dry: Potting soil dried by spreading on newspaper for 1-2 days

Moist: Potting soil directly from the tightly closed bag, no water added

Wet: Moist potting soil plus 40 ml water

Very wet: Moist potting soil plus 80 ml water

4. Allow time for students to prepare their containers and plant the seeds. Set them aside in the same area for observation over time.
5. Discuss the process of planting and watering the seeds with the students and have them write a description of that process in their notebooks (procedure).

- What do you think will happen (hypothesis)? Why? What should we watch for?
 - How can we keep an accurate record of what is happening?
6. After discussion, each individual records observations of the plants on day five, day eight and day 10, removing containers from the zip bags to observe. Groups design their own format of how to record information in a clear and consistent manner, including those characteristics they decided to watch for in the class discussion.
 7. On day 11, each group should take one container at a time, carefully turn it on its side on newspaper, and gently remove the plants, teasing them apart. Each member of the group should be responsible for only one of the plant types, taping the plant (including roots) into the notebook as part of the records.
 8. Empty the remainder of the containers in the same way, individuals working with the same type plant so that the effect of the different water environments can be compared.
 9. Students discuss in their groups what they observe, looking first at the same type plant, then comparing plants in the different environments. Individuals write in their own notebooks their observations (results) and what was learned (conclusions).



Assessment Opportunity

Have students write responses to the following questions, referring to their notebooks as necessary.

- Which plants thrived in the dry soil? Moist? Wet? Very wet?
- What plant characteristics indicated they were thriving?
- Did all the plants need the same amount of water?
- Which plants thrived in the least amount of water?
- What does that mean?

Closing

As a whole group, students share what they observed, learned and wrote about. Create a class chart to compare group results.

Extension

Ask students to investigate the effects of different kinds of irrigation on different seeds. Students should work in groups to design an investigation comparing regular watering to a drip system of watering. (Use eye droppers or straws to drip water onto soil.) Give students the opportunity to observe, record and communicate the results of their investigations with the class.

The teacher should introduce or review the following vocabulary with the students within the context of this lesson.

conclusion: a statement reflecting on the results of an investigation

controlled variable: a variable that will stay the same during an investigation

procedure: a description of exactly what was done during an investigation

property: an observable characteristic

results: a record of what happened during an investigation

variable: something that may cause the results of an investigation to change

