South Dakota State University Extension

Level: 1st-3rd Grades

GROW GETTERS

GETTING THE GARDEN GROWING!

Overview: In this introductory gardening lesson, youth will learn what plants need to grow and what fruits and vegetables grow in different seasons in South Dakota.

Contributors: Activities written by SDSU Extension Master Gardener Tamara Carnes under the direction and review of Anna Tvedt

The lesson was reviewed by the SDSU Extension Grow Getters Planning Committee: Rhoda Burrows, Ph.D., Kristine Lang, Ph.D., Aimee Ladonski, Nikki Prosch, Audrey Rider, Prairey Walkling

The Grow Getters Program originated as a Master Gardener project in 2020 and is now a multi-departmental effort among SDSU Extension staff and volunteers.

This material was funded by USDA's Supplemental Nutrition Assistance Program - SNAP.

S-0022-01-02

Activities in this Lesson

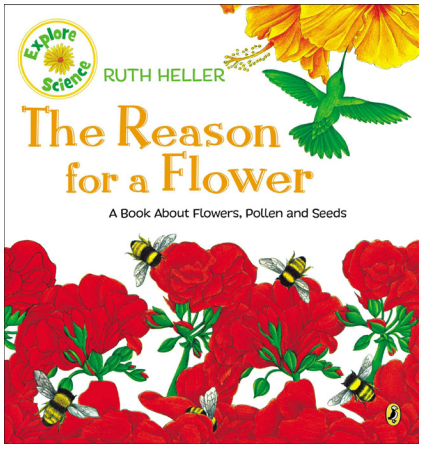
- Science Activity: Reach for the Sun
- Nutrition Activity: What Will My Garden Taste Like?
- Physical Activity: Location, Location, Location

South Dakota Educational Standards

- **Science:** 2-LS2-1 Plan and carry out an investigation to determine if plants need sunlight and water to grow. (SEP: 3; DCI: LS2.A; CCC: Cause/Effect) (2nd grade standard)
- **Health Standard 7:** 7.2.1 Demonstrate healthy practices and behaviors to maintain or improve personal health. (K-2nd grade standard)
- **Physical Education Standard 3 Nutrition:** Differentiates between healthy and unhealthy foods. (S3.E6.1) (1st grade standard)
    - Recognizes the "good health balance" of good nutrition with physical activity. (S3.E6.2) (2nd grade standard)

Book

- The Reason for a Flower by Ruth Heller
- Purchase the book: The Reason for a Flower by Ruth Heller
- Watch: "The Reason for a Flower" read-aloud by Mari Ann's Book Nook



Vocabulary

- **Fruit** the fleshy product of a flowering plant which contains the seed or seeds
- **Root:** the part of a plant that attaches it to the ground
- **Taproot** a thickened root that grows straight down below the main part of the plant, shaped like a carrot
- **Season:** a period of the year known for specific weather conditions such as Spring, Summer, Winter, or Fall
- **Angiosperms** plants that bear flowers and fruits

REACH FOR THE SUN

Science Activity
1st-3rd Grades

In this activity, students will grow three plants in different conditions (full darkness, shade, and full sun) to explore if plants need sunlight to grow. This activity will equip learners to help their parents find the best spot to plant a garden at home.

Time

Prep: <15 minutes

Day 1: approximately 30 minutes

Days 2-14: <5 minutes per day (or every other day as needed)

Materials

- Planting Vessels, 3 per group (these could be small pots, solo cups, etc.). They should be at least 3" across for indoor planting, but should be larger for outdoor planting to maintain moisture and not overheat
- Seeds, 3 per group - beans and peas work best as they are easy for small hands and quick to germinate
- Enough potting soil to fill all the vessels
- Water as needed
- Log Sheet
- **OPTIONAL:** Rulers and popsicle sticks to measure growth

Steps

Ahead of time:

It will likely be easier if the soil is watered ahead of time so that it is moist but not wet. We recommend that you put enough soil for this project into a large tote or cardboard box with newspaper under the area and mix enough water into the soil ahead of time. The educator should also identify ahead of time where to place the plants so that they will be in complete darkness, in complete shade, and in full sun for at least 6 hours/day.

Instructions for the students:

1. Each group needs to collect three seeds and three pots. Taking turns, fill all three pots up with enough soil until there is only 1-2" left at the top (show students with your fingers how much room to leave at the top without dirt).
2. Poke 1 seed down into the soil about 1" and pat the soil down on top so the seed is snug.
3. Mark the cup so you know which ones belong to your group and place one in each spot designated by your teacher.
4. Each day, check on your plants to see how they are doing. Water as needed.
5. At the end of two weeks, put all your plants into one spot where you can make your final observations on the Log sheet. Draw a picture of what each plant looks like, along with any words you think best describe the plants.

Guiding Questions:

Immediately after the setup:

- Ask students what they think will happen to their plants and have them make predictions about what they will find. A class prediction could be posted somewhere in the room for students to think about as they progress through the experiment.

During the experiment:

- When the plants are beginning to sprout:
  - How are all the plants similar? Did any group of plants sprout sooner or later than the others? How are they different?
    - ***Answer:*** Plants will all be similar in size and shape when they first sprout, differences will become obvious soon after.
- After several days of growth:
  - Which plants are the tallest? Which plants have the most leaves? The biggest leaves?
    - ***Answer:*** the ones in the dark will be tallest but will have very small leaves, discuss with the students how plant height may not always be a good measure for plant health, and how plants collect sunlight with their leaves for energy to make the foods they need to grow and survive. Typically, shade-adapted plants ae larger, thinner leaves that are better to gather whatever sunlight is available. If the bean leaves in the dark are smaller, it is because they didn't have enough energy.
- After the experiment
  - Which plants are the healthiest at the end of the experiment?
    - ***Answer:*** the ones in full sun, because beans and peas are plants that prefer bright, sunny days.
- How might other plants compare to the ones we used in the experiment?
  - Remind students that at home, some of the plants around their home are probably very happy growing in the shade. Impatiens and Hostas are both very popular landscaping plants in South Dakota and grow much better in the shade then in full sun. Plants that prefer full sun include their vegetable garden plants such as tomatoes, potatoes, peas, beans, corn, and squash.
- What do you think would happen if we kept growing the plants from our experiment for several more weeks?
    - ***Answer:*** The one in the sunny spot would probably get big and produce fruit, but the one in the shade and the darkness will eventually run out of energy to grow and die.
- Where is the best spot at home to grow a garden?
    - ***Answers:*** will vary but should demonstrate an understanding that most garden plants need lots of sun to grow well and produce the yummy foods we want them to make.

Modification notes:

There are a wide variety of ways to modify this experiment. These include but are not limited to:

- **Extension:** If time allows, you could test if plants need water to grow by ceasing to water the plants at the end of your experiment. Students could track how long it takes for their plants to stop growing.
- **Advanced:** Have students track plant growth and create time vs. growth graphs of plant height and leaf counts. Make a data table in the classroom to record the average height of each group every few days. To measure height, place a popsicle stick along the plant's stem and make a mark on it at the top of the plant's height, then use a ruler to measure how tall the plant was.

You can also have the students count leaves.

- **Even more Advanced:** Teach the students that quantitative measurements are any measurements scientists use that involve numbers (quantities). This includes height and leaf counts. Scientists use qualitative measurements to discuss observations that can't be counted, such as color, texture, or smell.

- **For indoor growing:** If growing plants indoors, instead of full dark, shade, and full sun, you can place plants in a cupboard (full dark), under a grow light (24 hours of light), and in the window (about 12 hours of light). Since plants usually have both light and darkness, 12 hours of light is a good scientific control group, which provides a standard to compare the other two plant groups to.

South Dakota State University Extension

GROW GETTERS

Name(s): _____ Date: _____

LOG SHEET: REACH FOR THE SUN

Your plants have grown in dark, shady, and sunny spaces. Record what you see. When you are finished, circle the picture of the healthiest plant.

Plant	Picture	Description
Completely Dark		
Shady		
Full Sun		

This material was funded by USDA's Supplemental Nutrition Assistance Program - SNAP.

S-0022-01-02

WHAT WILL MY GARDEN TASTE LIKE?

Nutrition Activity
PreK-3rd Grades

In this activity, students will taste samples of foods that can be grown in South Dakota outdoor gardens during Spring, Summer, and Fall. As an option, students can also try preserved foods (such as pickles) to discuss how they can still enjoy food from their gardens during winter.

Time

Prep: (approximately 60 minutes) which includes a shopping trip, washing, chopping, and plating several food items

Activity: appx. 30-60 minutes

Materials

For this activity, students will have the opportunity to taste several different foods that are in season in their South Dakota gardens at varying times during the season. Try to find three foods in each of the growing season categories. Bonus: pick up seasonal foods from a local farmer. Winter is an optional but interesting category to get learners thinking about what types of plants store well and how we preserve foods. You will also need trays and napkins for passing out the foods, and whatever tools you need to prep. It would be good to include a whole, uncut version of the food for students to pass around and look at before they try the samples. Try to find raw foods for the three growing seasons: spring, summer, and fall.

Spring: Asparagus, peas, kale, lettuce, radishes, cauliflower, chive onions, strawberries, rhubarb, carrots, cabbage, beets, turnips, parsnips, kohlrabi, spinach

Summer: Green Beans, Zucchini, Peppers, Tomatoes, Eggplant, Melons, raspberries, sweet corn, patty-pan squashes, cucumbers, Mulberries, Currents

Fall: Apples, Dry beans (can't do raw but could show them, or soak them to taste), Onions, winter squash, pumpkins, Potatoes, celery ALSO, some of the succession crops of things we saw in spring: Carrots, cabbage, kale, lettuce, spinach, cabbage, beets, kohlrabi, spinach (point out to students that it is getting colder, and some of the spring plants like fall too!)

Winter (Optional): Dried apples or applesauce, pickles, pumpkins, potatoes, onions, canned tomatoes, dried herbs, jellies (specifically of South Dakota grown fruits)

Steps:

1. Activate prior knowledge by leading the students in a discussion about what each season is like: temperature, daylight, what they see growing outside, etc. Depending on the age of students, you may place pictures or words onto the board that describe each season.
2. Explain to the students that during spring, summer, and fall many people in South Dakota can grow foods in their yards and vegetable gardens. Different plants like different weather conditions, and they all take different amounts of time to grow the food they produce.

3. One at a time, show the students the three foods you've chosen for each season. Start in the spring and give students the opportunity to name and touch the foods as you pass them around. Then, season by season, have students taste the samples.
4. **OPTIONAL:** Create a voting board where each student can write their name in the season that they think "tastes the best." Then, lead a discussion about why they chose the season they did. Draw attention to the diversity in students' taste preferences and that it is okay to like different foods than their friends.

Guiding Questions:

Before the Activity:

- What is it like here in the spring/summer/fall/winter? How does this change the way you and your family spend your days? How do you think this might affect the plants that live outside?

During the Activity:

- What are some meals that your family eats that have spring/summer/fall ingredients in them? Is there a certain time of year when you eat more tomatoes or more squash?

After the Activity:

- Why were fewer of the winter foods fresh? Which foods stay fresh (and looked like they were pulled straight from the garden) even when winter time comes? What is different about these foods than the fresh foods in other seasons?
  - » ***Answer:*** Vegetables that store until winter have a thick, hard shell (like squash) or they grow in the dark, cold soil (like potatoes).
- (1st-3rd Grades) Which of the plants you tried are angiosperms (flowering plants)?
  - » ***Answer:*** All of them! Even though we don't always eat the fruit of the plant, all of these garden fruits and vegetables are angiosperms. Some of the fruits on vegetables we enjoy are even toxic! We don't eat the berries on asparagus, but even they flower and produce small red fruits (these are toxic to humans). Potatoes also produce a fruit after flowering, which looks like a tomato but is also toxic to humans.

Modifications

Without buying samples: If you are unable to purchase samples, try showing pictures of the produce and talking about the flavors. You could also use play foods that you may have on-site. Kitchen play food sets often have many different fruits and vegetables.

To practice vocabulary: Have students work in groups to sort the items into roots, shoots, and fruits before taste testing the foods. You could also point out the taproots (radishes, carrots) and if you have potatoes explain that they are a modified type of underground stem called a tuber. In the spring we eat more parts of the plants body (roots, stems, etc) as they tend to grow faster than the fruits, which usually take longer to grow and mature. This is why we eat more fruits during the summer and fall.

Extension: For older students, you could extend this activity by having them choose their favorite fruit or vegetable and learn more about it either at home with a parent or in small groups that you help to find information for. They could decide if the part of the plant they eat is root, fruit, or another part of the plant as well as if it grows in South Dakota and what time of year it is ready to eat.

Note on Nutrition and Health Standards: For all students, they should be aware that all these garden foods are healthy as they are harvested. For the first-grade standard of recognizing

healthy and unhealthy you could discuss how we add sugar to the fruits in things like pies, or how we sometimes process and fry some of these foods, and that these cooking methods should be used in moderation. For the PreK/K students, focus discussion on how the foods they are eating give their bodies energy to grow and move. All students should also be told that being outside and working in a garden are healthy activities that are good ways to spend their time.

LOCATION, LOCATION, LOCATION

Physical Activity
PreK-3rd Grades

This is a simple activity aimed at helping students to apply what they learned in the science activity to an outdoor space. Students will explore outside, identifying locations that would be good sunny spots for gardens and locations better for relaxing in the shade when the gardening is done.

Time

Activity: Minimum 15-20 minutes, although it could be extended into actually growing a garden, which would be a summer long project.

Note: Ideally, this activity will be done after the science activity in which kids learn how much their plants preferred sunshine to shade or darkness.

Materials

- Safe, open natural area students can walk/move around as a class or in smaller groups

Steps

1. Before going outside, activate the learner's prior knowledge by referencing the results of the science activity. Remind them that most of the garden plants they enjoy require 6+ hours of sunshine on them, free from shade, each day. Tell students: "Today we are going to look for areas outside that have different amounts of sunshine each day. We will find some shady areas and some sunny areas. Let's find areas that would be good for growing the types of plants we have in our gardens."
2. Either as an entire group, or as smaller groups of students, walk around the area. Tell students to identify at least two large, bright, sunny areas and two areas that are mostly shading.
3. Have students sit or stand in each of these areas and observe how the sun feels on their skin, how the temperature feels, etc.
4. When all the areas have been located, sit down in a shady area to discuss what you observed.
5. **OPTIONAL:** Return to the same area in the morning, noon, and afternoon. Discuss which locations were sunny all day and which locations became shaded as the sun moved through the sky.

Guiding Questions

Before:

- How much sunlight do garden plants like to have to grow?
  - » *Answer:* Full Sun (6+ hours). Vegetables and many flowers in South Dakota need full sun to grow, but not all. Some plants are adapted to shadier conditions.

After:

- Of all the places we walked to today, which areas did you think would be the best for a garden? Why?
  - » *Answer:* The locations with the most sunlight for most the longest portion of the day.

- If you plant a garden at home, how will you decide where to put it?
    - » *Answer:* A sunny space.

Modifications

- **Extensions**
    - If you plan to start a small garden to grow plants with this group of learners, this lesson would be a great starting off place. If possible, it would then be ideal for students to get to watch the before and after setup of the garden space and help to plant the plants. Assigning a plant each to several groups of students, or something like a tomato plant per student would help students engage in the process and take ownership of the garden overall.
    - Talk about staying healthy in the sun. Ask students what happens to a plant when it is in the sun a long time (it grows). Then, ask them what happens to people if we are in the sun a long time (we get sunburned). Ask what they can do to stay healthy in the sun – wear sunscreen, play in the shade or alternate between shady and sunny spaces, or cover their skin with a hat, sleeves, or pants.
- **Take it home** - Have students describe where their gardens or plants are growing at home, and encourage parents to help students extend this lesson into their own backyards. Have another lesson day in the springtime in which families are invited to send pictures of their gardens with their student as part of a garden show and tell.

Additional Resources

If you liked this lesson, you may also like these other educational materials from SDSU Extension.

Nutrition and Physical Activity

- Pick it! Try it! Like it! Preserve it! materials are filled with tips for selecting, preparing, and preserving a wide variety of fruits and vegetables. Colorful fact sheets, recipe cards, and educational videos provide educators and families with fun, engaging tools to enhance any dietary curriculum!
- Growing Active Readers is a series of book-based lessons to help young children understand the benefits of making healthy decisions involving nutrition and physical activity.
- South Dakota Farm to School Resource Guide walks through the basics of starting farm to school programs in South Dakota, including local food selling/purchasing, school gardens, and in-class education.
- Preservation this page provides a suite of educational materials and programs offered by SDSU Extension related to food preservation.

Horticulture

- Garden and Yard this page provides easy access to all the educational materials and programs related to garden and yard by SDSU Extension. This frequently updated landing page includes sections for fruits, vegetables, problems and solutions, master gardener volunteer program, garden hour, and more.
- Vegetable Gardening in South Dakota this booklet will help you with basic vegetable gardening information and tips to get started.
- Fertilizing Gardens in South Dakota this booklet by SDSU Extension provides information on soil testing, types of fertilizers, and methods of application.
- An Identification Guide to Native Pollinator Plants of South Dakota for Managed Landscapes In this guide, learn about the perennial plants native to South Dakota that attract pollinators and can be incorporated in to gardens.
- Tree Pest Alert stay updated and informed with this weekly resource for selecting, planting, and caring for trees and shrubs all year round.