



National Agriculture in the Classroom

Relevancy and Engagement: agclassroom.org

How Does Your Garden Grow? (Grades 3-5)

Grade Level(s)

3 - 5

Estimated Time

45 minutes plus time to complete project

Purpose

Students synthesize what they know about soils, plants, and the environment to plan a garden, present their plans, and explain why they made the decisions that they did.

Materials

- *Master 5.1*, 1 copy per group
- *Master 5.2*, 2-4 copies
- *Master 5.3*, 1 copy per student
- Glue sticks

Essential Files (maps, charts, pictures, or documents)

- Master 5.1
[https://naitc-api.usu.edu/media/uploads/2015/04/20/Master_5.1.pdf]
- Master 5.3
[https://naitc-api.usu.edu/media/uploads/2015/04/20/Master_5.3.pdf]
- Master 5.2
[https://naitc-api.usu.edu/media/uploads/2015/04/20/Master_5.2.pdf]

Essential Links

- How Does Your Garden Grow? Lesson Video
[https://www.youtube.com/watch?time_continue=1&v=NZd5od54-OU]

Vocabulary

first expected frost date: an average date for a given location for the first freeze, marking the end of a growing season

growing season: the time of year where the weather allows plant growth

last expected frost date: an average date for a given location for the last freeze, marking the beginning of a growing season

Interest Approach – Engagement

1. Begin a discussion with the students about gardens. Use the following questions to guide the discussion:
 - Raise your hand if your family grows a garden.
 - What are your favorite foods that you have grown in your gardens?
 - When do you usually plant your garden?
 - When do you usually harvest the fruit and vegetables from your garden?

Background - Agricultural Connections

Growing a successful garden requires knowledge of plants and their environment, including the soil. Gardeners make decisions based on their location, their soil, and other environmental factors.

View the [How Does Your Garden Grow? Lesson Video](#) to obtain background information for the lesson.

After completing this lesson, students will be able to:

- Plan a garden that is appropriate for their area;
- Explain how understanding a plant's needs is important for a successful garden;
- Explain how plants require nutrients they obtain from the soil and how fertilizers can replace lost nutrients.

This lesson is one of a five part series. See the following titles for related lessons:

- [Plants Around You](#): Students learn about the functions of plant parts and the environment plants need to grow.
- [Properties of Soils](#): Students learn about the characteristics and components of soil.
- [Plant-Soil Interactions](#): Students learn about the function of roots and how water and nutrients move through a plant.
- [Plant Growth Affects the Soil](#): Students learn about how plant growth takes nutrients from soil and how nutrients can be replaced.
- **How Does Your Garden Grow?**: Students make a plan for a garden.

Procedures

Preparation:

Find out the last expected frost date in the spring and the first expected frost date in the fall for your area. A local garden center or Extension office should be able to easily give you this information. Alternatively, you can find this information online.

Cut apart the plant cut-out pieces from *Master 5.2*. Create sets containing parts representing the various plants for each team of students. The height of each cut-out piece is scaled to represent the amount of row space that a plant requires. For example, cabbage plants should be spaced 16 inches (40.64 cm) apart. The height of the cut-out is scaled so that it represents 16 inches (40.64 cm) of a row on *Master 5.1*. (The pieces are not scaled in the horizontal direction.) Students will place the cut-outs on the rows on *Master 5.1* to show what they would plant in their gardens. Students can line up the shaded line on each cut-out piece with the line representing the row on *Master 5.1*. They can then glue these pieces down after they have made their decisions.

Activity 1: Planning a Garden

1. Have the students list ideas about what they would need to know to help them plan a garden. Point out that they will need to know the last date that frost occurs in the spring in their area. Ask students why this is important. *(The last expected frost data in an area is important because most plants won't tolerate cold temperatures or frost well. The young plants are likely to die if they are hit by frost. Also, it gives an indication of how many days are in the area's growing season.)*
2. Explain to the students that you have found out the dates for both the last frost in the spring and the likely first frost of the fall. Write those dates on the board. Explain that you have used this information to figure out the number of days for the growing season in your area. Point out that seed packets often provide the number of days it takes for the plant to mature. If that number is greater than the expected growing season in your area, that plant may not be a good choice for your area.
3. Ask students to work in teams of 3 or 4. Give each group a copy of *Master 5.1, Planning Our Garden*. Explain to students that they are going to plan a garden. They will choose the seeds they want to plant and plan where things will grow in their garden. They can also indicate when they would plant different crops. Point out that each student will have three ten-foot rows to plan. Explain that they can place the cut-out pieces for the different plants on their template to plan their garden.
 - The cut-out pieces are sized to match the scale of the rows. For example, broccoli plants should be planted 12 inches (30.48 cm) apart. The cut-out for broccoli represents 12 inches (30.48 cm) of row space (without needing additional space between cut-outs).
 - To simplify the lesson, the rows in the student gardens are three feet apart. (Depending on the needs of specific plants, rows could sometimes be spaced closer together, but this makes the math more complicated and isn't necessary for the purpose of this activity.) This could be a discussion point if students mention that rows aren't spaced correctly for the plants that they choose.
 - Recommend to students that they put all of their cut-out pieces in place before they start gluing them to the template. In that way, they can more easily make changes if they wish.
4. Go over the second page of *Master 5.1* with students. Explain that they should write the name of the seed/plant they are using, the number of each plant they are growing in their garden, and any extra information they think is helpful to remember about that plant.
5. After each team has had a chance to design their garden, ask them to post their plan in a place where other students can look at it. Allow a few minutes for students to see what other teams have planned. Students will likely be interested in what other garden plans look like. Each team will likely design a very different variety and arrangement of plants.
6. Discuss the garden plans as a class. Ask teams to describe why they chose certain plants, how they decided where to plant the seeds, and if there was anything special someone would need to think about when growing some of the plants that they selected. Students should relate their reasons to the information provided on the seed packets.
7. Wrap up the activity by giving each student a copy of *Master 5.3*. Allow a few minutes for students to answer the questions on the activity sheet.

Possible Answers to Master 5.3:

1. List at least 3 ways that you thought about the environment when planning your garden.
 - Amount of sunlight the plant needs
 - Type of soil in which the plant grows best

- The temperature the plant needs
- Animals and insects living in the area
- Amount of water the plant needs

2. What might be wrong if your garden was not growing well? Explain (*The quality of the soil, the amount of water the plants are getting, the amount of sunlight the plants are getting, and whether the temperatures are appropriate for the plants.*)

3. Explain why fertilizers can be one way to help plants grow better. (*Fertilizers can help plants grow better because they replace nutrients in the soil. When plants grow, they remove nutrients. If you grow the same plant in the same place and then harvest and remove the plant year after year, you will use up the soil's nutrients. This happens because the plants take nutrients from the soil through their roots. Fertilizers make the soil more like it was before you started growing the plants there.*)

Concept Elaboration and Evaluation

After conducting these activities, review and summarize the following key concepts:

- Plants need nutrients to grow. The nutrients are provided by the soil.
- If soil lacks sufficient nutrients, they can be added using fertilizers.
- Soil is a natural resource that farmers use to grow the food we eat.



We welcome your [feedback](#)! Please take a minute to tell us how to make this lesson better or to give us a few gold stars!

Enriching Activities

- Grow an indoor garden. If you have space (or optimally a greenhouse), students can plant an indoor garden. Selecting the appropriate plants is important. Many plants will grow well in containers. Usually, larger containers are better than small ones. Herbs, such as parsley, chives, or cilantro, and lettuces typically grow well. If the site gets enough sun, pepper plants may grow well in a large container. Students can find out more about container gardening through online research. Have students work together to plan the garden, plant the garden, and maintain the garden.
- Grow an outdoor garden. If there is an appropriate space, consider planning and planting an outdoor school garden. This could be a container garden if it isn't feasible to prepare the soil for an in-ground garden. Seek volunteer help from parents to prepare the soil. Have students plan the garden by taking into consideration the space available, the local climate, the amount of time available, and so forth.

Suggested Companion Resources

- Seed Ball Garden Activity (Activity)
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=898>]
- Shape, Form, and Function in the Garden (Activity)
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=642>]
- What Do Plants Need to Grow? (Activity)
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=268>]
- Is There Ever Too Much of a Good Thing? (Activity)
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=269>]
- Grandpa's Garden (Book)
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=916>]

- **The Extraordinary Gardener (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=912>]
- **The Amazing Life Cycle of Plants (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=911>]
- **Harvesting Friends, Cosechando Amigos (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=904>]
- **Kids' Container Gardening (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=424>]
- **Oliver's Vegetables (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=457>]
- **Lily's Garden (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=425>]
- **Unearthing Garden Mysteries: Experiments for Kids (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=68>]
- **How Things Grow (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=273>]
- **Growing Seasons (Book)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=259>]
- **Utah Garden Planner (Kit)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=645>]
- **SOIL Reader (Booklets & Readers)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=397>]
- **4R Reader (Booklets & Readers)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=486>]
- **The Ultimate Guide to Gardening: Grow Your Own Indoor, Vegetable, Fairy, and Other Great Gardens (Teacher Reference)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=825>]
- **Edible Gardening: Growing Your Own Vegetables, Fruits, and More (Teacher Reference)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=361>]
- **School Gardens: A Guide for Gardening and Plant Science (Teacher Reference)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=283>]
- **Greening School Grounds: Creating Habitats for Learning (Teacher Reference)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=417>]
- **Soil Health Education Resources (Website)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=908>]
- **School Garden Center (Website)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=739>]
- **Successful Container Gardens (Website)**
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=504>]

Sources/Credits

- Nutrients for Life Foundation
- BSCS-Biological Science Curriculum Study
- Reviewed by the Smithsonian Institution

Author(s)

Nutrients For Life Foundation

Organization Affiliation

Nutrients for Life Foundation

Curriculum Matrix: agclassroom.org/teacher/matrix