

GROWING WITH THE SEASONS

Name _____

Age (as of January 1 of the current year) _____

County _____

Club name _____

Advisor _____



THE OHIO STATE UNIVERSITY

COLLEGE OF FOOD, AGRICULTURAL,
AND ENVIRONMENTAL SCIENCES





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Note to the Project Helper

CONGRATULATIONS! A 4-H member has asked you to serve as a project helper. You may be a parent, relative, project leader, friend, club advisor, or another person important in the 4-H member's life. Your duties begin with helping the youth create and carry out a project plan, as outlined in the Member Project Guide.

As a project helper, it is up to you to encourage, guide, and assist the 4-H member. How you choose to be involved helps to shape the 4-H member's life skills and knowledge of the importance of vegetable gardening.

Your Role as Project Helper

Your contributions are critical to delivery of the 4-H program, which is committed to providing experiences that strengthen a young person's sense of belonging, generosity, independence, and mastery. Your interactions should support positive youth development within the framework of the Eight Essential Elements (also known as the Eight Key Elements):

1. A positive relationship with a caring adult
2. An inclusive environment
3. A safe emotional and physical environment
4. Opportunity for mastery
5. Engagement in learning
6. Opportunity to see oneself as an active participant in the future
7. Opportunity for self-determination
8. Opportunity to value and practice service to others

For more information on the Eight Essential Elements, please refer to the *Ohio 4-H Volunteer Handbook* available online at ohio4h.org. On a practical level, your role as a project helper means you will strive to do the following:

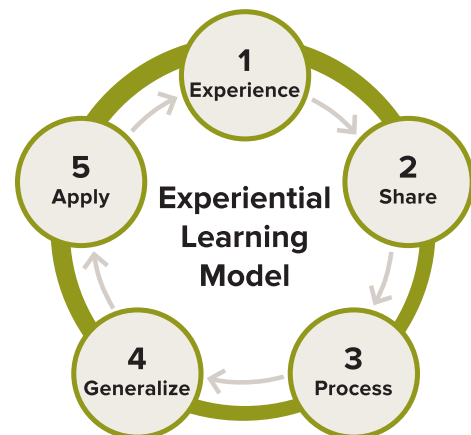
- Guide the youth and provide support in setting goals and completing this project.
- Encourage the youth to apply knowledge from this project book.
- Serve as a resource person.
- Encourage the youth to go beyond the scope of this 4-H project book to learn more about vegetable gardening.

What You Should Know About Experiential Learning

The information and activities in this book are arranged in a unique, experiential fashion (see model). In this way, a youth is introduced to a particular practice, idea, or piece of information through an opening (1) **experience**. The results of the activity are recorded on the accompanying pages. The member then (2) **shares** what he or she did with the project helper and (3) **processes** the experience through a series of questions that allow him or her to (4) **generalize** and (5) **apply** the new knowledge and skill.

What You Can Do

- Review the Learning Outcomes (project skill, life skill, educational standard, and success indicator) for each activity to understand the learning taking place. See the inside back cover for the Summary of Learning Outcomes.
- Become familiar with each activity and the related background information. Stay ahead of the learner by trying out activities beforehand.
- Begin the project by helping the learner establish a plan. This is accomplished by reviewing the Member Project Guide.
- After each project area is completed, conduct a debriefing session that allows the learner to answer the review questions and share results. This important step improves understanding from an experiential learning perspective.
- Help the learner celebrate what was done well and see what could be done differently. Allow the learner to become better at assessing his or her own work.
- In the Member Project Guide, date and initial the activities that have been completed.



Pfeiffer, J.W., and J.E. Jones, *Reference Guide to Handbooks and Annuals*. © 1983 John Wiley & Sons, Inc. Reprinted with permission of John Wiley & Sons, Inc.



Member Project Guide

WELCOME to *Growing with the Seasons!* This project helps you make the most of your garden by using all available space and the entire growing season. You will learn to check your soil, develop a garden plan, tell the difference between beneficial and harmful insects, and harvest at the right time.

Growing with the Seasons is designed for intermediate-level youth who have some experience with vegetable gardening and who would like to gain more experience. Completing the *Grow Your Own Vegetables* project first is highly recommended.

Check your county's project guidelines (if any) for completion requirements in addition to the ones below, especially if you plan to prepare an exhibit for the fair.

The amount of time for each activity varies, but the project is easily completed within one year.

Project Guidelines

Step 1: Complete **all nine** activities and **all** of the Talking It Over questions.

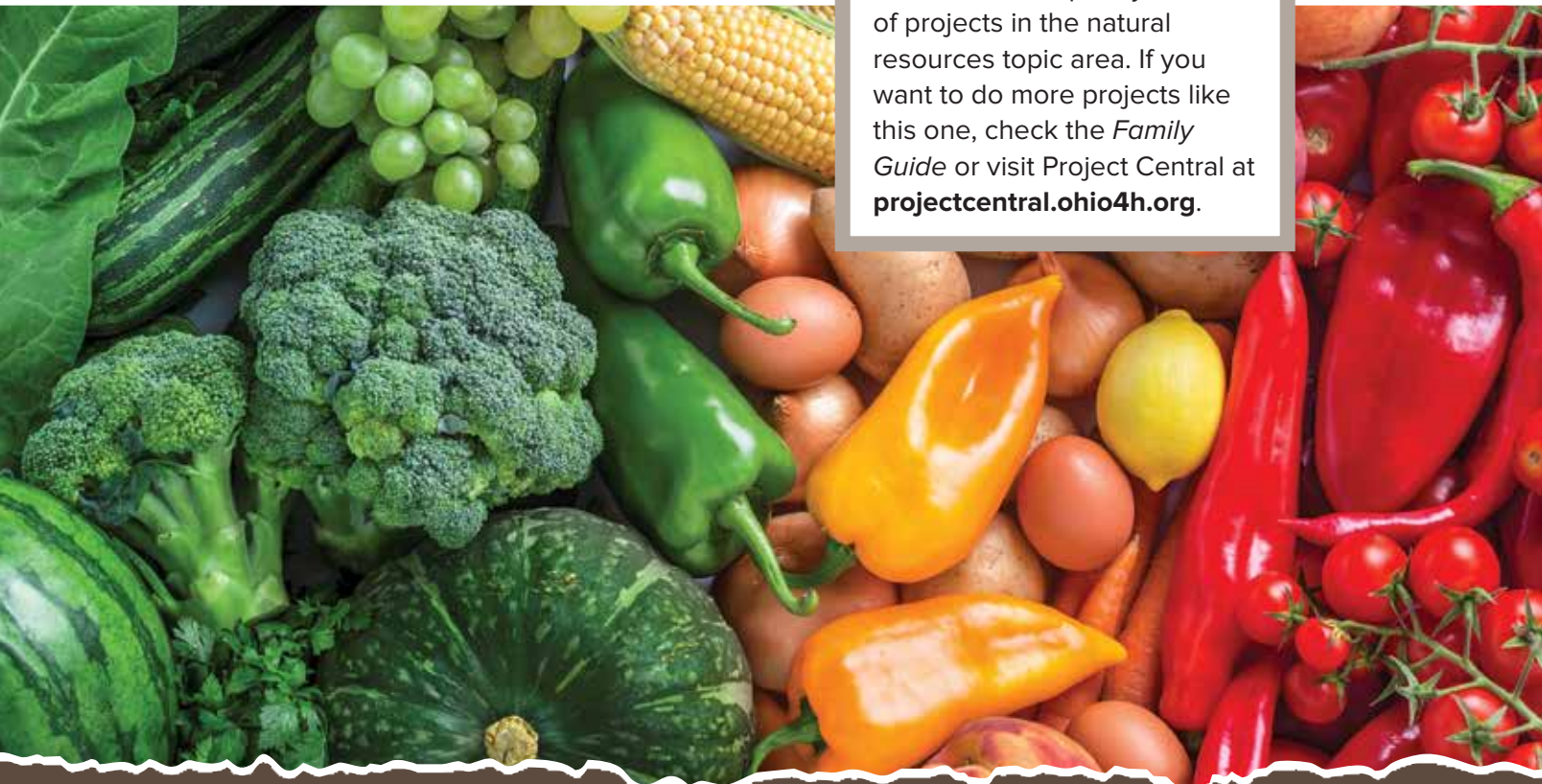
Step 2: Take part in **at least two** learning experiences.

Step 3: Become involved in **at least two** leadership/citizenship activities.

Step 4: Complete a project review.



Ohio 4-H offers plenty of projects in the natural resources topic area. If you want to do more projects like this one, check the *Family Guide* or visit Project Central at projectcentral.ohio4h.org.



Step 1: Project Activities

Complete **all nine** activities and all of the Talking It Over questions. The More Challenges activities are optional. As you finish activities, review your work with your project helper. Then ask your project helper to initial and date your accomplishment.

Activity	Date Completed	Project Helper Initials
PROJECT AREA: Garden Preparation		
1. Playing with Soil		
2. Getting the Most from Garden Space		
3. Plan Your Garden Early		
Talking It Over		
PROJECT AREA: Managing Your Garden		
4. Pest-y Critters		
5. Free Weeds: U Pick		
6. Disease 101		
Talking It Over		
PROJECT AREA: Harvest and Storage		
7. Pick It or Let It Go?		
8. Preserving Your Harvest		
9. Displaying Produce Like a Pro		
Talking It Over		



Step 2: Learning Experiences

Learning experiences are meant to complement project activities, providing the opportunity for you to do more in subject areas that interest you. What are some learning experiences you could do to show the interesting things you are learning about? Here are some ideas:

- Attend a clinic, workshop, demonstration, or class related to vegetable gardening.
- Help organize a club meeting based on this project.
- Go on a related field trip or tour.
- Prepare your own demonstration, illustrated talk, or project exhibit.
- Participate in county judging.

Once you have a few ideas, record them here. Complete **at least two** learning experiences. Then, describe what you did in more detail. Ask your project helper to date and initial in the appropriate spaces below.

Plan to Do	What I Did	Date Completed	Project Helper Initials
<i>Demonstration</i>	<i>Showed club members how to properly harvest and store vegetables.</i>	<i>5/5/YR</i>	<i>L.U.</i>



Step 3: Leadership and Citizenship Activities

Choose **at least two** leadership/citizenship activities from the list below (or create your own) and write them in the table below. Record your progress by asking your project helper to initial next to the date as each one is completed. You may add to or change these activities at any time. Here are some examples of leadership/citizenship activities:

- Teach someone about vegetable gardening.
- Help another member prepare for his or her project judging.
- Host a workshop to share tips about vegetable gardening.
- Encourage someone to enroll in a vegetable project.
- Arrange for a speaker to visit your club and talk about growing vegetables.
- Plan your own leadership/citizenship activity.

Leadership Activity	Date Completed	Project Helper Initials
<i>Organized a club field trip to a farmers market.</i>	<i>6/12/YR</i>	<i>L.U.</i>





Words in **bold** throughout this book are defined in the glossary.

ACTIVITY 1

Playing with Soil

A PLANT'S ROOTS need good soil conditions to support the plant and keep it strong. Roots absorb minerals, **nutrients**, and water, but they also need oxygen. If these conditions are not met, the plant does not thrive. For vegetable plants, that means production is low.

What to Do

Let's get to know the soil in your garden. That's a good first step in knowing what, if anything, you can do to improve it. This activity has two parts—a soil texture jar test and an experiment about changing soil **texture**.



Learning Outcomes

Project skill: Collecting data on soil conditions

Life skill: Making decisions

Educational standard: NGSS 5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.*

Success indicator: Improves soil sample by adding organic matter

*The educational standards cited here are from the Next Generation Science Standards (NGSS). The activities in this book support the learning goal for the performance indicators cited, sometimes as described in the performance indicator itself but often by laying the groundwork for learning with reinforcement of the related science and engineering practices, disciplinary core ideas, or crosscutting concepts. Complete information about each performance indicator is available at nextgenscience.org.



A. Soil Texture Jar Test

Soil texture refers to the amount of **sand**, **silt**, and **clay**. You can do your own “jar test” to see how close your soil is to ideal **loam**, which has approximately equal parts of each.

A jar test of soil composition is not very accurate, but it does provide a general idea about how much clay, sand, and silt are present. **Organic matter** does not have to be removed because it will not influence the results. Gather your materials and follow these easy steps!

MATERIALS:

- Soil samples
 - Newspaper
 - Glass straight-sided jar, such as a Mason or jelly jar, with a lid
 - Permanent marker
 - Ruler
 - Watch
 - 1 teaspoon of powdered dishwasher detergent
1. Collect a few random samples of soil from about 15 cm, or 6 inches, deep. Collect them from different sections of the garden. Collect a total anywhere between 1 to 2 cups of soil.
 2. Spread out the samples on a newspaper to air-dry, removing all debris, roots, and rocks.
 3. When dry, thoroughly mix all the samples.
 4. Crush any lumps.
 5. Fill the jar about one-quarter of the way with soil. Add a teaspoon of powdered Cascade or other non-foaming dishwasher detergent, and then fill the jar to the top with water.
 6. Cover with a tight-fitting lid and shake vigorously for about 15 minutes.
 7. After one minute of settling, mark the obvious separation of sand on the bottom of the jar.
 8. After two hours, mark the next layer from the bottom. This is the silt.



More Challenges

Test your soil! Learn what you need to know at go.osu.edu/soiltest. If you live in another state, check with your local Extension office for this information. Share your results with your parent or guardian, or with the owner of the land where you took the sample.



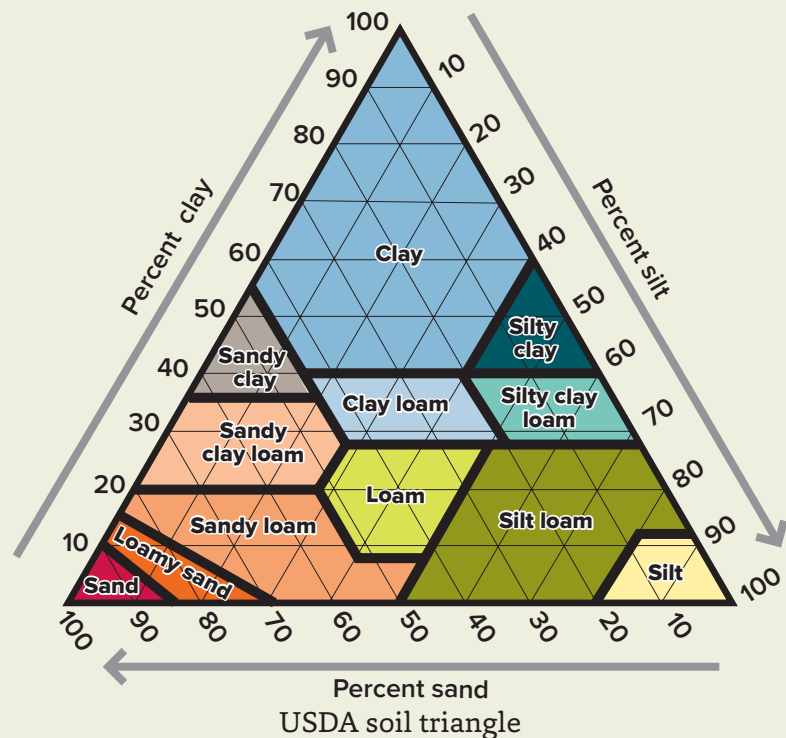
ACTIVITY 1

9. Put the jar on a level surface where it will not be disturbed for two days or more. After the water clears, in about two days, mark the depth of the third layer. This is the clay.
10. Measure the thickness of each layer—the sand, silt, and clay—and record your measurements in the table below. Then add them for a total of all the layers.
11. Calculate the percentage of each layer by dividing the depth of the layer by the total depth of all the layers. The combined percentages of sand, silt, and clay should be equal to 100.

Layer	Depth	Percent of Total
Example:	.5 inch	$5/1.5 = .33$ or 33% If the total of the first column is 1.5
Sand		
Silt		
Clay		
Total		

12. Use the USDA soil texture triangle to find out what kind of soil you have. You also can use their online soil texture calculator. Search for “USDA soil texture calculator.”

Now that the dominant component of the soil has been determined to be sand, silt, clay, it is easier to plan on making the most of the soil texture. If they are present in approximately equal amounts, your sample is loam.



B. Soil Texture Change

Clay is a valuable ingredient in soil because it is rich in nutrients. Too much clay, however, means the soil holds water and does not allow adequate air and water movement. Conduct this simple test to see if you can change the soil’s **structure** by adding organic matter.

MATERIALS: clay soil, organic matter (compost, sawdust), two paper plates, and water

1. Collect 2 cups of clay soil and ¼ cup of organic matter such as compost or sawdust.
2. Label one paper plate “soil” and the other plate “soil and organic matter.”
3. Add water to 1 cup of soil until it makes a mud cake. Place this on the plate marked “soil.”
4. Mix ½ cup soil and ¼ cup organic matter and add water until it makes a mud cake. Place it on the plate marked “soil and organic matter.”
5. Place both plates in the sun and let the mud cakes dry.
6. When the cakes are completely dry, break them apart with your fingers. Record your observations in the table below.



	Soil	Soil and Organic Matter
Describe the texture. Does it seem course, fine, or somewhere in between?		
How does the cake crumble—easily, with difficulty?		
Would this soil provide good growing conditions for roots? Explain.		
Could it be improved? How?		
What are some other observations?		



Background

The mix of sand, silt, and clay in soil determines its texture. Soil texture affects how much water soil holds and how much water moves through it. Soil with all three minerals—sand, silt, and clay—in about the same amount is ideal and is called loam. Loam has tiny spaces between the particles that allow for good **drainage** and **aeration**.

Some soils are heavy, which means they contain lots of clay particles. Clay particles are small and do not allow for good drainage. If roots sit in water too long, they are damaged from lack of oxygen. Coarse, sandy soils, on the other hand, have large particles that result in good drainage. Sandy soils drain so well that additional water for plants may be needed. Silt particles are in between, larger than clay and smaller than sand.

Other soil components include microscopic organisms called **microbes**, animals, insects, organic matter, and space that is taken up with water and air.

Farmers who use systems like **no-till**, **cover cropping**, and **diverse crop rotation** more frequently, increase soil health. This is due to the increase in the soil's organic matter. It also improves the microbial activity.

- **No-till**—Also referred to as zero tillage or direct drilling. Crops are planted from year to year without disturbing the soil through tillage.
- **Cover cropping**—A system of planting a particular crop to manage soil erosion and to increase soil health. Cover crops have been shown to add organic matter to the soil and increase yield.
- **Diverse crop rotation**—Rotating crops in a specific location within the garden from year to year.

Home gardeners improve soil most commonly by adding organic matter to the top 6 to 8 inches. Depending on **soil test** results, other amendments can be **beneficial**. Other actions, such as rotating plant locations, are good practices too.

Did you know?

Soil is made up of layers, called horizons. Four of the **soil horizons** are **topsoil** (O), **surface soil** (A), **subsoil** (B), and **stratum** or **parent material** (C). A layer of **bedrock** (R), which is not soil, is under horizon C.



Doing a soil test at the beginning of the growing season is a good idea. A soil test shows the level of nutrients in the soil and its **pH**. By testing your soil, you can determine what, if any, adjustments are needed.

