



Basic Vegetable Gardening

Lesson 3: Preparing the Soil

Lesson Summary: In this activity, members will test the viability of the garden seeds by starting a germination test. They will also begin to prepare the soil in the garden.

Intended Learning Outcomes:

Members will learn how to test seeds.

Members will learn what affects seed germination.

Members will understand the importance of working up the soil.

Length: 60 minutes

Materials:

Old papers, old newspapers or an old cloth for germinating seeds

20 of each type of the seeds that you plan to plant

Sticks and signs for marking off the garden

Chalkboard for the leader

Tools for tilling the soil

Background: At the last meeting, members chose the type of garden, made a list of plants and designed the layout of the garden. This lesson is part of the third step in gardening.

1. Choosing a site: Where to put your garden
2. Preparing a site: Choose your garden design
3. Planting the garden
4. Tending the garden
5. Harvesting, preparing and eating the food

Lesson Steps

1. (3 minutes) Introduction

Ask the members to summarize the decisions discussed at the previous gathering. Members should recall that they decided on the type of garden to build (for example: raised bed, terraced, trenched, square meter), developed a list of plants to plant, and designed a map of the garden. Today members will work together to conduct a test to see if the seeds they collected will germinate. They will test how good their seeds are by wetting the seeds, wrapping them up, and then checking in one week to see how many have germinated. After preparing the test, they will begin to till the soil. This is part of Step 3 of the garden process.

2. (15 minutes) Show how to test seed germination rates

2.1 (8 minutes) Explain how to do a germination test. Explain that the test must be done to check for seed viability.



Seed viability is the ability of the seed to germinate. If viability or germination rate is low, more seeds must be planted to have the number of plants you want.

Sometimes seeds will have low viability, meaning that not very many seeds germinate. This is often caused by the seeds being too old, stored improperly, or many other reasons. It is important to test the seed viability so you know how many seeds to plant. If there is low seed viability, more seeds will be planted to produce the goal amount of plants.

Question to investigate: What factors (things) affect seed viability?

To test seed viability, members will put 20 seeds on a wet cloth or wet paper and check to see how many have germinated in 5-7 days. Show the members the seeds that you or other people have collected to be planted in the garden. Explain to the members that many different things affect how and if a seed germinates. Ask the members if they can think of anything that might affect if a seed germinates. Write them on the board.

Expected Results- Members may suggest the following:

- Amount of water (too much or too little)
- Depth the seed is planted in the soil (too shallow or too deep). This is a common problem in Africa.
- Type of soil (moisture, acidity, drainage)
- Age of seeds (old seeds may not germinate)
- Nutrients in the soil (inadequate or too high concentration)
- Weather or other damage after planting the seeds (heavy rains, foot traffic on plants, pests)
- Variety of seeds (appropriate for soil and weather conditions)

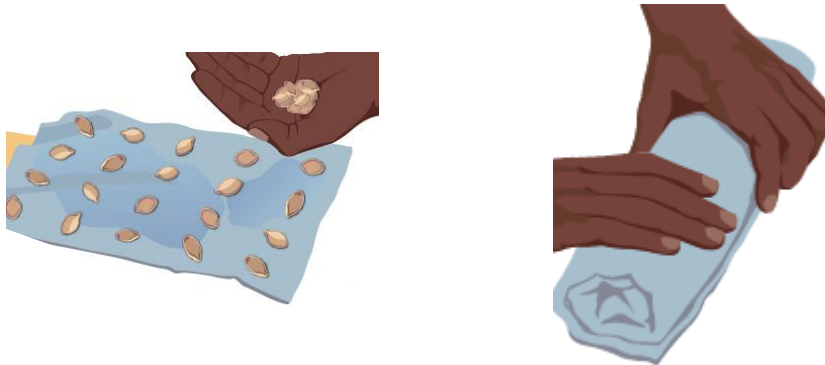
If members do not list each of these viability factors, write them on the board and explain the importance of providing favorable conditions for the seeds. Explain that not every type of plant grows the best in the same type of soil. Instead, it will be important to read the planting instructions or do research to find out how to best grow each type of plant.

Another challenge in Africa is that sometimes families save seeds that are very old. They may not have the money to buy seeds that have been improved for their climate.

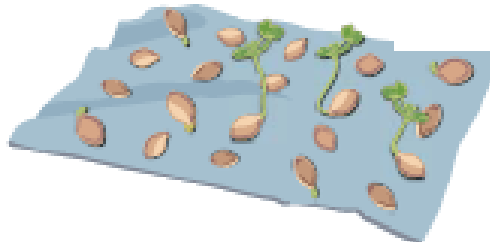
2.2 (8 minutes) Set up germination test

Note: The test will be set up today and must be checked in 5-7 days.

1. Select the seeds to be tested. If you have seeds for the same vegetable but from more than one source, be sure to label them, to keep them separate, and to conduct a separate test on each group. You can divide the group members into as many groups as you have different types of seeds to test.
2. Have the members put 20 seeds in organized rows on one-half of a clean, damp cloth. Cover the seed with the other half of the cloth and roll up the cloth. Place the rolled cloth in a shady place and leave it there for 5-7 days. If you do not have a damp cloth, damp newspapers or paper will work.



3. After 5-7 days, the members should unroll the cloth and look at the seeds. Most viable seeds will have germinated by now, and will have sprouts like in the drawing below.



4. Have members count the number of seeds that have germinated and divide that number by the number you first tested. This is your germination rate.

If the germination rate is less than 85%, the members should plant extra seeds to so there will be more plants. The lower the germination rate, the more (extra) seeds you must plant. For example, if you want four squash plants but the germination rate was only 70%, you will need to plant enough seeds for five or six plants.

Seed Germination Formula:		
$\frac{\text{Number of Seeds Germinated}}{\text{Number of Seeds Planted}}$	x 100 =	% of Germination Rate
Example:		
$\frac{14 \text{ Seeds Germinated}}{20 \text{ Seeds Planted}}$	x 100 =	70% Germination Rate

This calculation is shown below.

2.3 (4 minutes) Members record the germination rates for each test in their notebooks. They can use the chart below. They should fill out the first two columns today with the type of plant and number of seeds tested. When the test is finished, they should fill out the other two columns with the number of seeds germinated and the germination rate they calculated.

Type of Plant	# Planted	# Germinated	Germination Rate
<i>Example: beans</i>	<i>20</i>	<i>15</i>	<i>75%</i>



Note: If you need to save time, it is possible for the leader or advisor to set up the seed germination test 5-7 days before the group meets. That way, the gathering will focus on the results of the test, rather than doing the test itself. The group will have more time to prepare the soil.

3. (30 minutes) Prepare soil for planting.

Tell the group members that they will use the rest of the time to prepare the soil for planting. They will plant at the next meeting after they know the results of their seed germination tests. Depending on the site for your garden, it will be important to:

- Clear the brush around the fence
- Divide the garden into sections where different plants will be planted
- Label those sections using a stick and a sign
- Till the soil

3.1 Clear the brush and other materials about 1 meter around the outside of the garden. This will help keep out weeds and other pests in your garden. Some of the debris may be added to your compost pile. See lesson #9 on pest management for more information.

3.2 Till the soil to a depth of at least 20 centimeters. Make sure there are no large chunks of dirt. It is important to mix the soil up and make sure there are pockets of air throughout the soil. This is called aerating the soil. Spend a lot of time on this step, because it is very important for the garden. Seeds germinate better in fine soil.

3.3 Use your garden plan to divide the garden into different sections. The group should have decided on an overall garden plan at the last gathering. It is important to remain flexible throughout the garden project. You may need to adjust the dimensions that the members had decided on.

Some school gardens are too big and take too much time to cultivate, weed, and manage. Students can learn just as much in a small garden as in a large garden.

It is very important to make sure your garden is well labeled. The members will benefit from seeing what the plants look like at different stages. The labels will help members and others know what plant is growing in which area.

Use a strong stick that is about 30 to 40 centimeters long. Attach a sign or write directly on the stick using a marker. It may be helpful to label the same type of plant several times. Sometimes it is helpful to mark off an area using a string. Put the sign into the ground at the ends of the row or next to the plants.

Note: Labeling your garden can also be done when you are planting your seeds or transplanting your plants into the garden.

4. (5 minutes) - Summary and Debrief

Gather the members into a large group. Discuss the following points before they clean up for the day.

- If you broke the large group into smaller groups, have each group tell the others what they did for the day.
- What was one thing you learned while conducting your part of the work today?
- How would our work have changed if we had decided to put the garden (in a different area)?
- Did we make the right decision on the type of garden to build here?
- Are there any changes we should make to the garden plan before we begin planting?

5. (1 minute) – Close

Explain that the planting will begin at the next meeting. If the members are in charge of gathering some seeds, remind them to bring them to the next meeting. Set up a plan to check the germination experiment in 5-7 days. It is important to record the results at that time, so you can discuss it at the next meeting.

