

Unit D: Fruit and Vegetable Crop Production

Lesson 1: Planning and Preparing a Vegetable Garden Site

Student Learning Objectives: Instruction in this lesson should result in students achieving the following objectives:

1. Identify the important factors to consider in garden site selection.
2. Determine what and how much to grow.
3. Develop and draw a garden plan.
4. Prepare the planting seedbed.

Recommended Teaching Time: 3 hours

Recommended Resources: The following resources may be useful in teaching this lesson:

- A PowerPoint has also been developed with use of this lesson plan
- <http://www.gardenguides.com/>
- <http://www.gardenguides.com/how-to/tipstechniques/vegetables/veggie.asp>
- <http://gardening.about.com/od/gardenprimer/ss/NewGarden.htm>

List of Equipment, Tools, Supplies, and Facilities

Writing surface
PowerPoint Projector
PowerPoint slides
Transparency Masters
Graph Paper for garden plan
Landscaping Scales for garden plan

Terms: The following terms are presented in this lesson (shown in bold italics and on PowerPoint Slide #2):

- Climate
- Compost
- Cool-season vegetables
- Cover crop
- Crop rotation
- Fertile soil
- Garden plan
- Ideal seedbed
- Intercropping
- Irrigation
- Loam
- Raised bed, wide row system
- Soil pH
- Strip tillage
- Succession planting
- Warm-season vegetables

Interest Approach: Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

Ask students why most people grow their own vegetables. Have the students develop a list of reasons and place the student responses on the board. Possible answers: The home vegetable garden supplies the freshest possible vegetables that are generally higher quality than can be purchased. Extra produce can be sold or traded for other goods to neighbors or friends. People gain the satisfaction of growing their own food and can save money on their food bills.

**** Use this activity to lead into what is needed when planning to create a garden.**

Summary of Content and Teaching Strategies

Objective 1: Identify the important factors to consider in garden site selection.

**** Before starting this objective tell the students to pretend they are going to start a new garden. Ask them; “What do they need in order to start this garden?” If they have trouble developing a list, ask them, “Would they want to start their gardens in a desert? Why or why not?” This should give them an idea of the first factor which would be deciding where they want to plant their garden. Once they have most of the factors identified/listed go through the objective and talk about them in more depth.**

(PowerPoint Slide #3 and #4)

I. The convenience of having your own vegetable garden close to your home makes it the ideal garden location. Time is saved in planting, maintaining, and harvesting. The enjoyment of watching the plants grow is an added benefit of the close location. Important site selection factors include:

A. Adequate sunlight for best yields would be a minimum of 8 to 10 hours of direct full sun each day. Large trees and shrubs shade a garden and compete for nutrients and water. If some areas are shaded, select vegetables for those locations that will grow in those conditions.

(PowerPoint Slide #5)

B. Well-drained soil is needed. If a 30 centimeter wide by 45 centimeter deep trench filled with water drains away in an hour or so, the soil is classified as well-drained.

C. The best soil is a loam. **Loam** is a soil that has a combination of sand, silt, and clay particles along with the pore space that results from the combination of particle sizes. The combination of particles sizes results in soils that are well-drained with good aeration while also having high nutrient and water holding capacity.

(PowerPoint Slide #6 shows the soil particle sizes proportionally. PowerPoint Slide #7 shows a picture of the soil triangle. This will help you figure out what type of soil you have.)

(PowerPoint Slide #8)

Planting a **cover crop** in the fall of rye or oats that are plowed under or tilled in the spring can add organic matter. Using a cover crop is sometimes referred to as a green manure because the results are the addition of organic matter and nutrients very similar to the use of livestock manure.

(PowerPoint Slide #9)

Compost can be used instead of a cover crop. **Compost** is made by piling alternate layers 10 to 15 centimeters deep of plant material (grass clippings, old sod straw, or leaves) and soil. Adding nitrogen fertilizer and keeping the pile moist speeds up the decay. Organic matter added by the cover crop or compost helps keep the soil loose, adds nutrients, improves drainage, and increases moisture holding capacity.

(PowerPoint Slide #10 shows an example of a compost bin)

(PowerPoint Slide #11)

D. The garden should be located near a supply of water in case irrigation is necessary.

Irrigation is the addition of water to supplement natural rainfall.

E. **Fertile soil** is soil high in nutrients such as nitrogen (N), phosphorus (P), and potassium (K). Soil tests should be taken to determine nutrient levels. Fertilizer is applied as needed according to the test results and the crops you plan to raise.

(PowerPoint Slide #12 shows an example of a fertilizer bag with the nutrients N, P, and K listed on them. These three nutrients will always be in this order.)

(PowerPoint Slide #13)

F. **Soil pH** is a measure of the acid content of the soil (concentration of the hydrogen ion). Most vegetables grow best in a pH range of 6.0 to 6.5. Limestone is used to raise the pH and sulfur or gypsum is used to lower the pH.

G. A good garden site should be free of weeds and protected from animals. Fencing may be needed to keep pets and wildlife from damaging your plants.

(PowerPoint Slide #14 shows an example of the pH scale.)

Objective 2: Determine what and how much to grow.

**** Ask the students what they plant in their vegetable gardens. It is possible that not all the students will mention the same types of vegetables. If this happens, ask them why everybody's gardens aren't the same. What determines what you grow in your vegetable gardens? What determines how much you grow?**

(PowerPoint Slide #15 and #16)

II. Space available, time available, what you like to eat, and the size of your family are major factors in determining what and how much to plant. The **climate** (temperature, sunlight, rainfall, and day length) and soil type (percentage of sand, silt, and clay) determine what vegetables can be grown. General guidelines are as follows:

(PowerPoint Slide #17)

A. Vegetables can be planted in flower pots, flower boxes, patio containers, flower beds, or various size garden beds. Seed catalogues, seed packets and transplant tags provide information about space requirements for vegetable varieties.

(PowerPoint Slide #18)

- B. If your time is limited, it is better to plant a small well maintained garden than a large poorly maintained one. Keep in mind vegetables that ripen for one harvest such as potatoes require less time than vegetables such as cucumbers that have several harvests over time.
- C. Plant vegetables that you and your family like to eat. Calculate the amount of seed or plants needed and the number of feet of row space that must be planted to achieve the needed yield.

(PowerPoint Slide #19)

- D. The climate and season of the year also must be considered in the planting decisions. Some areas around the world have to worry about Frost. **Cool-season vegetables**, such as cabbage, can be planted 2 to 4 weeks before the average frost-free date for your area. They germinate well in cool soil and can withstand light frosts.

(PowerPoint Slide #20)

Cool season vegetables can also be planted in the cool fall weather. **Warm-season vegetables** need to be planted on or after the frost-free date in your area. These vegetables germinate and grow only in warm soil.

(PowerPoint Slide #21)

- E. Your plan for using the vegetables is very important in determining the amount to plant. Determine whether you will only eat fresh vegetables or if you will be canning and drying produce for the winter months.

Objective 3: Develop and draw a garden plan.

(PowerPoint Slide #22 and #23)

III. A **garden plan** is a scale drawing (preferably on graph paper) of the garden plot with vegetables, row lengths, and row widths included. The garden plan saves time by giving direction to purchases and garden planting work. Planning will result in a more attractive and productive garden.

(PowerPoint Slide #24)

- A. Arrange the garden in rows for the best sun exposure. Plant low-growing varieties on the south or east so they will not be shaded by tall—growing plants such as maize.
- B. Rows for small plants can be closer together than for larger plants. Vine-type plants need wider spacing than bush-type plantings. Follow seed company spacing recommendations.

(PowerPoint Slide #25)

- C. Group vegetables according to maturity (early, mid-season, and late or long season). **Intercropping** is the practice of growing rapidly maturing crops in the same row or between rows of late maturing crops. Growing green onions between cabbage plants is an example.

(PowerPoint Slide #26)

Succession planting is getting two crops from one garden row in the same growing season. Turnips, for example, could be planted after green beans have completed their production. Succession planting can also be used to describe the case when two or three plantings of sweet corn are made 7 to 10 days apart to provide a continuous supply.

(PowerPoint Slide #27)

D. Two planting systems that are gaining popularity are the strip tillage and raised bed, widerow system. **Strip tillage** is the practice of planting garden areas separated by a strip of sod. The **raised bed, wide row system** involves raising the soil level in a row 0.6 to 1.2 meters wide and planting vegetables in the entire row area. The result is up to three or four times as much production per foot of row. Also the raised beds mean the soil dries and warms quicker in the spring allowing earlier planting.

(PowerPoint Slide #28)

E. Long term planning should include a three or four year crop rotation. **Crop rotation** means not planting the same vegetables in a given spot two years in a row. Crop rotation reduces insect and disease problems. Mixed planting of vegetables also helps lower insect and disease outbreaks. Insects often zero in on plants by detecting odors associated with a given plant. Mixed plants tend to confuse the bugs by the great number of odors that are given off.

Objective 4: Prepare the planting seedbed.

(PowerPoint Slide #29 and # 30)

IV. The **ideal seedbed** is loose soil providing a desirable medium for seedbed germination and root development, open enough to absorb water and air, and high organic matter to prevent crusting.

(PowerPoint Slide # 31)

A. Take soil tests to determine nutrient levels in the soil. Use a spade or trowel to dig a small hole about 15 to 20 centimeters deep. Mix eight samples from well scattered locations together. Have the soil tested for pH, phosphorus, and potassium.

(PowerPoint Slide #32)

B. Apply limestone, phosphate, and potash according to the soil test and the crop to be planted. Add composted organic matter and nitrogen as needed for the crops to be planted.

(PowerPoint Slide #33)

C. For small garden areas, use a spade or hand spade to loosen the soil and a rake to smooth the surface. Larger areas can be prepared using a garden tiller. Commercial size gardens are chisel plowed or disked with a leveling harrow.

****Consider taking a soil sample from one of the students in the class, getting the soil test results, and reviewing the fertilizer recommendations. Show students seedbed preparation tools and equipment. If you have access to a garden area, you can also select a garden site and have students do the seedbed preparation for a vegetable garden.**

Review/Summary: Use the student learning objectives to guide lesson review. Give each student a term or a definition in large letters on poster board strips and have them find their “match”. Review the terms and their definitions by placing the matched sets on a bulletin board or chalkboard. Review garden plans that were developed. There are also questions on PowerPoint Slide # 34 that can be used as a review.

Application: Using the information covered in the four objectives for this lesson have the students develop a vegetable garden plan to match their family and their available space.

Evaluation: Observe student performance on lab sheet exercises, garden plan development, and the accompanying written test.

Answers to Sample Test:

Part One: Matching

1. c
2. d
3. a
4. b
5. h
6. i
7. e,
8. f,
9. g
10. j

Part Two: Completion

1. Strip tillage
2. eat
3. cool
4. 6.0 6.5
5. your backyard

Part Three: Short Answer

1. Scale drawing of the garden plot with vegetables, row lengths, and row widths included.

Test

Unit D Lesson 1: Planning and Preparing a Vegetable Garden Site

Part One: Matching

Instructions. Match the term with the correct response. Write the letter of the term by the definition.

- | | | |
|-------------------------------|------------------|------------------------|
| a. climate | e. fertile soil | i. soil pH |
| b. compost | f. garden plan | j. succession planting |
| c. cover crops (green manure) | g. intercropping | |
| d. crop rotation | h. loam | |

- _____ 1. Planting rye or oats to plow under or till in to increase organic matter.
- _____ 2. Planting crops in different locations than where they were planted the previous year.
- _____ 3. Combination of temperature, rainfall, sunlight, and day length.
- _____ 4. Rotted grass clippings, old sod, straw, or leaves.
- _____ 5. Combination of sand, silt, and clay particles along with pore space.
- _____ 6. Measure of the acidity or concentration of the hydrogen ion.
- _____ 7. Site containing high levels of phosphorus and potassium.
- _____ 8. Scale drawing showing vegetables to be planted.
- _____ 9. Practice of growing rapidly maturing crops in the same row or between rows of late maturing crops.
- _____ 10. Practice of planting sweet corn every 7 to 10 days to ensure fresh harvest over an extended period of time.

Part Two: Completion

Instructions. Provide the word or words to complete the following statements.

- 1. _____ is a planting system where vegetable garden areas are separated by grass areas.
- 2. Plant vegetables that you and your family like to _____.
- 3. Cabbage is an example of a _____ (cool or warm) season vegetable.
- 4. Ideal pH for most vegetables is _____ to _____.
- 5. The best location for your garden is _____.

Part Three: Short Answer

Instructions. Provide information to answer the following questions.

1. What is included in a garden plan: