

HANDS-ON MATH: PLANTING A GARDEN

Part I and II (Two Lesson Plans)

Developed by Leecy Wise and Sandi Watkins

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Activities, objectives and outcomes related to the Colorado
Certificates of Accomplishment, ABE II - 2M1, 2M2, and 2M19

Planting a Garden

OBJECTIVES

By the end of the following two lessons, students will be able to plan and plant a vegetable garden to meet their own needs and tastes. They will also be able to measure distances between rows and plants and work with gardens of different dimensions, by working with whole numbers and decimals.

LIFE SKILLS: To implement the project, students will use the following: hoe, rake, tape measure, and other gardening tools or supplies. They will also plot their own garden and determine what produce they will plant and how/when they will plant it.

MATH SKILLS: This competency requires that students add, subtract, multiply, and divide whole numbers and decimals.

READING SKILLS: Students will read a passage to gain information about how to plant a garden and what seeds to select. They will also study charts with information about different vegetables and study a zoning map to determine planting seasons in their geographical area.

SAMPLE VOCABULARY: characteristic, depth, edible, garden, harvest, hoe, hybrid, mature, plant, plow, productive, rake, row, season, seed, sow, uniform, vegetable, vigorous, weed, yield.

Planting a Garden

Before you begin a garden, decide what you are going to grow and the amount of space you want to make available for the growing.

Planning what you want to plant can be lots of fun. Start with those vegetables you love and would love to eat fresh all year long. Space is precious; don't waste it on vegetables you and your family could gladly do without. Onions, lettuce, radishes, beets and herbs take up comparatively little space in return for a good yield. Cucumbers, melons and eggplant are space-grabbers and, in contrast, yield relatively little. Tomatoes and peppers are a necessity and some believe that you must grow them no matter how much space they take. Some vegetables take deep soil and some do not. Think about the kind of soil you have and how much work you want to invest in preparing the soil. You will also want to find out what to feed your plants once they are in the soil. Vegetables may need some plant food when seeds sprout and again when plants are established. Leaf-types take high nitrogen food.

You'll want to start some of your vegetables from seed, too. Also, you will find that you have plenty of seedlings to share with friends once the little seeds come up. A nice present!

Many vegetables, like tomatoes, peppers, eggplant and melon, must be pollinated if they are to bear fruit. Outdoors the bees do the job.

If you want some extra color, think of flowers in your garde. Marigold is a flower and everyone knows of these plants, yet few grow them in the garden. They will do beautifully in a garden environment and supply many colorful, long-lasting cut flowers. But as an added dividend, some of the “smellier” varieties keep bugs away from other plants.

In most seed catalogs they publish “Planting Information” which tell you the depth to plant seeds, how many seeds to sow per foot, space between plants, space between rows, and the optimum soil temperature for seeding.

If you want to find out more about what to plant and how to plant it, go to the Internet and do a “search” on vegetable gardens. There is a lot of free information there for you from many good sources. Your local agricultural extension agent will also be glad to help out!

Planting a Garden

Planning the Vegetable Garden

(Look up the words you don't know, especially those underlined)

Quick Facts....

Plant only those vegetables your family likes.

Hybrids are usually more vigorous, productive and uniform than standard varieties.

To enjoy fresh vegetables over a long season, make an early spring planting and a summer planting for late harvest.

Common Garden Vegetables

Beans: The bush types are earlier, but pod set is more concentrated so they are productive over a shorter period than pole beans. Most bush beans have a bland flavor compared to the stronger characteristic flavor of the pole beans.

Cabbage: Early varieties usually produce smaller heads; late varieties larger. Smaller heads are good for cooking and for salads, larger heads for making kraut. Red leaf and Savoy (crinkled leaf) varieties are available. Reds mature later.

Carrots: For heavy soils (not sandy), the stump-rooted or half-long varieties may be more satisfactory than slender-rooted ones.

Cauliflower: Most varieties require blanching (leaves drawn up and tied to protect the developing head from light). This is not required for purple varieties and some of the new white ones.

Cucumbers: Newer varieties and hybrids generally resist several diseases. Slicing and pickling varieties are available, but most picklers make acceptable slicers when the fruits mature. The long, slender "burpless" hybrids are excellent for fresh use.

Lettuce: Leaf lettuce is high quality and the plants can be productive for a long period if you pick the leaves rather than cutting the plant. It also produces earlier than the crisp-head varieties. The butter-head varieties are a little earlier than crisp-head and of high quality.

Onion: It usually is not practical to direct-seed onion in home gardens because it must be done in March. Plant sets for hard yellow storage onions and transplants for sweet Spanish types.

Peas: Edible podded peas are either flat-podded snow peas used primarily to stir-fry, or round-podded sugar snap peas that are snapped and prepared like green beans. The edible-podded peas may be used fresh, cooked or frozen if the seed is bright green, or canned if the seed is light green.

Potato: Seed source is more important than variety. Use certified seed (tuber pieces) for assurance of freedom from disease.

Squash: Many productive summer squash hybrids are available. Winter squash varieties with bush rather than vine habit take less garden space.

Sweet Corn: The hybrids are uniform so all ears will reach edible maturity at about the same time. Plant several hybrids of differing maturity or use non-hybrid varieties for a longer harvest period. Some of the earliest varieties produce small ears with fewer rows of kernels.

Tomato: Hybrids are used almost exclusively in gardens for vigor, productivity and disease resistance. Earliness is generally associated with smaller plant and fruit size. The smallest are satisfactory as container plants on the patio.

Approximate amount to plant per person

6 ft. row.....Beans, beets, carrots, kale, lettuce, mustard, onion,
Swiss chard, turnip

12 ft. row.....Peas

25 ft. row.....Potato, sweet corn

6 plants.....Broccoli, peppers

2-4 plants.....Cabbage, cauliflower, cucumber, melons, squash,
tomato

Spring planting succession

About 4 weeks before date of average last frost:

Broccoli, cabbage, lettuce, onions, peas, potato, radish, spinach, turnip

About 2 weeks before date of average last frost:

Beets, carrot, mustard, parsnip, Swiss chard, sweet corn











2 or more weeks after date of average last frost:

Eggplant (t), pepper (t), sweet potato, beans, tomato (t), squash, cucumber, melons

(t) = transplant

Disk and Plant a Garden

This United States Department of Agriculture (USDA) Plant Hardiness Map to help you make the best choices of plants in your area. This Zone Map divides the US into 11 Plant Hardiness Zones based on average minimum temperatures. The map provides Hardiness Zone information for biennials, perennials, bulbs, trees, and shrubs. Plants are well adapted for growing in their listed zones.

Zone 2	-50° to -40°		Zone 7	0° to 10°	
Zone 3	-40° to -30°		Zone 8	10° to 20°	
Zone 4	-30° to -20°		Zone 9	20° to 30°	
Zone 5	-20° to -10°		Zone 10	30° to 40°	
Zone 6	-10° to 0°		Zone 11	Above 40°	

Planting a Garden

Match the word with the correct definition.

Place the correct number next to the correct definition.

- A. ____ A tool with a flat blade and long handle.
- B. ____ A horizontal line that is used to plant seeds or plants
- C. ____ To scatter seeds for growing
- D. ____ A circular plate to work the soil
- E. ____ To break and turn over the earth or soil
- F. ____ The measurement, or dimension downward
- G. ____ To establish or set up
- H. ____ A fertilized and ripened plant ovule
- I. ____ To irrigate
- J. ____ An undesirable plant
- K. ____ Any organism of the vegetable kingdom
- L. ____ The act or process of gathering a crop
- M. ____ A plant cultivated for an edible part or parts
- N. ____ A plot of land used for cultivation

Word List

- | | | |
|---------------|-----------|----------|
| 1. Garden | 2. Sow | 3. Weeds |
| 4. Vegetables | 5. Plants | 6. Seeds |
| 7. Depth | 8. Water | 9. Hoe |
| 10. Harvest | 11. Plow | 12. Row |
| 13. Disk | 14. Plant | |

Planting a Garden

Answer Sheet for Match Exercise - Garden

- A. 9
- B. 12
- C. 2
- D. 13
- E. 11
- F. 7
- G. 14
- H. 6
- I. 8
- J. 3
- K. 5
- L. 10
- M. 4
- N. 1

Planting a Garden

Hands-on-Math for Garden Plot Project

Garden Plot – 21.0 feet long X 26.0 feet wide

Row	
1	S N A P * B U S H * G R E E N * B E A N S
2	* * * * * * * * B E E T S * * * * * *
3	* * * * H E A D * * L E T T U C E * * * *
4	* * * * L A T E * * C A B B A G E * * * *
5	* * * * * * C U C U M B E R S * * * * *
6	* * * * * O N I O N * * S E T S * * * *
7	* * * * * * * P U M P K I N * * * * *
8	* * * * * * * T O M A T O S * * * * *

Using the Plant Information Chart and other math skills answer the following questions about planting in the garden.

1. How many square feet are in the Garden Plot? _____

2. What is the optimum soil temperature for onion sets? _____

3. How many feet should be between rows for tomatoes? _____

4. How many pumpkin seeds will it take to plant a row? _____

5. How many cucumber plants will be in one row? _____

6. What depth should you plant late cabbage seed, convert fraction to decimal? _____

7. Figure the amount of seeds for head lettuce for 4 per foot? _____

8. After thinning beets, how many plants are left in row? _____

9. Figure the amount of seeds for Snap Bush Green Beans...

6 per foot _____ 7 per foot _____ 8 per foot _____

Planting a Garden

Answer Sheet for Hands-on-Math for Garden Plot Project

Garden Plot – 21.0 feet long X 26.0 feet wide

Using the Plant Information Chart, the Garden Plot information and other math skills answer the following questions about planting the garden plot shown.

1. How many square feet are in the Garden Plot? 546 sq. ft.

2. What is the optimum soil temperature for onion sets? 50-65°

3. How many feet should be between rows for tomatoes? 3 to 5 ft.

4. How many pumpkin seeds will it take to plant a row? 42

5. How many cucumber plants will be in one row? 11

6. What depth should you plant late cabbage seed, convert fraction to decimal? 1/2 in. or .50

7. Figure the amount of seeds for head lettuce for 4 per foot? 84

8. After thinning beets, how many plants are left in row? 126

9. Figure the amount of seeds for Snap Bush Green Beans.....

6 per foot 126 7 per foot 147 8 per foot 168

Going Beyond

Draw a rough picture of each plot as you solve the problems.

1. Figure the area of the garden plots with the following dimensions:
 - a. 23.6 feet long and 25.3 feet wide _____
 - b. 13.8 feet long and 17.2 feet wide _____
 - c. 7.8 feet long and 9 feet wide _____

2. If a garden is 11 feet wide and its area is 93.5 square feet, how long is the garden plot?
3. If a garden is 12.6 ft long and its area is 320.04 square feet, how wide is the garden plot?
4. If a square garden is 144 square feet, what are the dimensions of its length and width?

5. If you wanted to build a cedar fence around a garden that is 15.6 feet wide and 22 feet long, how many feet of wood would you have to buy?
6. If you wanted to secure the fence with cedar posts every 5 feet, what is the minimum number of posts that you would have to buy?

7. If a garden that is 12 feet wide has 15 rows along its length that are 1.5 feet apart from each other, how long would the garden plot be?
8. If a garden that is 12 feet wide has 9 rows along its length that are 1.3 feet apart from each other, how long would the garden plot be?
9. If a garden that is 12 feet wide has 15 rows along its length that are 1.3 feet apart from each other, what is its area?

Going Beyond - Answers

1. Figure the area of the garden plots with the following dimensions:
 - a. 23.6 feet long and 25.3 feet wide 597.08 ft^2
 - b. 13.8 feet long and 17.2 feet wide 237.36 ft^2
 - c. 7.8 feet long and 9 feet wide 70.2 ft^2

2. If a garden is 11 feet wide and its area is 93.5 square feet, how long is the garden plot? 8.5 ft
3. If a garden is 12.6 ft long and its area is 320.04 square feet, how wide is the garden plot? 25.4 ft
4. If a square garden is 144 square feet, what are the dimensions of its length and width? 12 ft

5. If you wanted to build a cedar fence around a garden that is 15.6 feet wide and 22 feet long, how many feet of wood would you have to buy? 75.2 ft
6. If you wanted to secure the fence with cedar posts every 5 feet, what is the minimum number of posts that you would have to buy? 15 posts

7. If a garden that is 12 feet wide has 15 rows along its length that are 1.5 feet apart from each other, how long would the garden plot be? 22.5 ft
8. If a garden that is 12 feet wide has 9 rows along its length that are 1.3 feet apart from each other, how long would the garden plot be? 11.7 ft
9. If a garden that is 12 feet wide has 15 rows along its length that are 1.3 feet apart from each other, what is its area? 234 ft^2