Welcome to Vegetable Gardening. In this 4-H project you will learn about some of the vegetable plants you can grow for food. You will learn what is needed to make vegetable plants grow. You will also design and plant a vegetable garden.

Vegetable gardening is one of America’s favorite hobbies. Growing plants has provided people with a source of food for thousands of years. Growing your own vegetables can improve your diet, give you exercise, provide you with enjoyment, and save you money.

Vegetable gardening is a good way to strengthen your 4-H activities. When you make choices about what, when, where, and why to plant, you are using your HEAD. The work involved with handling the plants, from seed to harvest, makes use of your HANDS. When you contribute to your family’s food supply, your feelings of pride and achievement come from your HEART. You improve your HEALTH by the exercise of gardening, and also when you receive nourishment from the food you’ve grown.

Check (✓) as you study each lesson:

1. Groups of Vegetable Plants
   □ Plant Life Cycles
   □ Growing Temperatures
   □ Edible Parts

2. Planning and Designing Your Vegetable Garden
   □ Site Selection
   □ Designing Your Garden

3. Vegetable Plants Need Light and Temperature
   □ Light
   □ Temperature

4. Vegetables Need Water
   □ The Importance of Water
   □ Transpiration
   □ Mulches

5. Vegetable Plants Need Soil and Nutrients
   □ Plant Nutrition
   □ Soil Preparation

6. Preparing and Planting Your Vegetable Garden
   □ Choosing Your Planting Site
   □ Transplanting Vegetables
   □ Growing Vegetables from Seeds
   □ Caring for Your Vegetable Garden

Other things to do:
1. Help others learn (see Sharing with Others on page 32)
   □ Show someone in your family what you learned from this project.
   □ Show another 4-H member what you learned from this project.
   □ Show someone other than a 4-H member in your family what you learned in this project.

2. Record keeping
   □ Keep accurate records to show what you have learned.
   □ Be neat and complete (spell all of the words in your records correctly). Ask your parents, leader, or teacher if you aren’t exactly sure.

3. Round up
   □ Make sure to complete your project book and keep records.
   □ Exhibit something you have done from this project book.
Groups of Vegetable Plants

Vegetable plants are grouped according to their life cycles, the temperatures that help them grow best, and their parts that are eaten.

Plant Life Cycles

Life cycles of living organisms are made up of growth stages. A human life cycle starts with an infant who grows into a child, then into a teenager, and finally into an adult, who may produce more infants—the life cycle of birth, growth, and death goes on. Vegetables have three different types of life cycles.

Annuals complete their life cycle in one year or growing season. They grow from seeds in the spring and produce flowers in the summer. These flowers become fruit and seeds later in the summer. At the end of one year, they die. Beans, corn, and cucumbers are examples of some annual vegetables.

Biennials require two growing seasons to complete their life cycle. They grow leaves and stems during the first growing season. Over winter, they remain alive but in a resting state. During the next growing season, they produce flowers, fruit, and seeds, and then they die. Examples of biennials include green onions, carrots, beets, and cabbage. Since most biennials produce their edible portion during the first year of growth, we grow and harvest them just like annuals.

Perennials grow and produce flowers and seeds every year. The cold temperatures of winter kill stems and leaves. The roots survive underground and begin growing in the spring with new leaves and stems. Rhubarb, horseradish, chives, and asparagus are examples of perennials.
Growing Temperatures
Most vegetables that we grow in America came from other countries. We grow vegetables that came from cool, mountainous regions of the world. We also grow vegetables from warm, tropical regions too. Cool season vegetables aren’t bothered by temperatures that drop a little below 32 degrees. They do not grow well in the hot temperatures during mid- to late-summer. They are planted outdoors in early spring or late summer so most of their growth occurs while temperatures are moderately cool. Cool season vegetables include broccoli, cabbage, cauliflower, lettuce, peas, radishes and spinach. Warm season vegetables grow best with 70°F to 80°F day temperatures and 65°F night temperatures. They are injured by cold temperatures. These vegetables include beans, tomatoes, peppers, eggplant, corn, melons, cucumbers, and squash.

Edible Parts
In Meet the Plants, we learned that we eat many different parts of vegetables. When we eat lettuce, celery, and spinach, we are eating stems, leaves, or leafy parts. When we eat carrots, potatoes, sweet potatoes, radishes, and beets we are eating roots or tubers. Since they do not receive sunlight, they are not green. What colors are they? We also eat immature flowers of some vegetable plants such as cauliflower, and broccoli. When we eat tomatoes, corn, peas, and string beans, we are eating fruits and seeds.

ACTIVITY 1. Vegetable Concentration
What you will need:
• two identical seed catalogs • 3" x 5" index cards • scissors • scotch tape or glue

What you will do:
1. Cut out two identical pictures of a vegetable variety.
2. Paste or tape each picture on a 3" x 5" index card.
3. Next to each picture write the correct name of the vegetable, if it is a cool- or warm-season vegetable, and which part of the vegetable is eaten.
4. Mix the cards, lay them face down one at a time so that no cards touch.

The object of the game is to locate pairs of cards of the identical vegetable (two sweet corn, two scarlet runner beans, etc.). You should also be able to tell whether they are annuals, biennials, or perennials; cool or warm season plants; and which part is eaten.

To play, you take turns to match two identical pictures of vegetables on the cards. If the two cards you select match, you take them. You have another turn to match two more cards. If the two cards turned up do not form a pair, turn both cards face down again. Leave them in exactly the same position on the table as they were when first turned over. The turn then passes to the next member.

The winner has the greatest number of vegetable pairs at the end of the game.
ACTIVITY 2. What Part Am I? Vegetable Tasting Bee
Let’s see who really knows their vegetables now! Let’s play a team game.

What you will need:
• different vegetables  • a sharp knife  • paper plates  • blindfold (handkerchief)

What you will do:
1. Cut different vegetables into bite-size pieces and put them on paper plates.
2. Choose two teams from the members in the club or class.
3. The leader/teacher gives a blindfolded member on team #1 a piece to taste and identify.
4. Each team gets 1 point for correctly identifying the vegetable.
5. Each team gets 1 point for correctly identifying the part of the vegetable they are tasting.
6. If someone can’t identify the vegetable or the part, then the other team gets a turn.
7. After all the vegetables are eaten, the team with the most points wins.
8. After the game is over, make sure that you taste pieces of the remaining vegetables that you haven’t tasted before. This will help you decide which ones you want to grow in your vegetable garden.

You’ll want to choose vegetables you and your family will enjoy. Remember the Vegetable Tasting Bee? Now that you have tasted some fresh vegetables, decide which ones to grow.

ACTIVITY 3. Picking Favorites! Which Vegetables Will I Grow?
What you will need:
• seed catalogs• pencil

In the chart on page 4, list at least five of the vegetables you liked when you tasted them. What did you enjoy about them? Their crispness? Flavor? Juiciness? Why? Which ones are your favorites? If you like them, you will probably enjoy growing them too! Be prepared to share with other members of your group which vegetables are your favorites. Which ones are you going to grow?

Use a seed catalog to help you decide which vegetables you want to grow. If you use a seed catalog to look at tomatoes, the number of different kinds may surprise you. The different kinds are called varieties. Different varieties are grown for their various sizes, uses, shapes, colors, and flavors. Be sure to list those varieties you want to grow.

Some varieties of vegetables have been developed by plant scientists to fight off insects and diseases. Growing these varieties—disease- and insect-resistant varieties—will give you an advantage. You will be starting your vegetable garden on the right foot.
**FAVORITE VEGETABLES LIST**

<table>
<thead>
<tr>
<th>Name/variety</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>I want to grow</td>
<td>because</td>
</tr>
<tr>
<td>I want to grow</td>
<td>because</td>
</tr>
<tr>
<td>I want to grow</td>
<td>because</td>
</tr>
<tr>
<td>I want to grow</td>
<td>because</td>
</tr>
<tr>
<td>I want to grow</td>
<td>because</td>
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<td>I want to grow</td>
<td>because</td>
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<td>I want to grow</td>
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<td>I want to grow</td>
<td>because</td>
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<tr>
<td>I want to grow</td>
<td>because</td>
</tr>
<tr>
<td>I want to grow</td>
<td>because</td>
</tr>
</tbody>
</table>
PLANNING AND DESIGNING YOUR VEGETABLE GARDEN

In order to produce good vegetables, you must know several important things about making a good garden. In the next several lessons, you will learn how to make such a vegetable garden. If your garden doesn’t have these requirements, you must be able to provide them.

Site Selection

- *Light*, *moisture*, the right *temperature*, and *soil and nutrients* for healthy growth are the most important requirements.
- Your garden should be close to your home so it is convenient to watch over it and work in it.
- Water should be close by so you won’t have to carry it. Did you know that a gallon of water weighs over 8 pounds?
- Level ground is best—water can wash away soil and seeds on slopes.
- The garden should also be protected from strong winds, pedestrians, and animals.
- A garden plot 4 or 5 feet long and 4 feet wide is fine for a first-time gardener, and you can garden in containers if you don’t have ground to work.

Check which statements are true for you:

- I can garden
  - ☐ in a community garden
  - ☐ on a windowsill, porch, balcony, or deck
  - ☐ in my yard

In Lesson 1 you decided which vegetables to grow. The next step is to plan your garden on paper. A paper plan will help you become a successful gardener. You will make two plans on paper. One is called a garden plan and the other is called a calendar plan.

- Your garden plan is like a map. You will draw its size and shape, and show nearby buildings or trees. This will help you decide where and how to plant.
- Your calendar plan will be a time schedule to tell you when to begin different steps in your project.

First, prepare your VEGETABLE WORKSHEET on the next page. Then use it, with seed catalogs and the FAVORITE VEGETABLES LIST which you made in Lesson 1, to make your garden and calendar plans.
**ACTIVITY 1. Planning a Home for Your Vegetables**

After you have chosen the vegetables you would like to grow in your garden, fill in the chart below. You can use the *VEGETABLE PLANTING CHART* on the next page for some information. You may also have seed catalogs, or other helpful sources.

**VEGETABLE WORKSHEET**

<table>
<thead>
<tr>
<th>Vegetable name and variety</th>
<th>Seeds (S) or transplants (T)</th>
<th>Planting depth for seeds</th>
<th>Space between seeds (S) or transplants (T)</th>
<th>Space between rows</th>
<th>Days to harvest</th>
<th>Cool- or warm-season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: Bushbeans, GreenLake</td>
<td>S</td>
<td>1 1/2&quot;</td>
<td>1 1/2&quot;</td>
<td>20&quot;</td>
<td>58</td>
<td>warm</td>
</tr>
<tr>
<td>Vegetable</td>
<td>Planting depth, inches</td>
<td>Distance between rows, inches</td>
<td>Distance between plants after thinning, inches</td>
<td>Planting time, weeks: A=after last frost, B=before last frost,</td>
<td>Warm- or cool-season plant</td>
<td>Average days to harvest</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------</td>
<td>-------------------------------</td>
<td>-----------------------------------------------</td>
<td>-------------------------------------------------</td>
<td>--------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Beans, Bush</td>
<td>1 1/2</td>
<td>20</td>
<td>4</td>
<td>1–6/A</td>
<td>Warm</td>
<td>50</td>
</tr>
<tr>
<td>Beans, Pole</td>
<td>1 1/2</td>
<td>48</td>
<td>6</td>
<td>2–4/A</td>
<td>Warm</td>
<td>50</td>
</tr>
<tr>
<td>Beet</td>
<td>3/4</td>
<td>12</td>
<td>2</td>
<td>4/B–10/A</td>
<td>Warm</td>
<td>65</td>
</tr>
<tr>
<td>Broccoli*</td>
<td>1/2/plants</td>
<td>36</td>
<td>18</td>
<td>4/B–4/A</td>
<td>Warm</td>
<td>65</td>
</tr>
<tr>
<td>Cabbage, Early*</td>
<td>1/2/plants</td>
<td>30</td>
<td>12</td>
<td>8/B–4/B</td>
<td>Cool</td>
<td>75</td>
</tr>
<tr>
<td>Cabbage, Late*</td>
<td>1/2/plants</td>
<td>30</td>
<td>16–18</td>
<td>6/A–8/A</td>
<td>Cool</td>
<td>80</td>
</tr>
<tr>
<td>Cucumber</td>
<td>1</td>
<td>60</td>
<td>12</td>
<td>1/A–6/A</td>
<td>Warm</td>
<td>55</td>
</tr>
<tr>
<td>Lettuce, Leaf</td>
<td>1/4–1/2</td>
<td>12</td>
<td>4</td>
<td>4/B or Aug 1</td>
<td>Cool</td>
<td>45</td>
</tr>
<tr>
<td>Muskmelon*</td>
<td>1/plants</td>
<td>72</td>
<td>24</td>
<td>2/A–4/A</td>
<td>Warm</td>
<td>85</td>
</tr>
<tr>
<td>Onion, Sets</td>
<td>1/2–1</td>
<td>12</td>
<td>3</td>
<td>8/B–4/B</td>
<td>Warm</td>
<td>70</td>
</tr>
<tr>
<td>Pea</td>
<td>1 1/2</td>
<td>24</td>
<td>3</td>
<td>4/B–4/A</td>
<td>Cool</td>
<td>65</td>
</tr>
<tr>
<td>Pepper*</td>
<td>plants</td>
<td>36</td>
<td>12–16</td>
<td>3/A–4/A</td>
<td>Warm</td>
<td>70</td>
</tr>
<tr>
<td>Pumpkin</td>
<td>1</td>
<td>96</td>
<td>60</td>
<td>3/A–4/A</td>
<td>Warm</td>
<td>10</td>
</tr>
<tr>
<td>Radish</td>
<td>1/2</td>
<td>12</td>
<td>1</td>
<td>8/B–4/B or Aug 1</td>
<td>Cool</td>
<td>28</td>
</tr>
<tr>
<td>Spinach</td>
<td>1/2</td>
<td>12</td>
<td>3</td>
<td>4/B–4/A or Aug 1</td>
<td>Cool</td>
<td>45</td>
</tr>
<tr>
<td>Squash, Summer</td>
<td>1</td>
<td>96</td>
<td>60</td>
<td>2/A–4/A</td>
<td>Warm</td>
<td>50</td>
</tr>
<tr>
<td>Squash, Winter</td>
<td>1</td>
<td>60</td>
<td>48</td>
<td>2/A–4/A</td>
<td>Warm</td>
<td>90</td>
</tr>
<tr>
<td>Sweet Corn</td>
<td>1–1 1/2</td>
<td>30</td>
<td>10</td>
<td>1–8/A</td>
<td>Warm</td>
<td>80</td>
</tr>
<tr>
<td>Swiss Chard</td>
<td>3/4</td>
<td>34</td>
<td>9</td>
<td>4/B–1/A</td>
<td>Warm</td>
<td>60</td>
</tr>
<tr>
<td>Tomato*</td>
<td>plants</td>
<td>48</td>
<td>36</td>
<td>3/A–4/A</td>
<td>Warm</td>
<td>70</td>
</tr>
<tr>
<td>Turnip</td>
<td>1/4–1/2</td>
<td>12</td>
<td>4</td>
<td>4/B or Aug 1</td>
<td>Cool</td>
<td>65</td>
</tr>
<tr>
<td>Watermelon*</td>
<td>plants</td>
<td>96</td>
<td>36</td>
<td>3/A–4/A</td>
<td>Warm</td>
<td>90</td>
</tr>
</tbody>
</table>

Dates are for Central Pennsylvania.

*Plant spring crops about 3 weeks earlier in the warmest regions of the state and about 10 days later in the coldest regions. Fall crops should be planted up to 10 days earlier in the colder, short-season areas and up to 3 weeks later in the warm, long-season areas of the state.
Designing Your Garden
Some vegetable gardens are square plots of ground with neat, straight rows of carrots, beans, radishes, and tomatoes. There are many other ways to grow vegetables that are better than using a straight row. For example, letting a vine crop like cucumbers, squash, or cantaloupe climb up a fence or trellis will save space, and will allow you to grow more vegetables in your garden. Taking the time to design a plan for your garden will actually give you more space to plant more vegetables to harvest and enjoy.

ACTIVITY 2. Preparing a Garden Plan
What you will need:
- graph paper
- ruler
- pencil
- FAVORITE VEGETABLES LIST

What you will do:
1. Using your favorite vegetables, design a garden on the graph paper on page 10.
   Use this scale: 1 inch of paper = 1 foot of garden.
   For example, a garden that was 4 feet wide and 5 feet long would be drawn as 4 inches across and
   5 inches long on the graph paper.
2. Draw an X where you will place each vegetable plant.
   Include numbers for: lengths of rows, distance between rows, and distance between plants in rows.

Helpful Hints
- Place tall plants on the north side so they won’t shade short plants.
- If you have to plant on a hillside, make rows across—not up and down—the hill.

Draw a garden plan on the graph paper on page 10 like the example shown below.
**ACTIVITY 3. My Calendar Plan**

**What you will need:**
- a calendar
- *VEGETABLE PLANTING CHART* (page 7)
- seed catalogs

**What you will do:**
1. Check with your leader or teacher for the date of the last frost in the spring in your area.
2. On the Calendar Plan below write in the dates that different seeds and transplants can be planted outdoors (check the *VEGETABLE PLANTING CHART*).
3. Write in the date when you expect to start harvesting each vegetable. Start on the planting date, and count forward the number of days until maturity. The number can be found in a seed catalog or on the seed packet.
4. Write in the first frost date in the fall (Check with your teacher, leader or parents).

**Calendar Plan**

<table>
<thead>
<tr>
<th>Vegetable; seeds (S) or transplants (T)</th>
<th>Planting date</th>
<th>Expected harvest date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomato (T)</td>
<td>June 1</td>
<td>August 15</td>
</tr>
</tbody>
</table>

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*Illustration of a calendar with the month of June highlighted.*
Lesson 3

Vegetable Plants Need Light and Temperature

Light

Light is very important for plants during their growth. As soon as they germinate and emerge from the soil, vegetable plants should be planted where they receive plenty of light. Plants need light to start the process called photosynthesis (phoe toe syn' the sis).

Have you ever used a solar powered calculator? What happens when you cover the solar cells on the calculator? Without light energy hitting the solar cells, you can't use your calculator. A plant works in the same way—if it doesn't receive enough light, it will not work.

The leaves of plants are similar to the solar cells in a calculator. Leaves have a special chemical called chlorophyll which absorbs the light and converts it into energy. This new energy powers the growth of plants. The green color of the leaves tells you that chlorophyll is present. The plant is making food (photosynthesis) when the leaves receive light.

Experiment 1. Light For Green Growth

What you will need:
• one paper plate        • one short nail (3-4 inches)

What you will do:
1. Select an area on your lawn.
2. Lay the paper plate flat on the grass.
3. Push the nail through the center of the plate into the soil to hold the plate down.
4. After 4 days, remove the plate and compare the grass under the plate with the rest of your lawn.

Questions to Answer:

What happened? ______________________________________

____________________________________________________

Why? ________________________________________________

____________________________________________________

What do you think would happen if the plate was on the patch of grass for 2 weeks? ________________________

____________________________________________________

When you did this experiment—Light for Green Growth—did you learn anything about plants and sunlight? An ideal spot for a vegetable garden would be located on the south side of a building. Trees or buildings near your garden will shade it. Most vegetables grow best with more than 6 hours of sun. Some can stand a little bit of shade.
Now that you have learned the importance of light to green plants, you should walk around your yard or school. Look for three areas that your parents or teacher will give you permission to use for a vegetable garden. Here's how to investigate each of these three sites to learn which one is best for your vegetable garden.

**ACTIVITY 1: I See the Light**

**What you will need:**
- pencil or pen

**What you will do:**
1. On a sunny day observe these garden sites at the 4 times indicated on the chart below. Observe whether the sun is shining on the sites (can you see your shadow?). In the last column record about how many total hours your garden site receives sunlight.

<table>
<thead>
<tr>
<th></th>
<th>9:00 a.m.</th>
<th>12:00 p.m.</th>
<th>3:00 p.m.</th>
<th>6:00 p.m.</th>
<th>Total hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Check the box which describes each of the sites you have selected:

Site 1 receives  □ 6 or more hours of sunlight.  □ less than 6 hours of sunlight.
Site 2 receives  □ 6 or more hours of sunlight.  □ less than 6 hours of sunlight.
Site 3 receives  □ 6 or more hours of sunlight.  □ less than 6 hours of sunlight.

Describe each of the three sites. Which site is best for the vegetables you have selected? Why?

Site 1:________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Site 2:________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Site 3:________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Temperature

You learned in Lesson 1 that some vegetables, like lettuce and peas, grow best in cool weather and don’t grow well when it’s hot outside. You can plant these in your garden in spring—April or May. You can plant them again in August, so they are growing in cool fall days. These vegetables are called cool-season vegetables. They grow best when daytime temperatures are between 60° and 65°F.

Vegetables like tomatoes, peppers, corn, and beans grow best during the long and hot summer days of July and August. These vegetables do not like cool weather. You should wait to plant them until the danger of frost is past—usually from May 15 to June 1 depending on where you live. These are called warm-season vegetables. The best daytime temperature range for them is 65° to 80°F.

Correct temperature is important if vegetable plants are to grow. What happens to the vegetables themselves if they are put in places like the Arctic or the tropics?

EXPERIMENT 2. From the Arctic to the Tropics

What you will need:
• 3 identical samples of the same cool-season vegetable.
• 3 identical samples of the same warm-season vegetable.

What you will do:

Treatment A
1. Place one of the warm-season vegetables and one of the cool-season vegetables in the freezing compartment of a refrigerator for 1 hour each day, for 5 consecutive days. Remove both vegetables after 1 hour, and leave them at room temperature.
2. Keep one of each of these same vegetables at room temperature for 5 consecutive days.

Treatment B
3. Place one of the warm-season vegetables and one of the cool-season vegetables in an oven with the temperature between 150°–200°F for 1 hour each day, for 5 consecutive days. Remove both after 1 hour, and leave them at room temperature.
4. Keep one of each of these vegetables at room temperature for 5 consecutive days.
5. On the RECORD SHEET on page 15 note what happens to each of the vegetables in Treatments A and B for five consecutive days. Be sure to describe the changes you observe in each vegetable after the treatments.
<table>
<thead>
<tr>
<th>Day</th>
<th>Treatment A Warm-season vegetable</th>
<th>Treatment A Cool-season vegetable</th>
<th>Treatment B Warm-season vegetable</th>
<th>Treatment B Cool-season vegetable</th>
<th>No treatment Warm-season vegetable</th>
<th>No treatment Cool-season vegetable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
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<td>3</td>
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<td>4</td>
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<tr>
<td>5</td>
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</tbody>
</table>

**Questions to Answer:**
1. Describe what happened to the warm-season vegetable in Treatment A: ____________________________

2. Why did this happen? ____________________________

3. Describe what happened to the cool-season vegetable in Treatment A: ____________________________

4. Why did this happen? ____________________________

5. Describe what happened to the warm-season vegetable in Treatment B: ____________________________

6. Why did this happen? ____________________________

7. Describe what happened to the cool-season vegetable in Treatment B: ____________________________

8. Why did this happen? ____________________________

9. Describe what happened to the vegetables that received no treatment. ____________________________
LESSON 4

VEGETABLES NEED WATER

In Lesson 3, you learned that plants require light and temperature to grow. In Meet The Plants you learned that plants are similar to factories. Energy from sunlight enables the leaves in the plant to turn raw materials into the fresh vegetables we enjoy eating. Now let’s discover what else vegetables need.

The Importance of Water

Water is a major component of all living plants. Water is one of the raw materials transported by plant roots to the plant factory in the leaves. Water transports nutrients and air found in the soil to the stem. It then travels up the stem to the leaves where an important chemical process, photosynthesis, occurs. Photosynthesis makes plant food or simple sugars which the plant needs. The plant uses this sugar to grow and flower and become the food we eat. Water also carries this sugar back to the stems and roots that use it as fuel for growing.

Did you know that a sweet tasting, ripe watermelon is 95% water? Leafy vegetable plants like lettuce and spinach may require much more water to live and grow than a pine tree. Water also helps to keep plants standing upright. It fills all the cells in the stem so that it can support the weight of the leaves. What would happen to plants if they didn’t have enough water?

The vegetable plants that you will start from seeds are delicate. As these seedlings grow and mature, they need less of your care to grow and flower. However, like all living things, plants still have certain basic needs.

Seeds need water in order to germinate. When water enters the seed it begins to swell. Inside the seed, the immature plant, called the embryo, begins to grow. This is germination. As the hard outer coat of the seed splits, the first little rootlet pushes its way out. This rootlet takes in more water and minerals from the soil. If the soil dries out while the seed is germinating, it will die.

Fast growing vegetable plants need about an inch of water each week. During dry weather, vegetable plants in gardens, as well as in containers, need extra water. When you water your plants, you should be sure to wet the soil 4" to 6" deep. Soaker hoses and trickle irrigators are two good tools to use when watering. Watering this way promotes deep root growth. This causes the roots to push deeply into the soil for water. Frequent light watering, like sprinkling with a bucket or hose, promotes shallow root growth. Another problem with frequent sprinkling is that diseases can often appear because the foliage is constantly wet.

Water is one of our most important natural resources. Conserve water whenever you can. Some simple ways to save water are: (1) Don’t leave the hose running after you finish watering; (2) Use mulch or ground cover around your plants so the ground won’t dry out as quickly; (3) Water plants in the early morning so more water will soak into the soil and less will evaporate. In these ways your family can save water when gardening. You can also collect rainwater in clean containers to water your vegetable plants.
EXPERIMENT 1. Sprouting Seeds
What you will need:
• seeds (beans are best)    • 4 paper towels    • 3 plates    • water

What you will do:
1. Number the plates Plate 1, Plate 2, and Plate 3.
2. Place a paper towel on Plates 1 and 2.
3. Place 4-6 seeds on each of the 3 plates.
4. Cover the seeds on Plates 1 and 2 with another paper towel.
5. Add enough water to Plate 1 to wet the paper towels. Check this plate daily to make sure the paper towels stay damp.
6. Keep Plate 2 completely filled with water every day.
7. Set Plate 3 aside to compare with the other plates. Keep Plate 3 completely dry.
8. After several days, observe the seeds on all three plates.

Describe what happened to the seeds that were kept damp, on Plate 1.


Describe what happened to the seeds that were kept constantly wet, on Plate 2.


Describe what happened to the seeds that were completely dry, on Plate 3.


ACTIVITY 1. Let’s Measure The Rainfall
A rain gauge measures how much water your vegetable plants are getting from the rain. If your garden receives less than one inch of rain per week, you need to check if your plants need watering.

What you will need:
• 3 tin cans (any size will work)    • ruler    • crayon or waterproof marker

What you will do:
1. Place the ruler inside each can and mark every 1/4 inch from the bottom of the can.
2. Place one can to catch the rain at each of the 3 garden sites you selected in Lesson 2.
3. After each rain, record on the RAINFALL CHART on page 17 how much rain was collected in the rain gauge at each of the sites. Pour the water out after each rain.
4. At the end of each week, add the amount of rainfall for the week at each site.
**RAINFALL CHART**

Example: Week of ____________________

<table>
<thead>
<tr>
<th>Site #</th>
<th>Sunday</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Week of ________________

|        |        |        |         |           |          |        |          |       |
|        |        |        |         |           |          |        |          |       |
|        |        |        |         |           |          |        |          |       |

Week of ________________

|        |        |        |         |           |          |        |          |       |
|        |        |        |         |           |          |        |          |       |
|        |        |        |         |           |          |        |          |       |

**ACTIVITY 2: How Dry I Am!**

**What you will need:**
- pencil
- information from ACTIVITY 1

**What you will do:**
1. Record in the chart below the rainfall each of the three sites receives per week (use an average).
2. Feel the soil in each site three or four times per week. Is each site mainly wet, moist, or dry.

<table>
<thead>
<tr>
<th></th>
<th>Average rainfall</th>
<th>Wet/moist/dry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site #1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site #2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site #3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Which site will require the most extra watering?

Which site will require the least amount of watering?

Are any of the sites too wet or too dry for vegetables?

How did you determine this?

---

**Transpiration**

Water can leave the plant through its leaves. This process is called transpiration. When a plant loses water too quickly, it may wilt. This means that water is being transpired through the leaves faster than the roots can take it up from the soil. This can happen when the wind blows or if it is very warm and the soil is dry. If your plants look like they are wilting you should probably give them a good, deep watering.

**Mulches**

A mulch is a layer of material which has been spread over the garden soil. It is used to reduce weed growth and to keep the soil moist. Some examples of mulches you can use are straw, hay, leaves, compost, or grass clippings. Mulches can save you time and energy in your vegetable garden. Mulches are also helpful in keeping fruit and vegetables, such as tomatoes and melons, off the ground. This prevents them from getting dirty or bruised, or from rotting.

Mulches can be turned back into the soil to improve fertility and the structure of the soil as they decompose or rot. Mulch also protects the soil from washing away, or eroding, during hard rains or watering. A light-colored mulch also helps keep the soil cool in the summer. What do you suppose a dark-colored mulch would do to the soil?

---

The best site for you to use for vegetable gardening will be the one that has soil that drains well. The soil should never be too wet. If there is excess water at your site, the roots of your vegetable plants will probably be drowned. In the next lesson you will learn that a well-drained soil lets air move through it to reach the roots.
LESSON 5

VEGETABLE PLANTS NEED SOIL AND NUTRIENTS

Good plant nutrition begins at the roots. Roots take up mineral nutrients, water, and air from the soil. Soil is made up of tiny particles that rest on top of one another in such a way that spaces form between them. If you look carefully at the diagram below, you can see how air and water fill up these spaces.

Sand is the largest of these tiny particles, silt is the medium-sized particle, and clay is the smallest. Loam is a mixture of all of these particles. It is important to remember that the smaller the particle size, the easier soil will stick together. Is pottery made from sand or loam?

If we were to look at soil under a microscope, we would find it is actually billions of small particles sitting on top of each other. As the particles rest against one another, gaps form like the spaces in piles of rocks. These gaps, called pore spaces, are filled with air or water.

About 1/2 of soil is made up of solid particles, 1/4 of it is air, and 1/4 of it is water. When we water the soil or it rains, the pore spaces fill with water. When the soil is damp the pore space is partly filled with air and partly filled with water which just happens to be what garden plants like best. When there hasn’t been rain for several weeks the pore space is mainly air. Plant roots grow between soil particles and must get just enough water to keep them growing. Your job as a gardener is to help keep this balance of air, water, and soil nutrients. It will take some work and thought to do it, but with practice you can grow healthy vegetables.
EXPERIMENT 1: Sudsy Soil Separator
What you will need:
• 1 cup of dry, finely crushed soil (remove grass, sticks, stones and leaves)  • pencil
• 1 quart glass jar with a lid  • detergent (dishwasher detergent)
• water  • index card or a white sheet of paper

What you will do:
1. Fill the quart jar 2/3 full of water and pour the cup of soil into the jar.
2. Add 3 tablespoons of detergent, cover the jar tightly, and shake well for 5 minutes.
3. Let the jar sit for 24 hours. Later:
4. Place the index card next to the jar and mark on the card where each layer of soil has settled.

Questions to Answer:
How many total inches of soil are in the jar?

How many inches of sand are in the jar?

How many inches of silt are in the jar?

How many inches of clay are in the jar?

What soil type is this?

Explain why

__________________________________________________________

__________________________________________________________

ACTIVITY 1: Getting a Feel for Your Soil
What you need:
• one cup of sugar or salt  • one cup of flour  • some modeling clay  • one cup of water

What you will do:
1. Rub sugar or salt between your thumb and finger to give you an idea of what sand feels like. Describe the feeling to other members.
2. Add a few drops of water to the sugar or salt and share with others how it feels now? Do the particles stick together?
3. Feel some flour between your fingers. This is the way silt feels.
4. Add a few drops of water to the flour. How does it feel now? Do the particles stick together?
5. Feel the modeling clay. This is how clay in the soil feels.
6. Add a few drops of water to the clay. How does it feel now? Do the particles stick together?
ACTIVITY 2: What’s Your Type?
What you will need:
• soil from each of your three vegetable garden sites  • cup of water

What you will do:
1. Feel the soil from Site 1. Add a few drops of water. What does it feel like now?  

2. Is the soil from Site 1 mainly: sand silt clay

3. What factors made you decide on this soil type?  

4. Repeat these same steps for the soil from Site 2.
Is the soil from Site 2 mainly: sand silt clay

5. What factors made you decide on this soil type?  

6. Is the soil from Site 3 mainly: sand silt clay

7. What factors made you decide on this soil type?  

Plant Nutrition
Plants need 16 different nutrients. Three of these nutrients—carbon, oxygen, and hydrogen—come from air (carbon and oxygen) and water (hydrogen and oxygen). The other 13 come from the soil.

The three nutrients needed in the largest amounts are nitrogen (N) for healthy foliage, phosphorus (P) for root and flower development, and potassium (K) for general health and hardiness. These elements are commonly provided by adding fertilizer to the soil. This practice is called fertilizing. Fertilizer should be added regularly to plants when they are actively growing.

Plant Fertilizers
There are two general categories of fertilizers. Organic fertilizers come from plant or animal sources. Most contain only moderate amounts of nutrients which are released slowly. Examples of organic fertilizers are animal manure, blood meal, and wood ashes. Spread and dig them into the top several inches of soil two weeks before planting.

Inorganic fertilizers come from chemical or mineral sources. Many of them are easily dissolved by water which makes them available to plants after watering. They do not improve the structure of the soil. Inorganic fertilizers should be applied just before planting and mixed well into the soil. These fertilizers are concentrated so you must be careful not to use more than the recommended amount.
Fertilizers have numbers on their labels that tell the amounts, or percentages, of nitrogen (N), phosphorus (P), and potassium (K) found in the fertilizer. Organic and inorganic fertilizers are equally effective for plants. When added to soil, organic fertilizers become available to the plant less quickly than inorganic fertilizers.

Fertilizers come as powders, tablets, or in liquid form. The most economical are powders that can be mixed with water when needed. It is very important to carefully read and follow label directions when applying fertilizers. Add fertilizers only when plants are actively growing. Before adding fertilizer to your soil, you need to know which nutrients your soil needs and how much.

The soil in your garden won’t always be the best for plants. Organic matter, fertilizer, and lime can improve the soil for plants. Organic materials improve the structure of the soil. Some may be available at no cost. Your leader can help you find out what is available in your area. You may want to purchase a soil testing kit from your local cooperative extension office. Your 4-H leader or parents may want to help you collect your soil sample.

**Soil Preparation**

Before you plant any vegetables, you will need to prepare your soil. This will help insure that the plants grow well and produce healthy vegetables. Before spading, squeeze a handful of soil. If it crumbles easily, it is dry enough to start work. If it sticks together, it is too wet. If you spade wet soil, it can remain hard and cloddy for weeks. You should wait several days for the spring sunshine and breezes to dry the soil a little bit more. The soil should be spaded to a depth of 8 to 10 inches. When you spade the soil, push a spade or shovel into the soil, lift up the chunk of soil and turn it over.

It is best to spade vegetable gardens in the fall. This helps grass and weeds growing on the surface rot and decompose. During the winter, spaded soil freezes and thaws. This leaves the soil in excellent condition for spring planting. Do not rake the soil after you spade it in the fall.

If you must spade a new garden in the spring, do it as early as possible before planting. This leaves time for the soil to settle. If you pick a site where vegetables have been planted before, spade the soil at least two weeks before planting your seeds or transplanting. You can start to prepare the soil early in spring, as soon as the soil is dry.

Soil preparation takes a lot of work. Add a two inch layer of organic matter, such as manure, compost, or peat moss. If a soil test indicates a need for fertilizer and lime, add these now. Now spade them into the soil to a depth of 8 to 10 inches. After turning it over, use the rake to push the soil back and forth until it looks smooth. It is important that this is a nice place for seeds and delicate transplants to grow. Remove all the large clods of soil you can’t break up with the spade or shovel. Remove sticks, rocks, and weeds from the surface of the soil also. This lets the seedlings sprout easier. In Lesson 6, you will use what you have just learned about soil preparation.
LESSON 6

**PREPARING AND PLANTING YOUR VEGETABLE GARDEN**

In LESSON 2 you started planning your garden on paper. You’ve decided which vegetables to plant. You’ve prepared your garden plan and your calendar plan. You will now select the site where you will plant your vegetables. You will prepare the soil for your vegetables. Are you ready to get your hands soiled?

**Choosing Your Planting Site**

As you completed lessons in Vegetable Gardening, you have studied environmental factors that affect how well a plant grows. Another very important step is to evaluate the site where you plan to plant your vegetables. Evaluating a site helps you decide which one is best for planting your vegetable garden. Here are some factors you should keep in mind as you select the final site: How much sun does the site get? How well does the soil drain?

**ACTIVITY 1. Final Site Selection**

**What you will need:**
- pencil
- information on the three sites from previous activities

**What you will do:**
1. Enter all the information from your three sites into the chart below.
2. Decide which of the sites you will use for your vegetable garden site.

<table>
<thead>
<tr>
<th>Site</th>
<th>Hours of light</th>
<th>Soil texture</th>
<th>Soil moisture</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
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<td>2</td>
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<tr>
<td>3</td>
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</tbody>
</table>

Which site will you use for your vegetable garden? ____________________________________

List the factors that you considered in selecting that site? ____________________________________

__________________________________________________________

Share what you have decided with a friend.
ACTIVITY 2. The Ace of Spades

What you will need:
- vegetable garden site
- rake
- organic matter, fertilizer, or lime as needed
- a spade or shovel
- can for sprinkling fertilizer
- four stakes and string

What you will do:
1. Check the soil in your vegetable garden site to see if it is ready for spading.
2. Measure and mark the four corners of your vegetable garden with stakes.
3. Remove rocks, sticks, and trash.
4. Spread the lime and organic matter over the top of the soil in your garden site.
5. Using the spade, dig straight down 8–10 inches into the soil.
6. Lift a shovelful of soil and turn it upside down in the same spot. Break large clods with a shovel.
7. Continue turning the soil by the spadeful until you’ve covered the entire garden space.
8. Spread a light covering of fertilizer evenly over the surface.
9. Rake and smooth the area.

Transplanting Vegetables

Now it’s time to purchase some transplants for your vegetable garden. Your teacher/leader can help you locate a greenhouse, garden center, or nursery where you can buy transplants. Follow your garden plan so you will know how many and which transplants to buy.

When you purchase vegetable transplants, you can be a wise shopper by observing a few helpful hints about what to look for. The transplants may come in a plastic container which is divided into six individual cells. Or there may be six transplants in one plastic container. They are called by many different names. Here are some things to look for when you buy transplants:
- Plants should be similar in size and height.
- Each plant should have at least two sets of true leaves.
- Plants must have good root growth. Check the bottom of the cell pack for too many tangled roots.
- The color of the leaves of transplants should be dark green and look healthy.
- If insect damage is present, don’t purchase the plants.
- Do not buy vegetable plants that already have flowers or fruit on them.

If you bought transplants directly from a greenhouse, they need to be prepared for planting outside. They’ve had plenty of light and water since they sprouted, and are quite tender. They need to be toughened up or hardened off before they can be planted in the garden.

You should begin hardening off transplants 10 to 14 days before they can be planted outdoors. Write this date on your calendar schedule. Start by slowly cutting down the amount of water you give them for 3 days. Do not fertilize them. Next, take the plants outside for a few hours each day. Place them where they will be protected from strong sun and wind. Put them inside in an enclosed, unheated area at night. Each day, for 2-5 more days, leave them outdoors a little longer, placing them in stronger light. After three more days, leave them out all day. The last three days they can remain outdoors all day and night unless there is a chance of frost. In that case, bring them back inside the unheated area.

When the seedlings are ready for transplanting, soak them with water an hour or so before removing them from their containers. Plant them in the late afternoon so that the midday sun isn’t too strong. Dig a hole twice the size of the plant’s root ball. Cup the roots in one hand when
removing the plant from its container. Place the plant in its hole and cover with soil quickly so that the roots don’t dry out. Avoid handling the plant by its stem. Water the soil thoroughly to help the plant settle into its new home.

**ACTIVITY 3: The Transplant Doctor**

**What you will need:**
- vegetable transplants
- garden plan
- hand trowel
- pocket knife

**What you will do:**
1. If your transplants grew in containers made of peat moss (peat pots), tear the upper 1/2 inch off the container and remove the bottom of the peat pot also.

2. If they came in a plastic container, carefully turn the container over and gently knock the plant out. DO NOT pull on the stem.

3. If roots are very tangled, make fine cuts with the knife 1/4 inch deep in the surface of the root ball.

4. Dig holes for the transplants with a trowel and set them in the soil a little deeper than they were in the containers. Seedlings in peat pots can be planted in the container if you follow the directions in Step 1.

5. Pat the soil down firmly around the roots of each plant.

6. Providing shade for transplants for a few days will help prevent wilting.

7. Water the transplants once each day for on week until they are established.

**Growing Vegetables from Seeds**

Many vegetables you can plant in your garden will grow from seeds. Don’t be in too big of a hurry to start seeds outdoors. Remember, a late frost can kill or injure warm-season vegetable plants.

To start seeds outdoors, you should wait until the soil warms up to at least 60°F. Prepare the soil in your vegetable garden site the same way you did for your transplants. Use a round stick or hoe handle to make a furrow for your seed. Next, plant the seeds at the depth recommended on the seed packet. Do not plant the seeds too deep. Cover the seeds with a thin layer of fine soil.

After you cover the seeds, water the soil carefully with a fine spray of water. Apply enough water to soak the soil deeper than the seeds. Be careful not to wash the seeds out of the soil. Water your seedbed every day, until the seedlings germinate and they sprout above the surface of the soil.

After the seedlings germinate, they will develop their first true leaves. Any time soon after this stage of development, it is time to thin them. Thinning means removing extra plants carefully. To thin, carefully remove enough plants to allow the remaining plants to grow. Use your *VEGETABLE PLANTING CHART* on page 7 as a guide.
ACTIVITY 4. Get Those Seeds!
Getting the seeds for your garden is fun. Seeds can be ordered from a seed company by a catalog. You can also buy them at garden centers, supermarkets, hardware stores, and department stores that carry gardening supplies.

What you will need:
- Your list of vegetables you want to grow
- money to purchase seeds

What you will do:
1. Go to the garden section of a store and select the seeds you want to plant. Make sure that the variety of each vegetable is the same one you selected. Read the description of each variety before you choose the best one for your garden. Ask a salesperson for help if you have any questions.

   When it is time to plant, make straight rows by stretching a string tied to two stakes across the garden. Push the stakes into the soil so that you have a guide for digging a seed furrow. This furrow is where your seeds will go. Use the handle end of your hoe to dig a shallow furrow for small seeds. Deeper furrows are made by pulling a corner of the hoe along carefully directly under the string. Check your VEGETABLE WORKSHEET for the proper planting depth.

   Shaking seeds from the packet lets too many fall out at one time. You'll have to pull these extra seedlings out later because they'll grow too close together. Instead, hold a small amount in one hand and pinch with the thumb and index finger of your other hand a smaller amount to sprinkle in your furrow. Carefully cover the seeds with finely crumbled soil to the proper depth indicated on your seed package. If you cover them any deeper, you may not see them again.

Caring for Your Vegetable Garden

Fertilizer
Sometimes you will need to apply more fertilizer to the soil while your plants are growing. Usually 1 or 2 cups for every 100 square feet of surface is enough. You can use the same fertilizer you added when you prepared your soil. If fertilizer is needed, apply it every 4 to 6 weeks. If dry fertilizer falls on the leaves or flowers of your plants, carefully brush it off with your hand or rinse it off with water. Make sure that you water the soil thoroughly after you apply fertilizer.

Weed Control
Weeds can be a problem in the vegetable garden. Unless they are removed while they are small, they will compete with the vegetables for space, moisture, and nutrients. Lightly cultivate or loosen the surface of the soil once a week. Don't go any deeper than about 1/2 inch to avoid injuring the roots of the flowers.

   A mulch on the surface of the soil will help conserve moisture during the summer and help control weeds. A mulch should let water down to the soil and smother weeds. A mulch may consist of grass clippings or peat moss which covers the soil surface about one inch thick. If plants are spaced correctly, they will grow together and discourage weeds from growing.
Watering
During dry periods when there is no rain, you will have to water your vegetable garden. It is best that the soil be kept damp to a depth of 4 inches. You can use a trowel to dig down four inches to check if the moisture has reached this depth. Frequent light watering encourages shallow roots. This is not good for plants.

Staking
Some varieties of vegetable plants grow tall, become top heavy, and fall over. To prevent this, we have to put a stake in the ground to help support them. The easiest time to do staking is when you transplant. The growth of the plant will be supported by the stake. Tie one loop of plastic string around the plant and another loop around the stake.

Disease and Pest Control
Insect pests and diseases sometimes attack vegetable plants. For good pest control, follow these cultural practices:
• Start with healthy seeds and plants.
• Remove diseased plants or plant parts from your garden site.
• Stay out of your vegetable garden when the foliage is wet.
• Remove dead or fallen plant material from your vegetable garden.
• Water your plants only during the early part of the day.
• Keep weeds out of your garden.
• Change vegetable gardens to new areas and use different vegetables every 2 to 3 years.
• Remove dead plants from the vegetable garden at the end of the growing season in the fall.
• Turn the soil over at the end of the growing season.

ACTIVITY 5. Record Sheet
Complete the chart on the next page as you take care of your garden. You will have to keep a record of each harvest in order to determine the total amount harvested.
**RECORD SHEET**

<table>
<thead>
<tr>
<th>Item</th>
<th>Purchased</th>
<th>Cost</th>
<th>Quantity actually used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fertilizer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lime</td>
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<td>Seeds</td>
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<tr>
<td>Transplants</td>
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<tr>
<td>Pest and disease control</td>
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<tr>
<td>Other</td>
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<tr>
<td><strong>Total production costs</strong></td>
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<table>
<thead>
<tr>
<th>Vegetable variety</th>
<th>Date planted</th>
<th>Number or rows planted</th>
<th>Date germinated</th>
<th>Date first harvested</th>
<th>Amounts harvested</th>
<th>Total harvested</th>
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28
Record and Review

Congratulations! You have just completed Vegetable Gardening. It is important that you take a few minutes to record and review some of the things you learned. These questions will help you bring together all of the information, experiments, and activities that you have completed.

There is more than one right answer for each question. Be sure to do your own work. Write neatly and think about your answers before you write them down. Your parents, leader, or teacher will help you if you have any problems. Good Luck!

1. Describe and discuss how many different ways vegetable plants can be grouped. 

2. List five vegetables for each group below.

<table>
<thead>
<tr>
<th>Cool-season</th>
<th>Warm-season</th>
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3. List and describe at least five things you should consider when you are planning a site for your vegetable garden.

4. Why is light so important to vegetables?

5. What effects of temperature did you observe on warm season and cold season vegetables?
6. Why is water so important for vegetable plants?________________________________________

________________________________________

________________________________________

7. What is transpiration? Why is it important to know about this process?________________________

________________________________________

________________________________________

8. Which methods will you use to water your vegetable plants? Why?________________________

________________________________________

________________________________________

________________________________________

9. Describe the soil preparation process you used for your vegetable garden site.________________________

________________________________________

________________________________________

________________________________________

10. Why are fertilizers important for vegetable plants?________________________________________

________________________________________

________________________________________

________________________________________

11. What characteristics should you look for when buying transplants?________________________

________________________________________

________________________________________

________________________________________

________________________________________
New Word Search

Search up, down, across, and diagonally for the new words shown below. Circle them when you find any of the following words:

<table>
<thead>
<tr>
<th>ANNUAL</th>
<th>FERTILIZER</th>
<th>HOE</th>
<th>RAKE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HARDY</td>
<td>PORE</td>
<td>VITAMINS</td>
<td>FERTILE</td>
</tr>
<tr>
<td>BIENNIAL</td>
<td>LOAM</td>
<td>MULCH</td>
<td>SPADE</td>
</tr>
<tr>
<td>ELEMENTS</td>
<td>PERENNIAL</td>
<td>VARIETY</td>
<td></td>
</tr>
</tbody>
</table>

F E R T I L I Z E R
N R A L L A U N N A
O N E R O M L C H K
R L H O E A I F R E
A B F U V T M I N S
H I F E R T I L E P
P E R E N N I A L A
O N R V F I B E R D
N N O W T A P O R E
R I V I T A M I N S
V A R I E T Y N K I
E L S T N E M E L E

How did you do?

Number of words found:
12-15 ➔ EXCELLENT you have a green thumb!
10-11 ➔ GREAT
8-9 ➔ GOOD
less than 7 ➔ OK, but you should review the materials again.
Sharing with Others

If you do any of the activities listed below, you will help others in your family, club, class, and community to learn about landscape gardening. Sharing what you know will help you learn even more about landscape gardening. Circle the sharing activities you plan to complete. When you complete an activity, enter the date on the line.

- Read a report on vegetable gardening
- Give a speech.
- Give a demonstration.
- Present a skit.
- Put up a poster.
- Exhibit an item and information about it.
- Turn in a written report.
- Keep a scrapbook and show it to a group.
- Have a poem or report about vegetable gardening published in school, city or 4-H news.
- Do a bulletin board or window display.
- Tape-record meaningful information on vegetable gardening.
- Take pictures, slides, or videotape one of the above activities and show them.

Roundup Projects

You will exhibit your completed project book and one of the following:
- Transplants that you have grown and a poster describing the steps involved
- Garden and calendar plans with information needed to design a vegetable garden
- Container-grown vegetable plants and poster describing how you grew and cared for them
4-H ACTIVITIES REPORT
This report will help you keep a better record of your club activities. Fill it in as you complete each assignment.
Refer to this record when you are entering county, state, and national programs. Ask your local leader to explain these programs to you.

My 4-H Activities Report for the 19____ Club Year

Projects taken____________________________________

TV member □ yes □ no

Program title____________________________________

Offices held
Club ____________________________________________
County __________________________________________

“Show-and-tell” given to:
Family ____________________________________________
Friends ____________________________________________
Local club _________________________________________
County __________________________________________
Regional __________________________________________
State ______________________________________________

News articles ______________________________________
Radio _____________________________________________
TV ______________________________________________

Things done to improve your health
__________________________________________________

Community service or citizenship work done
By myself __________________________________________
With club __________________________________________

Number of meetings your club(s) held this year________

Number you attended________
This project was developed by Timothy J. Rollins, former associate professor of agricultural and extension education, Robin Good-Hamilton; Peter Ferretti, professor of vegetable crops; and Dennis J. Wolnick, associate professor of floriculture, in consultation with the state 4-H Horticulture Curriculum Committee. Committee members who contributed were: Tom Becker, Janet Klobert, David Quatchak, Judy MacRone. The Katherine Mabis McKenna Foundation also supported the development of this 4-H Horticulture project.

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