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Where trade names are used, no discrimination is intended, and no endorsement by the Cooperative Extension Service is implied.
I. Suggested Use of Guide

4-H club projects are designed to provide opportunities for boys and girls to learn by doing, and to acquire work habits useful in the future. Vegetable gardening can be an exciting and rewarding experience for 4-H'ers. Some rewards of vegetable gardening are obvious. But for the 4-H gardener, the harvest is not the most important. Vegetable plants complete an entire life cycle in one growing season and open a whole new world of adventure to probing young minds.

Vegetables can be enjoyed for their interesting forms and cultural methods. Vegetable gardens offer budding environmentalists opportunities to observe a special environment created by growing plants.

No special skills or talents are needed to be a vegetable gardener or a 4-H vegetable garden leader. An interest in growing vegetables and a desire to introduce 4-H'ers to gardening is helpful. Some disappointments can be expected, especially with first-time gardeners. These disappointments can be learning experiences once problems are identified.

This leader's guide is exactly that — "a guide." It is not and cannot be the final word in home vegetable gardening. Material presented in this leader's guide should be used with the understanding that most gardening knowledge and skills are acquired by doing, not by reading. This guide was developed so you a leader can follow the instructions, step by step.

The 4-H vegetable project leader should attend a leader training program if offered by the county extension staff. These training meetings will give you a chance to meet the county extension staff and to add to your vegetable gardening knowledge.

Some duties you, a leader, will have during the project year:

1. Finding a place to hold meetings,
2. Obtaining and issuing member project books and enrollment cards. These can be obtained from the county extension office and distributed to the 4-H'ers at the first meeting,
3. Becoming familiar with the members project book and checking the book periodically to be sure it is being kept up to date,
4. Attending leader training workshops if offered by the county extension staff,
5. Ordering seed catalogs from several companies, for group purchases and for references,
6. Obtaining a site for a group garden, if in a city situation. For help seek the county extension staff's assistance,
7. Planning your own demonstration garden,
8. Gathering equipment needed for initial club meeting,
9. Holding regular weekly or monthly meetings, whichever is more convenient,
10. Planning to visit each member's project at least twice during the season, once with a county extension staff.
member. This extra effort builds a member's morale and self-confidence, and helps acquaint you and the county agent with the project workings and the members.

11. Encouraging members of your club to participate in a county-sponsored roundup or county fair 4-H exhibit. This will give the members of the club a goal to strive for.

Social aspects of gardening should be emphasized. Include the member’s families, neighbors, and schoolmates in helping with and planning the project, and in club activities. This fosters feelings of belonging by the club members and their families. A social portion of your monthly club meetings with refreshment is always a good idea. Rotating the meeting to a different member’s home each month will give you a different place to have the monthly meeting. It also gives you a chance to involve every member’s parents, and to make a visit to the member’s garden. More importantly, it encourages the gardener to maintain the garden, demonstrate creativity, and do good work.

Respect all questions posed by gardeners, try to give straightforward, honest answers. When you do not know, tell the members you will find the answer for them. Most of all, do not give glib answers to the 4-H’ers. Productivity goals in the garden should not be as important as the process of learning by the club members.

Planning the garden site and the types of vegetables to be grown by the member should be a family decision. 4-H’ers should be encouraged to grow some crops which they may prefer not to eat. There should be a selection of sure-fire crops that will encourage young gardeners. These should be suggested for young or first-time gardeners. These include zucchini, chard, scarlet runner beans, and tomatoes. Planting dates suggested in this guide are typical for central Pennsylvania; if you live in the southern section of the state, these dates will be two to three weeks earlier and in the northern region, about one week later.

Lastly, encourage parents to let their club members participate in the preparation of the vegetables for family meals. A 4-H’er can have a greater sense of accomplishment by following the vegetable from the small plot to a palatable dish on the family table.

These ideas go a long way toward making a 4-H club work and grow together. Most of all, be yourself; encourage creativity; work along with your 4-H members; don’t stifle enthusiasm in the young. You will find 4-H club work very fulfilling and rewarding.

II. Suggested Monthly Agenda and Topics

The organizational details of every meeting are not included with the monthly meeting agenda. This section is included here so that you may use it with each monthly meeting.

The first things to do for each meeting are:

4-H club president calls meeting to order
4-H club pledge and pledge to the flag
Minutes of previous meeting read and approved
Treasurer’s report
Start meeting agenda for this month

At the finish of the formal presentation:

Remind members of any special assignments for the next regular meeting . . . such as reading project book.
Refreshments (optional)
Recreation (optional)
Prepare materials and presentation for the next meeting.

January

Attend leader training held in your county. Become familiar with leader’s guide and members project book.

Secure catalogs from several seed companies for reference. Collect materials such as flats, soil, and other props needed for the first several meetings.

If a community area is to be used for a garden, make the necessary arrangements (with the advice of the county extension staff) to have the garden site selected and prepared.

February

Distribute membership cards.

Discuss the principles of 4-H for new members.

Discuss some basic gardening techniques
(a) tools needed
(b) soil preparation
(c) garden size

Plan to use your own garden if possible for demonstration and instructional purposes. Start Sweet Spanish onions and leeks indoors.
March
Demonstrate seeding of other vegetables indoors (pepper and eggplant). Discuss possible special projects for 4-H round-up.
Discuss vegetables to be grown in large, medium and small gardens; and easy-to-grow vegetables.

April
Discuss planting of transplants and seed. Start pepper, then tomato seed indoors.
Discuss problems members may be having with the seeds started indoors.
Demonstrate soil preparation, soil spading, addition of fertilizer, organic matter, and lime.
Demonstrate planting, depth of seeding, and transplanting.
Show a seed germination demonstration (i.e. sprout a bean in a jar; as shown in 4-H Plant Science Project.)
Discuss germination, seedling parts, and possible germination problems.

May
Seed cucumbers and melons indoors 3 or 4 weeks before time of transplanting.
Have a meeting at a member’s home.
Discuss mulching and weed control — especially use of black plastic, old newspapers, straw, and hay.
Discuss succession planting and interplanting.
Demonstrate weed control by cultivation and by use of mulches.

June
Have a meeting at a member’s garden.
Discuss watering techniques and devices; also last dates for succession cropping.
Discuss insect and disease control. Obtain slides from county extension office file.
Harvest radishes and leaf lettuce sown in April and May. Make a simple salad with mixed lettuce types and radishes. Make radish roses.
Visit members’ gardens with extension agent.

July
Have a meeting in another member’s garden.
Discuss fertilizer side dressing.
Discuss members’ insect and disease problems.
Describe types of cabbage, broccoli, or cauliflower and their culture for succession planting.
Explain how best to exhibit vegetables for round-up.
Select best tomatoes for show purposes.
Demonstrate harvesting techniques. Have members bring some of their harvest for a salad break. Try some early broccoli.
Check project books for the roundup.

August
Prepare for roundup.
Prepare an exhibit for the roundup.
Discuss harvesting of all types of vegetables. Have a few members prepare some tomato, pepper, eggplant, summer squash, or melon dishes. Point out crops to be used in fall succession planting.
Visit members’ gardens before roundup.
Attend roundup as a club. Visit other 4-H and commercial vegetable exhibits at the fair.

September
Have a club picnic. Invite members to bring part of their harvest to be part of the picnic meal. Try to get everyone to bring something a little different — from simple hors d’oeuvres (celery and carrot sticks) through main meal items and dessert.
Ask members to invite family and friends.
Award prizes for best gardens as demonstrated on visit to members’ gardens.

October
Discuss fall garden cleanup.
Discuss good and bad points of members’ gardens with the members.
Demonstrate and discuss the planting of a fall cover crop.
III. Lesson Plans and Objectives

FEBRUARY  Basic Garden Techniques

Objective: To help 4-H members develop an understanding of how to plan a garden and where to locate a garden.

Planning your garden
Demonstrations can be given by leader or older club members. A well-planned garden is the key to success for Green Thumb Gardener 4-H members. Planning should include family considerations, likes, and dislikes. Be sure that each 4-H home vegetable garden is planned on paper before seeds are purchased, seeded, and transplanted. Members should be encouraged to save their plans from project year to project year, so they can improve succeeding plans and add to their gardening information.

Material needed
Poster board drawing of a garden plan or plans
Enough 8½ x 11 graph paper for one piece per member
Enough pencils or pens for each member
A table for members to work on
Examples of garden plans
Seed catalogs and other gardening literature for 4-H’ers to use.
Soil test kits

Starting suggestions
Suggest that 4-H’ers include their families in the planning of the garden. Suggest to 4-H’ers that tall plants such as tomatoes, and corn go on the north side of the garden so as not to shade shorter plants.

Order and buy disease-resistant varieties.

A small garden well-cared for is usually better than a large garden. A narrow strip of the garden can be prepared as needed. Sod areas should be spaded in the fall, to allow weather to kill soil insects and to improve tilth.

Planting plan should include:

Sketch of the planting areas and outline of the garden’s boundaries.

Listing of types and varieties grown (see digest of selected varieties).

Planting pattern of vegetables, straight rows, or scattered.

Spacing between planted rows.

Planting dates and number of rows (plants) to be planted of each type.

Notation of crops which are going to be succession cropped or intercropped.

Discuss running rows north to south to make maximum use of the sun.

Locating the garden (slides available from county extension office)

In a sunny area away from trees.

Near the house or other source of water.

Select an area with well-drained soil. Avoid frost pockets and heavy clay.

For next time, ask members to prepare for March meeting by selecting garden site with parents; bring in soil samples. Discuss with parents, vegetables to grow in garden; read project book on soil preparation.

MARCH  Starting Seed Indoors

Objectives: To help 4-H members develop an:
Understanding of vegetable plant growth;
Understanding of the process needed to grow transplants;
Understanding that growing transplants is a desirable part of gardening.

Material needed
Seeds of sweet Spanish onions, leeks, early cabbage and broccoli, head lettuce, and eggplant
Pots, flats, and seed bands
Seed flat, milk carton, or other suitable container
Soilless mix (peat moss and perlite, Jiffy mix, Reddi-earth, Promix)
Clear plastic bags or sheets
Plant labels
Heating cable (if available)
Seed start kits (if available and convenient)

Starting seed indoors
Some gardeners prefer to buy transplants but, to a 4-H gardener, starting seed indoors might be a way of arousing interest in gardening before the warm weather arrives. Some advantages of growing their own transplants could be saving several dollars on the cost of buying transplants; growing varieties which are not grown commercially; and growing varieties bred and packaged for use by home gardeners.

Several containers can be used for sowing seeds indoors. The seed flat method (using flats or smaller market packs, pots, egg cartons, or seed bands) is time-honored. Seedstarter kits can be purchased. All you do is remove the lid of the container and add water. Contents of the con-
tainer usually are seed, soil mix, and plant nutrients. Peat pellets are another innovation in seed starters. These compressed pellets of sphagnum peat moss have nutrients included. Place these pellets in water. Watch them expand into small self-contained pots for planting one or two seeds which later can be transplanted in the garden. Seed starter kits minimize transplant shock and get your vegetables off to a good start.

A seed flat can be any shallow box, having drainage hole, used for starting seed. An ideal one is a wooden box 14 inches wide and 24 inches long and about 3 inches deep, or it could be a smaller flat for growing smaller numbers of plants. Flats can even be old egg cartons, milk boxes, or other cartons. Here is how seed sowing can be shown indoors:

Make a soil mixture of 1 part peat moss and 1 part sand or perlite, screen or buy milled sphagnum peat moss to be sure all large particles of peat moss are removed. You may want to use sifted sphagnum moss or horticultural vermiculite instead of the above mixture. Remember, you can also buy prepackaged mixes such as Jiffy mix, Reddi-earth, and Promix to use for seedling production.

Sift or shake soil mixture into the containers or place expanded peat pellets or peat pots into the flat (a standard flat should hold 50 pellets; allow freshly expanded peat pellets to drain for several hours before placing in flats). The soil mix should be worked into the corners with your fingers. A layer of newspaper is often placed into the bottom of the flat before soil is added so that soil will not trickle through the openings in the flat. Firm soil mix with a block of wood or something similar. Make sure the soil surface is level and that the soil mix is about ½ inch below the top of the flat. This is to allow for watering and to prevent soil from being washed out of the flat.

Soak the filled flat in a shallow pan of water (only if it is filled with soil or if soil-filled pots are used rather than peat pellets). Seed should be sown 4-10 weeks before the time the seedlings are to be transplanted outside. If possible, use seed pretreated with a fungicide to prevent damping off. If the seed has not been pretreated contact county extension office for name of correct pretreatment. Sow tiny seeds over the seed bed, and then press gently into the soil surface with a wood block. Do not cover them. Small seeds are easily scattered if placed into a salt shaker. Sow medium-sized seed in shallow furrow, pressed into the soil. Furrows should be the depth indicated on the seed package. Cover the seed with sphagnum peat moss, or fine sand, or vermiculite, and firm with a hand or float. If large seeds are used, poke them into a seeding mix with your finger and then cover them.

Cover the flat with a pane of glass, sheet of plastic, or a double sheet of newspaper. Set the flat in a warm, lighted spot, and if possible give heat from the bottom. Check daily to see that the soil mix does not dry out; and remove paper, glass, or plastic sheet when the seeds germinate. Information on the number of days to germinate seed is usually on the seed package.

Give the new seedlings more light as growth progresses. Twelve hours of light per day should be supplied with the help of artificial light. Seedlings get spindly if grown under poor light or very high temperatures; the best temperature is about 65-80°. Carefully transplant seedlings to another flat when one set of true leaves has developed. It is important to maintain a constant even moisture all the time the seedlings are growing in the flats.

Transplant into the garden at correct time. Delaying planting beyond the scheduled time will cause plants to grow slowly and be less productive. Young plants should not be planted into the garden directly from an indoor growing area. Take them outside in the daytime and bring them in at night for about seven to ten days before transplanting.

**APRIL**  
**Garden Soil Preparation and Seed Sowing**

**Objectives:** To help 4-H members develop an:
- Understanding of proper soil management;
- Understanding of how to manage garden soil for better vegetable production;
- Understanding of how to sow seed and how it relates to soil management;

**Material needed**
Shovel, spade or spading fork, fertilizer, limestone, Area large enough for out-of-doors demonstration; Poster boards of garden plans, Twine and four stakes,

Instruct 4-H’ers to sow tomato and pepper seeds following March’s instructions at their home for May planting.

**Soil preparation**
The value of good soil preparation should be stressed to the 4-H’ers. Fertilizers, seed, and labor may be wasted if the planting soil is not in good condition.

Measure out the garden site, place stakes at four corners of the area to be gardened.

Check soil wetness. If soil that is pressed tightly in the hand forms a compact muddy mass and does not crumble when released, it is too wet to be worked. When the soil crumbles easily it is ready to be worked. Heavy clay soil that is worked when too wet loses its crumbly texture and will become as hard as concrete.

Follow soil test recommendations. Lime and fertilizer should be broadcast on the garden before the bare soil has been turned for the first time. Lime and fertilizer should be thoroughly worked into the soil. If possible, lime should be applied in the fall before planting time. Before spading the soil, broadcast 2/3 of the required fertilizers on the area to be spaded. The rest of the fertilizer can be side-dressed or banded at planting time. Two or two-and-one-half pounds of fertilizer usually are sufficient to fertilize 100 square feet of area. However, the best method for determining how much fertilizer is needed is by a complete soil test.
Soil in a small garden is best worked with a spade or spading fork. Dig the soil 8 or 9 inches deep if it is possible to do so without disturbing the sub soil. In spading the soil, the back of the spade should be used to crush the lumps as each spadelful is turned.

After the plot has been spaded, it should be raked as soon as possible to prevent rapid loss of soil moisture. Thoroughly and deeply pulverize the soil without overworking it. If seeds are planted in coarse, lumpy soil, they will be irregularly covered and a very slow, irregular germination will take place, resulting in a poor stand of seedlings. The best finishing or smoothing tool in the small garden is the iron or gravel rake. It is an excellent pulverizer and leveler, when properly used. Stones and bits of trash should be raked to one edge and hauled away.

General planting considerations
In the early spring, it is advisable to take advantage of short periods of good weather to get as much early planting done as possible. It is a good plan to prepare narrow strips and plant them before preparing the remainder of the garden plots.

It is not good practice to sow seed in cold wet soil or in hot dry soil. The best time to sow seed is when the soil is in the correct condition for spading. It is better to sow seed as soon as the soil can be worked after a heavy rain fall than to have a heavy rain fall on newly sown seeds.

Depth of planting for seeds depends on the size of the seed. When planting seeds in heavy soils it is best to place the seeds at a shallow depth. Seeds to be planted in sandy soil should be placed deeper than stated on the seed package. In general, small seed such as carrots, celery, turnips, parsley, and onions should be planted approximately ¼ inch deep. Medium-sized seeds such as spinach, beets, leeks, onions, rutabaga, swiss chard, cabbage, and chinese cabbage, are planted ½ inch to ¾ inch deep. Large seeded vegetables such as lima beans, squash, cucumber, corn, and cantaloupe are planted 1 inch deep under normal conditions.

Select vegetables and varieties that are disease resistant and suited to your locality. Seed should be treated to kill disease organisms on the surface of the seed and to prevent seed decay and damping off. Seed can be purchased already treated and this is most likely the best for the 4-H gardener.

To make straight planting rows, stretch a line between two stakes placed at the ends of the row. Furrows may be dug and seeds sown directly under the line without moving it out of position. Shallow furrows may be opened with the back of a rake or the handle end. Deeper furrows are opened by pulling a corner of a garden hoe along under the string.

The actual sowing of seed can be the most pleasant part of the entire planting process. In sowing seed, it is best not to shake the seed from the packet; instead, hold a small supply in the palm of one hand and with the other hand pull seeds out from between the thumb and forefinger. This is a rapid means of distributing seed in the furrow. Sowing seeds in excess of the amount required to produce a good stand of plants is wasteful and requires tedious work to thin the stand. After placing seeds in the furrow, cover with fine sand.

MAY Mulching, Weed Control

Objectives: To help 4-H members develop an understanding of weed control; understanding of how and when to cultivate; understanding of the use of different mulching materials;

Material needed
Transplants (tomato, peppers, etc.)
Black plastic, clear plastic
Straw mulch samples
Several different types of garden hoes
File (metal)

Remind members to sow melon and cucumber seeds for transplanting June 1 (central Pennsylvania planting date)

Weeds have no place among vegetables because they rob the vegetables of valuable water and nutrients. Weeds are probably the biggest problem to the 4-H vegetable gardener. Weeds in the home garden are best controlled by the use of mulches, a garden hoe, or a cultivator.

Demonstrate sharpening the garden hoe.

Show several kinds or sizes of hoes or a row cultivator.

Discuss shallow frequent cultivation rather than letting weeds grow tall, and making twice the work for the gardener.

It is best to scrape the soil instead of chopping with the hoe. Tell the 4-H'ers not to dig into the soil or they will cut into the feeder roots of the vegetable plants and bring up new weed seeds.

Mulching

Mulches may be organic (straw, sawdust, leaves) or synthetic (black plastic, paper, aluminum foil). They are used to control soil temperature, moisture, weed control, and for fruit protection.

Organic mulches must be deep enough so that weed seedlings cannot grow through the mulch. This is usually 3 to 4 inches of organic mulch. This type of mulch should not be applied before the soil warms in the late Spring. Black plastic will eliminate all kinds of weeds and grasses, when placed in planting areas in the early Spring.

Demonstrate use of black plastic mulch:
Dig two shallow trenches approximately three feet apart.
Unroll 1.5 mil black plastic, placing edges in the trenches.
Pull tight at both edges and ends of unrolled black plastic and fill in trenches with soil.
Cut cross-shaped slits for planting seeds or transplants.
Apply plastic mulch when soil temperature is warm enough to germinate seeds.

Transplanting
Transplants save time, and lengthen the growing season by one to two months. Select transplants that are healthy and stocky in growth and are free from insects and disease.

Dig a hole where the transplant is to be planted. Be sure that the hole is large enough to accommodate the transplant’s root system.

Water plants thoroughly before planting. Try not to disturb roots.

Set each plant slightly deeper than before in a hole large enough to take the roots without cramping.

Use a liquid solution of starter fertilizer when transplanting to give your plants a faster start.

Press the garden soil firmly around the plant’s root system and cover with dry soil to exclude air and conserve moisture.

Transplant on a cool cloudy day or in the later afternoon.
Water the young plants thoroughly at least once a week if dry weather follows transplantings.

JUNE Summer Maintenance

Objectives: To help 4-H members develop an:
Understanding of routine summer maintenance,
Understanding of the methods of harvesting vegetables;
Understanding of insect control in the home garden.

Material needed
Insect and disease control slides
Garden hose
Soaker hose
Different types of nozzles
Coffee cans with both ends cut out

Harvesting
Show harvesting radishes.
Show harvesting lettuce. Pick outermost oldest leaves of leaf types; cut head types at the crown.

Watering
Water deeply. Shallow watering causes plant roots to grow close to the soil surface where they dry out during long dry spells.

Dig three holes in a triangular pattern about 8 inches away from the crown of plants like squash, cucumber, and the other succulent plants.

Place one-pound coffee cans in these holes (remove ends of cans).

Fill these cans as needed to supply an adequate amount of water to each plant.

Insect control
Show slides on insect control
Bean beetle
Japanese beetle
Cutworms
Organic insect control

For the next time, ask members to bring some of their garden harvests for a simple community salad break.

JULY More Summer Maintenance

Objective: To help 4-H members develop an:
Understanding of intermediate and advance maintenance techniques such as summer fertilizing;
Understanding of summer succession planting techniques;
Understanding of methods for exhibiting produce grown by 4-H members.

Material needed
Home garden insect and disease slides
Several pounds of 5-10-5 complete fertilizer
Trowel
Hoe or spade
Packs of cabbage, broccoli, and cauliflower seed
Five show quality tomatoes of uniform size

Insect and disease control
Discuss common insect and disease problems.
Show insect and disease slides pertinent to present problems.

Cabbage
Discuss culture and use of cabbage types in summer succession plantings.

Summer fertilizers
Side dressing and foliar sprays can give plants the boost they need to produce throughout the summer.
Spray soluble fertilizers on foliage of plants.
Place granular fertilizer 4 to 6 inches from base of plants in band 2 inches wide, scratch fertilizer into soil surface.
Selecting show vegetables
Vegetables selected for judging should be:
- Free from injury and damage;
- Uniform in size, shape, and color;
- True to variety and type of vegetable;
- Arranged as five vegetables of the same type on a white paper plate.

Salad break
Have members bring some of their garden harvest from their garden for a varied community salad — consider mixing together all vegetables that the group may like.

AUGUST Roundup
Objective: To help 4-H members develop an:
Understanding of the 4-H project roundup;
Understanding of competition and the rewards of participation;
Understanding of fall succession planting.

Material needed
Seeds of radish, lettuce, turnips, beet, spinach, mustard
Rake
Spade
Labels
Two stakes and strings
Project books

Roundup
Check members’ project books for completeness.
Make sure members get their project to the roundup.
Prepare club exhibit with club members.
Transport exhibit to roundup.
Ask members to help erect an exhibit.
Visit commercial vegetable exhibits with club members.

Fall succession planting
After the August roundup it may seem futile to teach succession planting. The 4-H project member is hopefully gardening not only to complete a 4-H project, but is learning about nature and being encouraged to consider gardening as a lifetime hobby.

Select areas in garden to plant radish, lettuce, turnip, beet, spinach, and mustard.

Prepare soil, adding fertilizer if needed.

Set stakes at either end of rows. Pull string between stakes.

Make furrows under string and sow seed at proper depth, usually stated on package.

Avoid sowing seeds too thickly.

Hasten germination by firming soil over seed.

Thin as necessary after plants emerge from soil.

For next time, remind family members of club picnic, date, and time; discuss what each should bring to the picnic.

SEPTEMBER Club Picnic
Objective: To help 4-H members develop an:
Understanding of the importance of completing a project;
Understanding of the uses of produce grown;
Understanding of the importance of social interaction.

Material needed
Place to have picnic

List of members who will attend picnic

Award ribbons for completion

Invite family and friends to a 4-H vegetable garden club picnic. Picnic is optional and should be informal. If you decide not to have a picnic, use October meeting plan. Awards for gardeners with best garden and most organized garden.

OCTOBER Fall Cleanup

Objective: To help 4-H members develop an:
Understanding of the importance of fall garden cleanup,
Liming and cover cropping;
Understanding of learning by successes and mistakes.

Material needed
Rake
Spade

Several pounds of annual ryegrass
Lime

Fall cleanup
Discuss fall cleanup for insect and disease control.
Discuss fall soil preparation.
Demonstrate making a compost pile.

Pros and cons of this year's garden
Discuss positive and negative aspects of each member's garden, accentuating the positive.

Planting fall cover crop
Prepare soil in garden areas. Spade it 9 inches deep, be sure to follow the same rules as in the spring for spading.

Add lime if necessary.

Broadcast ryegrass seed over the area at the rate of 2 pounds per 100 square feet of garden area. Sow by October 10.

Lightly rake area to give good seed-soil contact for a good stand of an annual ryegrass cover crop.

Water if necessary.
IV. Digest of Selected Vegetables

BEETS
Beets have been cultivated for many centuries and have been used as food for humans and animals and as medicine. Three or four centuries ago, beets were thought to be a cure for yellow jaundice. They are now known not to be a cure for jaundice.

Horace and Cicero, ancient Roman writers, wrote about beets that were vastly different from beets cultivated today. Romans grew beets for their tops rather than for their edible root. Cultivated red beets, as we know them today, were originally grown in Germany and later introduced into Italy. Wild red beets originated on the coasts of Western Europe and North Africa.

Beets grow well in a rich mellow soil. They withstand frost so they may be planted as soon in the spring as the ground can be worked. This is typically mid-April, in central Pennsylvania. Two or three plantings in succession before July 1st will provide beets continuously during the growing season. The last planting for winter storage should be made between June 15 and July 1. Lack of soil moisture during the late spring results in tough stringy beets. Beet seeds are really fruits; each contains several small shiny brown seeds (show this to 4-H’s). Do not plant beets too thickly or the roots will be thin, stringy, and not uniformly round. Plant beet seeds about ½ inch deep, spaced 12 inches between the rows and 3 to 4 inches apart in the row.

Succession planting: early beets may be followed by late broccoli and cabbage.

Companion planting: beets can be interplanted with leaf crops and other low-growing crops.

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Days to harvest</th>
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<tbody>
<tr>
<td>Ruby Queen</td>
<td>60</td>
</tr>
<tr>
<td>Honey Red</td>
<td>60</td>
</tr>
<tr>
<td>Detroit Dark Red Strain</td>
<td>62</td>
</tr>
<tr>
<td>Formanova or Cylindrica</td>
<td>70</td>
</tr>
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<td>for slicing</td>
<td></td>
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<tr>
<td>Burpee’s Golden Beet</td>
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BROCCOLI
Broccoli is a member of the cabbage family as are cauliflower, cabbage, brussels sprouts, and collards. When we eat broccoli, we eat flower shoots. These arise from the sides and top of the plants. The eating quality of broccoli is poor after any of the flowers open and the head begins to open. Side shoots of smaller broccoli spears develop after the terminal spear has been removed from the plant. The side shoots are cut as they develop, at about the same stage of development as the top clusters (before the head spreads and flowers open).

Transplant early broccoli to the garden about April 15. Broccoli likes cool weather. The first crop should be produced before hot summer weather. Fifteen plants will be enough for a 25-foot row in the garden. Spacing should be 24 inches between rows and about 18 inches between the plants within each row. A second crop can be planted about June 25. Broccoli has a long harvest season. Other cultural practices of broccoli are similar to those of cabbage.

Succession planting of broccoli plants may be done in areas in which garden peas and beets have been grown. Intercrop planting of broccoli may be done within rows of low growing vegetables such as onions, carrots, radishes, and beets.

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<thead>
<tr>
<th>Varieties</th>
<th>Days to harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Comet</td>
<td>55</td>
</tr>
<tr>
<td>Premium Crop</td>
<td>74</td>
</tr>
<tr>
<td>Italian Green Sprouting</td>
<td>85</td>
</tr>
</tbody>
</table>

CABBAGE
The cabbage we grow in our garden today was developed from wild forms native to central and western Europe. The Romans considered cabbage to be valuable as a food and medicine. The ancient Germans used cabbage as a staple in their diet. Greek fables trace cabbage back to the father’s of the gods.
Cabbage is a heavy user of nitrogen and phosphates and responds to liberal fertilization, with manures and super phosphates. Top dressing with nitrogen fertilizer during the growing period hastens growth.

Cabbage is a close relative of cauliflower, broccoli, Brussels sprouts, collards, turnips, and radishes. These crops should not be planted in succession, one with another, either in the same year or the succeeding year, because of similar disease and insect problems. Select varieties resistant to Fusarium yellows whenever possible, and consider the many textures and colors available — savoy (crinkle leaf); regular; green blue-green; red.

Try Chinese cabbage grown from seeds in a small urban garden. This is a great vegetable for salads and for boiling or stir-frying. Sow seed sparingly, and then thin plants to 18 inches in the row and 24 inches between rows. Varieties to use are Burpee Hybrid (75 days) and Michihli Dwarf varieties (70 days). These varieties are excellent for container gardens and for small urban gardens.

Transplant in late April, spacing 24 inches between rows and 20 inches between plants in the row.

Succession plantings of late cabbage may follow early peas and sweet corn.

Intercropping of cabbage plants may be done between rows of onions and lettuce.

**Varieties**

<table>
<thead>
<tr>
<th>Early varieties</th>
<th>Days to harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dwarf Morden</td>
<td>53</td>
</tr>
<tr>
<td>Little Leaguer</td>
<td>60</td>
</tr>
<tr>
<td>Resistant Golden Acre</td>
<td>63</td>
</tr>
<tr>
<td>Market Victor</td>
<td>67</td>
</tr>
<tr>
<td>Stonehead</td>
<td>70</td>
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</table>

<table>
<thead>
<tr>
<th>Mid season</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Baby Head</td>
<td>72</td>
</tr>
<tr>
<td>Ruby Ball</td>
<td>72</td>
</tr>
<tr>
<td>King Cole</td>
<td>74</td>
</tr>
<tr>
<td>Market Prize</td>
<td>76</td>
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<tr>
<td>Savoy Ace</td>
<td>76</td>
</tr>
<tr>
<td>Savoy King</td>
<td>82</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Late crop</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Harris Resistant</td>
<td>95</td>
</tr>
<tr>
<td>Danish Ballhead</td>
<td>100</td>
</tr>
</tbody>
</table>

The Greeks and the Romans collected the wild species for a medicinal essence. The Europeans developed many sizes and shapes of carrots for their use. Soon after the carrot was introduced to North America by the colonists, it became a favorite of the American Indians. Carrots can be divided into two groups, according to their color or the root size.

The carrot is a biennial plant, but it is grown as an annual in cultivation. Carrots grow best in rich, loose soil, free of clods, rocks, and stones. Sandy loam and peat soils produce the smoothest roots. Avoid heavy clay soils. If carrots are a must in a garden with heavy clay soils dig a trench six inches wide and eight inches deep. Refill it with a 50-50 mixture of sphagnum peat and existing soil. This will make the soil light enough to grow smooth carrots. Planting depth is 1/4 to 1/2 inches deep. Carrot seed is slow to germinate so cover with vermiculite or sand to minimize crusting. Carrots can be planted in rows 15 inches apart. Within each row mature carrots can be thinned to allow 2 to 3 inches between plants. Thinning is essential to good carrot root formation. As plants develop, pull alternate plants.

Another method of sowing carrots is to thinly scatter seed over an area, then thin and pull carrots as needed. This method could cause weeding problems. Carrot rows can be marked for weeding before seeds germinate by dropping a few radish seeds in the row at intervals of several inches. The radish seeds germinate in a few days.

Successive seedings every two weeks between April 1 and June 15, will yield a continuous crop, (central Pennsylvania dates).

**Varieties**

<table>
<thead>
<tr>
<th></th>
<th>Days to harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nantes Strains</td>
<td>70</td>
</tr>
<tr>
<td>Royal Chantenay</td>
<td>70</td>
</tr>
<tr>
<td>Danvers 126</td>
<td>75</td>
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<tr>
<td>Danvers Half Long</td>
<td>75</td>
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<tr>
<td>Imperator Strains</td>
<td>75</td>
</tr>
<tr>
<td>Sparta Bonus</td>
<td>76</td>
</tr>
</tbody>
</table>

**CUCUMBERS**

Cucumbers are members of the cucurbit family. The cucumber is believed to be a native of India and tropical Asia. Oriental people have used cucumbers for more than three thousand years. The next stop on the cucumber's world travels was to Europe, and its presence in Egypt was recorded in early Egyptian writings. Cucumbers mentioned
in the Bible probably were imported by the Hebrews from Egypt. The cucumber was a favorite food of Tiberius, a Roman Emperor. The cucumber was being cultivated in French Canada by the American Indians when the French colonists landed.

Cukes, as cucumbers are often called, require space to grow. They can, however, be trained on trellises or fences. Some varieties (especially Patio Pik hybrid) can be grown in containers and hanging pots. Cucumbers are a warm season crop. They also have a high water content. This means that adequate soil moisture should be maintained around the plants.

Sow seeds about 1 inch deep between May 10 and June 15 in central Pennsylvania. Allow about 48 inches between rows and space seeds about 12 inches apart in the row.

To obtain best results with cucumbers, start seeds indoors in peat pots or planting bands; about 3 to 4 weeks before the date you expect to plant outdoors (transplant June 1 in central Pennsylvania). Black plastic mulch will give cucumber plants a quicker start and maintain good soil moisture. Bitter cucumbers often are caused by a lack of soil moisture. Over-mature cucumbers (fat yellow fruits) left on the vine reduce yields. When cucumber begins to bear fruit heavily, daily pickings are recommended.

Harvest slicing varieties when fruits are 5 inches long and dark green. Pickling cucumbers can be picked at any desirable size over 1½ inches long.

### Varieties

<table>
<thead>
<tr>
<th>Variety</th>
<th>Days to Harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slicing</td>
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</tr>
<tr>
<td>Patio Pik</td>
<td>55</td>
</tr>
<tr>
<td>Victory</td>
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<tr>
<td>Burpess Hybrids</td>
<td>62</td>
</tr>
<tr>
<td>Marketmore 70</td>
<td>67</td>
</tr>
<tr>
<td>Pickling</td>
<td></td>
</tr>
<tr>
<td>Premier</td>
<td>51</td>
</tr>
<tr>
<td>SMR 58</td>
<td>54</td>
</tr>
<tr>
<td>Wisconsin SMR 18</td>
<td>54</td>
</tr>
</tbody>
</table>

EGGPLANT

Eggplant is a member of the nightshade family, as are tomatoes, pepper, and Irish potatoes. Wild eggplant is native to India. An ancient Chinese book describes use of eggplant by fashionable women in making black dye used to bring their teeth to a high metallic gloss. Eggplant was introduced in Europe via Africa during the 14th Century Moorish invasion of Spain. It also appeared at this time in Italy. Cultivation in the Americas started in Brazil in the mid-1600s. Eggplant, a warm-season plant, was readily adapted to the warm weather regions of the Mediterranean, Africa, India, Japan, and in North and South America.

Eggplant can be cooked in many ways but is never eaten raw. It comes in purple, black, white, and orange colors. Eggplant comes in many sizes and shapes — egg size and shape to large and long, or broad and almost round.

Eggplant does best in a warm, rich, moist soil; a very high humidity; and high heat (75-90°F). It is a long season crop to be started indoors 10 weeks before transplanting. Plants are sensitive to cool air and soil temperatures and should not be transplanted until June 1 in central Pennsylvania, later in northern Pennsylvania. Three taller-growing varieties are Classic, Special Hibush, and White Beauty. For patios try Long Tom, Short Tom, Morden Midget, Dusky, or one of the egg-sized types.

Companion cropping of eggplants works well when they are placed in rows of tomatoes or peppers. Substitute every fourth or fifth tomato or pepper plant with an eggplant.

Eggplants should be spaced 24 inches between the garden rows and 18 inches between plants in the row.

### Varieties

<table>
<thead>
<tr>
<th>Variety</th>
<th>Days to Harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dusky</td>
<td>64</td>
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<tr>
<td>Burpee Hybrid</td>
<td>70</td>
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<tr>
<td>Black Magic Hybrid</td>
<td>73</td>
</tr>
<tr>
<td>Classic</td>
<td>76</td>
</tr>
<tr>
<td>Special Hibush</td>
<td>82</td>
</tr>
</tbody>
</table>

LEEKS, GARLIC, AND CHIVES

Leek, onion, and garlic are close relatives originating in central Asia.

Leeks have been the badge of Welshmen. In the 6th Century, a Welsh victory over the Saxons was attributed to the distinguishing leeks worn by Welshmen during battle.

Garlic, currently popular in cooking, was used by the Egyptians, Greeks, and Romans not only in cooking, but also as a medicinal to cure intestinal worms, laziness, plague, and to bring men of great sadness to humor. Some even believed that garlic rubbed on the soles of one’s feet would cure the common cold.

Chives also have been used for ages. The Emperor of the Holy Roman Empire, Charlemagne, included chives in his royal garden. Indians and colonists cultivated leeks and chives by about 1775.
Leeks can be distinguished from the hollow round-leafed onion, scallion, and chive because leeks have flat leaves and do not form bulbs. Leeks must be grown from transplants. It takes leeks several months to reach transplant size (pencil thickness) from seeding and another 4 to 5 months to reach final maturity. Set them out in late May to mid-June. Transplants should be spaced 4 to 6 inches apart within a row; and in a small garden only 12 inches between rows. Leeks prefer high levels of soil moisture and fertility. Leeks are harvested in late fall before Thanksgiving.

Garlic is available in two types. The common types may be purchased in the market (pink skin or white skin varieties) with about 10 small cloves or segments. Elephant garlic, which can be ordered through mail-order houses, has a milder flavor than the standard type and can weigh up to one pound. Both are set out in the fall of the year. Planting depth is one inch. Distance between rows is 12 to 15 inches and 2 to 4 inches between plants in the row. Garlic, like onion, is harvested when the tops mature and fall over.

Leeks and garlic can be interplanted with taller growing plants such as onions, cabbage, lettuce, and broccoli. Chives are best grown in 4 to 6 inch pots in a fertile, well-drained, soilless media. The easiest way to grow chives is to buy plants and divide them, but they can be grown from seed. Chives are a hardy perennial and can be left in the garden year-round. They do best in a rich moist soil and in a sunny location, but they will tolerate partial shade. Chives are usually harvested by snipping the grass-like leaves with scissors.

LETTUCE
Some say lettuce is native to Asia, Europe, and North Africa, while others say it is native to the mountain regions of Siberia. It is among the first vegetables cultivated and has been known by Romans, Greeks, and earlier by the Chinese. Persian kings (the early traders of the world) cultivated lettuce in their royal gardens.

Some 15th Century Writings mentioned the first head-type lettuce. It is purported that Christopher Columbus carried lettuce seeds on his first voyage. The Cos or Romaine Lettuce type was introduced to France and England in the 16th Century.

Four types of lettuce are available. What is best to grow depends on the preference of the grower. The four types are: Crisphead (Iceberg), the most commercially available variety; Butterhead, a loosely headed form, with leaves loosely folded around the head and having a buttery texture; Leaf Lettuce, an open growth pattern with varied leaf forms and colors (some leaves are crumpled or deeply lobed and leaf colors vary from green to deep ruby red); Romaine or Cos, grows tall and upright in form with some leaves measuring 8 to 9 inches in length and bundled very tightly.

Lettuce grows best in the spring and early fall; it will not tolerate the heat of mid summer. Lettuce must grow quickly to be of high quality. Therefore, grow lettuce (especially head types) in light sandy soils enriched with well-rotted compost or manure. Non-heading varieties are more tolerant of heavier soils. Lettuce seed should be sown ¼ inch deep in late March or early April for spring harvest. Plant lettuce around August 15 in an open cold frame for fall harvest. Rows of lettuce should be 15 inches apart and about 6 inches between the plants in the rows. A method of prolonging the lettuce crop is to sow a few feet of row at a time at 10 day intervals until hot weather is expected.

Lettuce is excellent for intercropping with cabbage, onion, and other root crops. Use transplants when intercropping. Oak Leaf, Slobolt, and Salad Bowl are the most heat resistant varieties of lettuce.

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Days to harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crisphead</td>
<td></td>
</tr>
<tr>
<td>Ithaca</td>
<td>74</td>
</tr>
<tr>
<td>Fulton</td>
<td>76</td>
</tr>
<tr>
<td>Romaine</td>
<td></td>
</tr>
<tr>
<td>Valmaine</td>
<td>72</td>
</tr>
<tr>
<td>Parris Island Cos</td>
<td>76</td>
</tr>
<tr>
<td>Butterhead</td>
<td></td>
</tr>
<tr>
<td>Summer Bibb</td>
<td>62</td>
</tr>
<tr>
<td>Buttercrunch</td>
<td>64</td>
</tr>
<tr>
<td>Leaf</td>
<td></td>
</tr>
<tr>
<td>Oak Leaf</td>
<td>40</td>
</tr>
<tr>
<td>Prize Head</td>
<td>45</td>
</tr>
<tr>
<td>Ruby</td>
<td>47</td>
</tr>
<tr>
<td>Salad Bowl</td>
<td>48</td>
</tr>
</tbody>
</table>

ONIONS
Onions belong to the lily family. They originated in central Asia and have been cultivated since prehistoric times. Onions were highly regarded among ancient civilizations. Egyptians of ancient times used the onion as an object of worship and fed it to slaves building the pyramids. The onion family has about 300 members. It is said that without the use of the onion, the art of cooking would be lost. The
great armies of the ancient world were fed onions for courage and strength in battle.

Onions require large amounts of nutrients to develop properly. Work organic matter and fertilizer into the planting soil, and one pound of organic matter and 4 pounds of 5-10-5 fertilizer per 100 square feet of area. Supplying moisture during the growing period is also essential for good bulb development of the onion.

In the home garden, onions are generally grown from sets for both green onions and mature bulbs. Onion sets are small onions grown from seeds (4-H'ers should be advised to plant sets for best results). For late green onions, you may plant seeds of bunching types during June. Plant onion sets in late April or early May. This is a good crop for interplanting in available empty spaces.

Practice frequent shallow cultivation around onion roots since they are near the soil surface. Onions are a low-growing crop, and may be conveniently planted between such widely spaced plants as broccoli, late cabbage, and other crops. The plants should be pulled and the tops and necks thoroughly dried. After the tops of the onions have dried, cut tops off about one inch from the bulb. Removing green tops subjects onions to neck rot diseases during storage.

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Days to harvest</th>
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</thead>
<tbody>
<tr>
<td>Sets</td>
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</tr>
<tr>
<td>Ebenezer</td>
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<tr>
<td>Stuttgart</td>
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<tr>
<td>Southport Red Globe</td>
<td>90</td>
</tr>
<tr>
<td>Seeds or transplants</td>
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<tr>
<td>Pronto S</td>
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</tr>
<tr>
<td>Early Yellow Globe</td>
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</tr>
<tr>
<td>Sweet Spanish</td>
<td>110</td>
</tr>
<tr>
<td>Southport Red Globe</td>
<td>110</td>
</tr>
<tr>
<td>Bunching</td>
<td></td>
</tr>
<tr>
<td>White Lisbon</td>
<td>100</td>
</tr>
<tr>
<td>White Sweet Spanish</td>
<td>110</td>
</tr>
<tr>
<td>Long White Bunching</td>
<td>120</td>
</tr>
</tbody>
</table>

PEAS
Peas may have originated in Italy, but it is commonly believed that they are native to Asia and the Near East. They are a delicious and nutritious vegetable. Europeans have grown peas since early time. The varieties we grow today were developed in England. Greeks and Romans used peas extensively as did the Indians who introduced peas to China in ancient times.

Peas thrive only during cool humid conditions. Plant from March 20 to April 20. Peas sown too deeply come up slowly and produce a poor stand. A good planting depth is 1 to 1½ inch deep, with spacing of 18 inches between the rows and 1 inch within the row. Avoid heavy concentration of manure, compost, or high nitrogen fertilizers. Excessive growth of vines will mean a low yield of pods. Dwarf varieties growing 12 to 20 inches tall in double rows need no support and are ideal for a small garden. Mighty Midget is the smallest of the varieties. Wando does best in warmer weather.

Late cabbage or some other late crop may be planted as a succession planting as soon as peas are harvested.

If dwarf varieties of peas are grown, onions, carrots, lettuce, and cabbage, may be planted between the rows. The earliest and latest dates for planting are April 1 for the early crop and August 1 for the late crop (central Pennsylvania dates).

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Days to harvest</th>
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<tr>
<td>Sparkle</td>
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<tr>
<td>Progress No. 9</td>
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<tr>
<td>Little Marvel</td>
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<tr>
<td>Frosty</td>
<td>64</td>
</tr>
<tr>
<td>Lincoln</td>
<td>66</td>
</tr>
<tr>
<td>Wando</td>
<td>68</td>
</tr>
<tr>
<td>Green Arrow</td>
<td>68</td>
</tr>
<tr>
<td>Edible podded types</td>
<td></td>
</tr>
<tr>
<td>Dwarf White Sugar</td>
<td>60</td>
</tr>
<tr>
<td>Dwarf Gray Sugar</td>
<td>65</td>
</tr>
<tr>
<td>Mammoth Melting Sugar</td>
<td>68</td>
</tr>
</tbody>
</table>

PEPPER
Peppers are native to South America. As with other American vegetables, it was introduced to Europe with the discovery of America. The pepper is a member of the Nightshade family which includes potatoes, tomatoes, and eggplant. Several ornamental varieties are available for container culture. The color range of peppers is from green to yellow to orange to red.

The culture of peppers is similar to eggplant and tomato. All are warm-season crops. Pepper seed germinates slowly. Plants should be set out in the garden 18 to 24 inches between rows and 12 inches within the row. Plants should not be set out until the weather has warmed, about the end of May in central Pennsylvania. A 10 foot row should be sufficient for a small garden. If night temperature drops below 60 degrees or rises above 73 degrees F, blossoms may not set fruit.

Peppers may be planted to follow such early crops as mustard, lettuce, and early beets. Onions and carrots are often sown between pepper plants in the same row.
Varieties

Days to harvest

Sweet peppers — thick-wall types
- Golden Bell  
- Staddons Select  
- Penn Bell  
- Midway  
- Bell Boy  
- Yolo Wonder Types

60

Sweet peppers — thin-wall types
- Canape  
- Italian Sweet  
- Cubanelle  
- Tasty Hybrid  
- Sweet Banana

62

Hot peppers
- Hungarian Yellow Wax  
- Long Red Cayenne  
- Large Red Cherry

70

Early sweet corn or late cabbage can be planted between rows of early potatoes. After harvest, the potato plot may be planted to late crops such as late turnips.

Varieties

Days to harvest

Early
- Norland  
- Mid Season  
- Superior  
- Late  
- Katahdin

75

90

120

RADISH

The native habitat of the radish is uncertain although it was known to most of the ancient civilization of Rome, China, Egypt, and Greece. The Greeks offered radishes to their god Apollo, as a sacrifice. The radish was introduced to England and France during the early 1800's and then to America. Eleven kinds of radishes were grown in American Colonial gardens.

Radishes mature quickly and are easily grown. They do well in a sandy loam soil with liberal amounts of organic matter. Young gardeners with spring fever can grow them very early in the season in a cold frame.

The radish’s short season and growing period make it ideal for intercropping and companion plantings. The spring crop of radish usually takes about 25 days to mature. Plantings can be repeated every 10 days or so until warm weather. Winter radishes grow very large, and can have a very strong flavor if planted before August 1. Radish seeds can be sown by scattering thinly over an area or by sowing in rows about 12 inches apart in early April. Seeds should be planted about ½ inch deep and young plants thinned to 1 inch between plants within the row.

Succession plantings may be made every week until early summer, then wait until a month before the first frost. Another method is to plant early, mid-summer, and late varieties.

Varieties

Days to harvest

Summer Types
- Cherry Belle  
- Early Scarlet Globe  
- Scarlet Knight  
- Burpee White  
- Champion  
- White Icicle

22

24

24

25

28

28

Winter types
- Round Black Spanish  
- White Chinese

55

60

POTATO

The potato is probably the most important cultivated vegetable the New World offered to the Old World. The Aztec and Inca Indians are believed to be the first to cultivate the potato which was native to areas of Peru, Chile, Bolivia, and Mexico. The 16th Century saw the introduction of the potato in France and Spain.

In early time, it was grown for its flowers. The potato today is the largest volume non-grain food crop in the world. It is grown on every continent. Major world producers are Russia, Poland, and Germany. In Europe, the potato is the principal starchy food in the diet.

The potato is usually grown in rich mellow well-drained soils. Heavy soils are a detriment to potatoes. Potatoes respond well to fertile soils, but should not be grown on soils immediately after heavy applications of lime. Otherwise they will do well on high pH soils. Certified seed potatoes (seed potatoes guaranteed free from insect and disease) can be purchased from garden stores or mail order firms. Potatoes generally are not planted in small gardens, but they should be grown if 4-H’ers are interested in them.

There is an interesting and exciting way to introduce 4-H’ers to the growth habit of the potato. A nursery container, a medium-sized plastic bag, or an old water pail can be used as a planter. Fill the container half way with moist soil mix, place a seed piece in the container, and add soil mix to within 2 inches of the container top. The final step is to water the soil in the container, using about one tablespoon of water soluble fertilizer to a gallon of water. Use about one quart of this nutrient solution to settle the media in the container. Add some more moistened media if it is needed. This method of potato culture will provide enough potatoes for a roast at harvest.
SNAP BEANS
It was once thought that snap beans and kidney beans were native to India. In the late 1800's, it was discovered that the Indians in North and South America had cultivated beans long before the Europeans. Early colonists from Europe took beans back for cultivation, causing the confusion. The bean first appeared in Europe in about the 16th Century.

Beans are not particular as to type of soil provided if it is warm and well-drained. A rich soil is not required although lima beans require more fertility than do snap beans. Being legumes, beans make use of free nitrogen from the atmosphere. Little or no nitrogen fertilizer is necessary. Beans are tender to frost so they are planted between May 15 and July 20.

Seeds may be attacked by seed maggots and rot (in the ground) if planted while the soil is cold and wet, especially in heavy clay soils. Plant the bean seeds about ½ inch deep in moist soils and a little deeper in sandy soils. Space rows 30 inches apart and space seeds about 4 inches apart in the row. Each seed should be placed in a mound. Break up crusted soils around beans for better plant development.

A row of green pod bush beans may be sown every two weeks until the end of June.

Snap beans may be planted in areas in which early spinach, radish, lettuce, and early cabbage have been grown. There are many good bean varieties available, here are the recommended varieties for Pennsylvania.

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Days to harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bush green</td>
<td></td>
</tr>
<tr>
<td>Provider</td>
<td>50</td>
</tr>
<tr>
<td>Tendercrop</td>
<td>53</td>
</tr>
<tr>
<td>Tenderette</td>
<td>53</td>
</tr>
<tr>
<td>Bush Blue Lake types</td>
<td>58</td>
</tr>
<tr>
<td>Bush-wax</td>
<td></td>
</tr>
<tr>
<td>Sinclair Butterwax</td>
<td>50</td>
</tr>
<tr>
<td>Resistant Cherokee Wax</td>
<td>53</td>
</tr>
<tr>
<td>Eastern Butterwax</td>
<td>53</td>
</tr>
<tr>
<td>Resistant Kinghorn Wax</td>
<td>54</td>
</tr>
<tr>
<td>Pole types</td>
<td></td>
</tr>
<tr>
<td>Kentucky Wonder 191</td>
<td>68</td>
</tr>
<tr>
<td>Kentucky Wonder Wax (yellow)</td>
<td>68</td>
</tr>
<tr>
<td>Blue Lake</td>
<td>60</td>
</tr>
</tbody>
</table>

Two ounces of seed are needed to plant a 25 foot row of beans. Be sure to pick beans when they are young and succulent. Try growing garbanzo beans (chick peas) for fun. Also, Bush Ramano 14; Scarlet Runner Bean (mentioned earlier); English or Italian Broadbean (Vicia faba).

SWISS CHARD
Swiss chard is a member of the beet family that produces edible stalks rather than an edible root. The Roman writer, Pliny, mentions the long white mid ribs which the ancient Romans prized as a food plant before the Greeks. The chard has been in cultivation since the very beginnings of agriculture. Chard is excellent as a vegetable by itself and can be added to rice and soup dishes.

Only one planting of chard is necessary as crop after crop of outer leaves may be harvested without injuring the plant.

The culture of chard is similar to that of beets. Chard needs rich mellow soil. Planting can take place in mid-April. Chard seed is sown ½ inch deep. Each seed (cluster) contains several seeds, as does the beet seed, and a fairly wide spacing of seed facilitates thinning. As plants grow larger, they need to be thinned to at least 6 inches in the row and 18 inches between the rows. A 25 foot row will supply the needs of an entire family. The outstanding features of chard are that it tolerates summer temperatures in which spinach and lettuce go to seed, and that there is no need for successive plantings even if the whole plant is cut off at the crown.

Although chard succeeds itself because of its long growing season, it is possible to plant the seed in a row of low-growing quick-maturing plants such as radish or beets.

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Days to harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fordhook Giant</td>
<td>60</td>
</tr>
<tr>
<td>Lucullus</td>
<td>60</td>
</tr>
<tr>
<td>Ruby (Rhubarb Chard)</td>
<td>60</td>
</tr>
</tbody>
</table>

TOMATO
The tomato is another native of the New World. Botanists consider Peru as the origin of tomatoes. The first European name given to the tomato was the “apple of love.” Spanish and Portuguese introduced it to Europe in mid-1400’s. In most countries of Europe it has grown as an ornamental in the garden but in Spain it was used as a vegetable. The Italians were next to recognize the tomato’s value in culinary arts. Even though the tomato was native to America, Colonial New Englanders considered the tomato fruit to be poisonous. It was not until the mid-1800’s that the tomato was eaten by Americans.
The tomato is usually started indoors and transplanted into Pennsylvania gardens. Tomato plants require fertile soil, but it is not unusual to find a home garden soil which is too rich in nitrogen. Tomatoes can be seeded indoors in early April using standard indoor cultural practices. Do not set plants in the garden until danger of frost has passed, about May 20 in central Pennsylvania. Transplants should have many branches and be stocky, (about 6 inches tall). The tomato transplant should be planted deeper than the soil depth they were grown in. Tomatoes are able to root along the planted stem giving the plant more root to absorb food and water.

Varieties are important in growing a tomato crop. Tomatoes in cages or those that are staked can be planted as close as 24 inches between plants. Five plants will do nicely in a 10 foot garden row. There are dwarf (determinate) varieties of tomatoes which can be grown in containers, hanging baskets, and indoors. There are also red, yellow, pink, white, and fruited varieties. Shapes may be round, pear, plum, oblate, and heart-shaped.

Plant a combination of early and late varieties for succession crops. Select varieties resistant to verticillium and fusarium wilt.

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Days to harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early red</td>
<td></td>
</tr>
<tr>
<td>Spring Giant</td>
<td>65</td>
</tr>
<tr>
<td>Springset</td>
<td>67</td>
</tr>
<tr>
<td>Gardener VF</td>
<td>69</td>
</tr>
<tr>
<td>Redpak</td>
<td>70</td>
</tr>
<tr>
<td>Mid-season red</td>
<td></td>
</tr>
<tr>
<td>Jet Star</td>
<td>72</td>
</tr>
<tr>
<td>Burpee VF</td>
<td>73</td>
</tr>
<tr>
<td>Supersonic</td>
<td>79</td>
</tr>
<tr>
<td>Late red</td>
<td></td>
</tr>
<tr>
<td>Beefmaster</td>
<td>82</td>
</tr>
<tr>
<td>Ramapo</td>
<td>82</td>
</tr>
<tr>
<td>Patio types</td>
<td></td>
</tr>
<tr>
<td>Pixie hybrid</td>
<td>52</td>
</tr>
<tr>
<td>Tiny Tim (smallest fruits)</td>
<td>55</td>
</tr>
<tr>
<td>Small Fry hybrid</td>
<td>68</td>
</tr>
<tr>
<td>Patio'</td>
<td>70</td>
</tr>
</tbody>
</table>

Jubilee' and Sunray are yellow varieties. Snowball is a white variety, and Traveler is a pink-fruited variety.

'T Not resistant to nematodes nor to fusarium and verticillium wilts.

**TURNIP**

Turnips have been cultivated in Europe and Western Asia since prehistoric times. They are thought to have originated in Western Asia and the Mediterranean. Cabbage and turnips have long been the staple food for people of Northern and Central Europe.

The best season for turnips is late summer and fall. Turnip seed usually is sown in rows in the middle of August. Turnips are sometimes grown as an early spring crop. Turnips are usually direct-seeded at a depth of a ½ inch deep. Rows should be 15 inches apart and plants thinned to 3 inches within the row. Tops from the thinning can be used as greens for the table. Be sure to keep the crop growing fast and watered well for a good quality root.

Late turnips are very successfully grown to follow any crop which matures before the end of July. A good plan is to look over the garden in early July, check for vacant planting spaces and plant turnips in these spaces.

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Days to harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Just Right (fall plant only)</td>
<td>40</td>
</tr>
<tr>
<td>Purple Top White Globe</td>
<td>58</td>
</tr>
<tr>
<td>Amber Globe (yellow flesh)</td>
<td>60</td>
</tr>
<tr>
<td>Turnip greens</td>
<td></td>
</tr>
<tr>
<td>Seven top</td>
<td>40</td>
</tr>
<tr>
<td>Shogoin</td>
<td>40</td>
</tr>
</tbody>
</table>

**ZUCCHINI OR SUMMER BUSH SQUASH**

Squash are native cultivated vegetables. Their origin was in the South America tropics. The flowers held a sacred place in the religion of some Indian tribes.

The bush or summer squash was one of the first vegetables which early explorers and settlers noticed in use by the natives. It is likely that squash were first introduced into Europe about 1542.

Zucchini and other summer bush squash types require less room to grow than vining types. They can also be grown in containers on the patio or where they can get full sun. Like cucumbers, all summer squashes are warm season crops.

Sow seeds about one inch deep between May 10 and June 1 in central Pennsylvania. Rows should be 30 inches apart. Seeds should be about 30 inches apart in the row.

Squash can be started in peat pots or planting bands about three to four weeks before the date you expect to plant outdoors. Black plastic mulch will give zucchini and other summer squash a quicker start and maintain better soil moisture. Summer squash require regular picking about two to three times a week to attain maximum quality and production.

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Days to harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zucchini Elite</td>
<td>47</td>
</tr>
<tr>
<td>Dixie</td>
<td>48</td>
</tr>
<tr>
<td>Seneca Butterbar</td>
<td>50</td>
</tr>
<tr>
<td>Early White Bush (patty pan types)</td>
<td>54</td>
</tr>
</tbody>
</table>
List of Specialized Plantings

Gardeners often overlook the possibilities of succession planting, intercropping, and early plantings. The information listed below is designed to give the gardener some idea of when and how to use vegetables to insure the garden’s success.

### Plants to be harvested more than once
- Mustard
- Spinach
- Chard
- Chives

### Crops that produce many from few
- Herbs
- Chives
- Bunching onions
- Tomatoes

### Crops for succession planting
- Bush Beans
- Beets
- Cabbage
- Chinese Cabbage
- Lettuce
- Mustard
- Carrots
- Radish
- Peas
- Fall Turnips
- Kale
- Spinach

### Plants that can be caged or staked
- Pole Beans
- Pole Lima Beans
- Cucumbers

### Partially shade-tolerant crops
- Lettuce
- Garden Peas
- Scallions
- Chives
- Leeks
- Mustard Greens
- Swiss Chard
- Turnips

### Early planting crops
- Broccoli plants
- Cabbage plants
- Lettuce
- Peas
- Carrots
- Swiss Chard
- Onion sets
- Spinach
- Turnips
- Radish
- Beets
- Potato

### Late planting crops
- **Summer**
  - Seeded Bunching Onions
  - Snap Beans
  - Eggplant
  - Pepper
  - Tomatoes
  - Potato
  - Squash
  - Beets
  - Cabbage
  - Broccoli
  - Cucumbers

- **Fall**
  - Radish
  - Peas
  - Spinach
  - Lettuce
  - Turnips

- **Late Fall**
  - Garlic

### Beginner’s fool-proof vegetables
- **First choice:**
  - Onion sets
  - Bush Green or Wax Beans
  - Tomatoes
  - Swiss Chard
- **Second choice:**
  - Cucumbers
  - Collards
  - Turnips
  - Peppers
  - Lima Beans
  - Kale

- **Leaf Lettuce**
- **Red Radish**
- **Zucchini Squash**
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