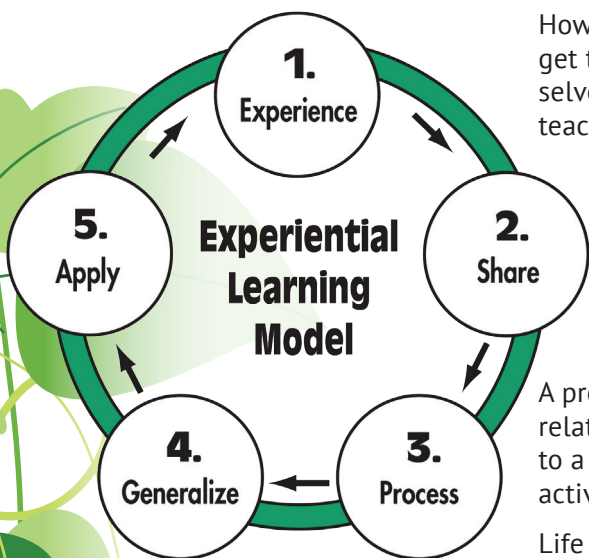




Note To The Project Helper



Pfeiffer, J.W., & Jones, J.E., "Reference Guide to Handbooks and Annuals"
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How wonderful that you've agreed to be a project helper to help youth get the most out of learning about vegetable gardens and about themselves. Whether you are a family member, project leader, junior leader, teacher, or neighbor, your help is greatly appreciated!

Each of the 12 activities in Level A, See Them Sprout, is designed to give the young person an opportunity to learn by doing. Then the youth reflect on what happened, what they learned, and how they can generalize and apply it to everyday life. This is called the **experiential learning process**, and it distinguishes 4-H from most schools and other formal education programs.

A project skill and life skill are listed for each activity. The project skill relates to the vegetable gardening subject matter. The life skill relates to a process that the member undergoes when doing the activity. The activity has been designed to teach both these skills.

Life skills are grouped into three categories. This Level A manual and Level B, Let's Get Growing, focus on competency and coping life skills. Level C, Take Your Pick, introduces contributing life skills, while Level D, Growing Profits, focuses on them in greater depth.

Acknowledgements

Originally written by Marta Lah, curriculum development assistant, 4-H; Robert Ritchie, Purdue University Extension curriculum specialist, 4-H; and the curriculum design team of Rosie Lerner, Horticulture; Mike Dana, Horticulture; Gail Ruhl, Botany & Plant Pathology; Rick Foster, Entomology; Jeff Jones, Extension Educator, Marion Co.; Jamie Sukala, Extension Educator, DeKalb Co.; Barb Thuma, Extension Educator, Allen Co.; Lilah Miller, 4-H Volunteer Leader, Porter Co.; and Katie Rust, 4-H Volunteer Leader, Porter Co.

Updated in 2015 by Ryan Wynkoop, special projects coordinator, 4-H.

Graphic design: Kathi Brethauer, KB Design, Indianapolis. Editor: Nancy Alexander, Noblesville, Ind.

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Life Skills Learning through 4-H

Competency

Acquiring knowledge
Using scientific methods
Mastering technology
Making career decisions
Managing resources
Communicating

Coping

Recognizing self-worth
Relating to others
Making decisions
Solving problems
Dealing with change

Contributing

Applying leadership skills
Taking community action
Volunteering
Conserving the environment

To encourage and challenge members, you can:

- Guide the member in thinking through why something happened or didn't happen
- Listen
- Be a resource person for understanding the subject matter
- Provide additional information to challenge the member

A project leader/helper's guide for the four youth manuals is available online for download. It contains a content overview, activities list by manual, background information not found in the members' manuals, and additional suggestions for group activities. The Solutions section of the project leader/helper's guide answers some of the the questions posed in the "Grow What You Know," "What's It All About?" and "Dig Deeper" sections of the 4-H members' manuals.

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In Level A, See Them Sprout, you will:

- Complete the activities in year 1 or year 2, depending on your level.
- Complete the record sheet for year 1 or year 2 at the back of this manual.

For exhibit options, see your county handbook/Fair Book.

First You Plan

Growing vegetables is easy and fun

You can garden just about anywhere. You don't need to live in the country or have a big yard to be a gardener. You can have a productive garden right in the middle of the city, too! If you live in a house, you can probably find an area in your yard. Ask an adult helper to be sure you can garden there.

If you live in an urban area and don't have a place to plant a garden in the ground, use a container that you can set on a porch, deck, balcony, or patio. Or have a row of pots indoors on a sunny windowsill. You can grow things in planter boxes, windowsill boxes, pots, wooden barrels, bushel baskets, tubs, or just about anything you can think of. Just make sure your container has a few holes in the bottom so extra water can run out.

Your plan

The best way to start a garden is to have a plan like this:

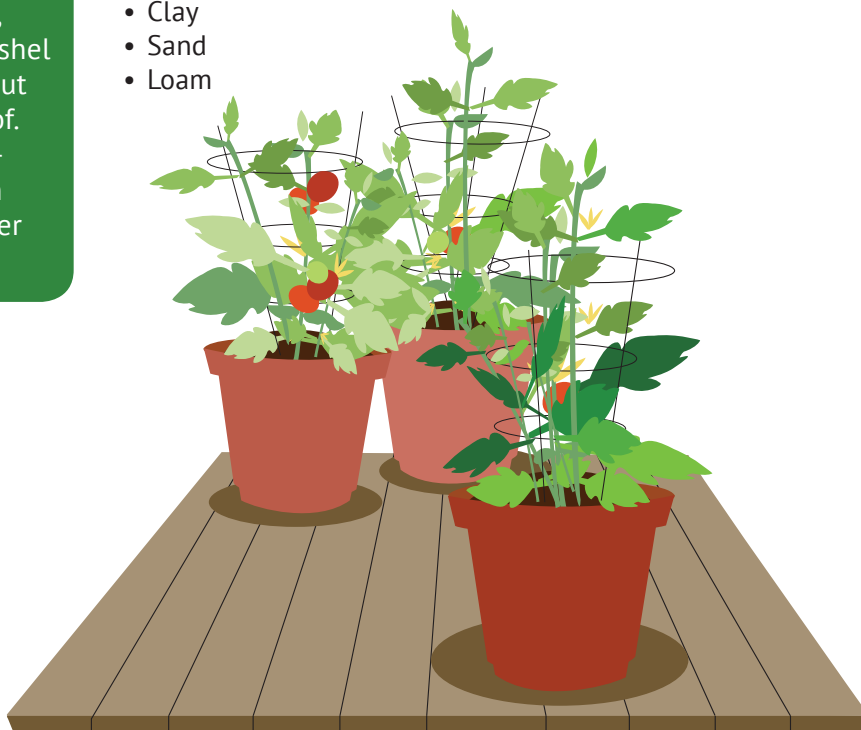
- Choose a location.
- Decide how big a garden you can easily care for.
- Draw a plan of the space; it can be rectangular, square, round, or curvy.
- Make a list of the vegetables you want to grow.
- Check that what you want to grow will fit in your space. Make changes, if needed.
- In your plan, draw where you will plant each vegetable. Add planting dates.

If you have the space, the best place for a garden is on level ground and in full sun.

- Most vegetables need at least six hours of direct sun every day.
- Make sure this place is well-drained. That means that puddles don't stay around for long. Plants need water, but they don't like to stand in water all the time! Would you?
- Ask an adult helper which way is north. This is useful to know because:
 - Rows that run north to south allow plants to get the most sunlight as the sun travels its east-to-west path.
 - Tall plants (such as corn, pole beans, peas, and tomatoes) planted on the north side of a garden won't shade the shorter plants.

Just as sunshine is important for your garden, so is good soil. Soil provides food for plants. You will learn more about these three kinds of soil in future activities:

- Clay
- Sand
- Loam





Supplies: pencil, ruler, graph paper (optional)

1. Before you chose a place for your garden, take a look around the yard. Ask yourself:
 - Will my garden be in the ground or in pots?
 - How much space can I use?
 - Does this space get six or more hours of sun a day?
 - Are there trees, large shrubs, buildings, or privacy fences shadowing part of the space?
 - Is the space somewhat bare of plants and bushes so I can clear it easily?
 - Will it be easy to water?
 - Will it be just the right size for me to take care of?
2. Make a scale drawing of the space. Drawing to scale is easy—just reduce the number of feet to an equal number of inches. For example, if your garden is 6 feet long and 4 feet wide, draw a rectangle 6 inches long and 4 inches wide in the space on the next page. (If your garden is too large to fit on the page when you draw it to scale, make the scale smaller; make 1/2 inch equal to 1 foot of your garden space.) Graph paper makes this conversion even easier. A piece of graph paper is included in this manual on page 46.
3. Now you have a basic plan. Take a good look at your plan. Remember, starting out small is best. Even a small garden needs at least an hour of work every week. A garden that takes too much time soon becomes no fun at all. You can always make your garden bigger next year.
4. Now decide what vegetables you want to grow. What are your favorite vegetables? What does your family like? There probably won't be room for every kind, so plant what you and your family will eat. Read the seed packet or use the garden publications on pages 38-39 of this manual to find out how much space each vegetables needs. Write on your plan where you'll plant the vegetables.
5. Find out when you should plant your seeds or plants. Some vegetables can be planted earlier than others. Write down the dates for each vegetable in your garden plan.
6. Decide where to purchase seeds or plants. If your garden is small, or you're using a container, look for bush-type plants or seeds, which take up less space. Check around for the best price.
7. Plan on preparing your soil before planting. Will you need to add organic material? (See "Grow What You Know.") Container gardens need lightweight potting soil because garden soil is too heavy for container plants or seeds. Allow time to get your soil ready for planting.
8. Stand by and wait for the time to plant!



GROW WHAT YOU KNOW

THE SQUEEZE-IT TEST

You can test a handful of your soil by squeezing it lightly.

- If it feels gritty and falls apart when you open your hand, it's too sandy.
- If it feels muddy when it's wet or caked when it's dry, the soil has too much clay.

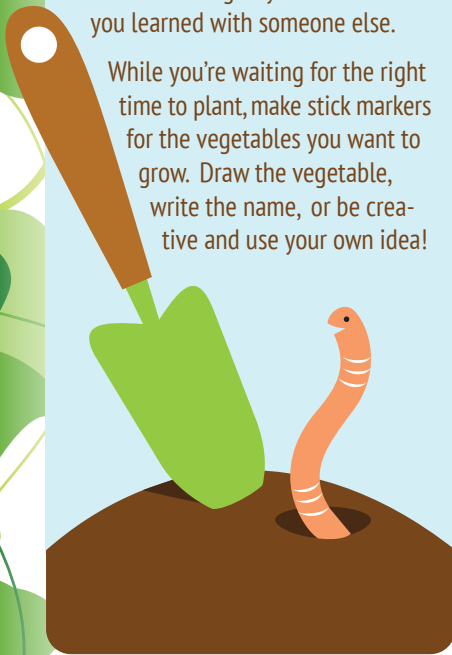
The best kind of soil is in-between. It feels crumbly but won't fall apart when you squeeze it into a ball. It is lightweight and fluffy. Adding organic material such as compost can help both sandy and clay soil types.

DIG DEEPER

Talk to someone who has had a garden, and find out how he or she planned it.

Find a book, magazine, or website about gardening, and read a part that's interesting to you. Share what you learned with someone else.

While you're waiting for the right time to plant, make stick markers for the vegetables you want to grow. Draw the vegetable, write the name, or be creative and use your own idea!



Sun reminder: Rows that run north to south allow plants to get the most sunlight as the sun travels its path from east to west.

1. Draw your garden plan or container in the space below or on the graph paper provided for you on page 46 of this manual.



Size of my plot (length and width in feet) or container _____

Location of my garden _____

Direction the garden rows or containers face _____

Type of soil in my garden plot or container _____

Vegetables I plan to plant _____

Where I plan to purchase seeds or plants _____

Number of packets (or ounces of seeds) I need to buy _____

2. Share with your project helper how you made your decisions.

3. Why is it good to ask yourself many questions before deciding on something?

4. The next time you make a decision, what will you do differently?

Gardening Safely

Store it right!

When you're done using your tools, clean them and put them into storage. Keep your storage area for tools:

- Easy to get to
- Organized
- Dry

To keep metal tools from getting rusty, scrape off the dirt, and rub the metal part with a little oil once in a while. Any lubrication will do the job, even motor oil, but don't use cooking oil.

Garden tools

Keep all tools in a standing, hanging, or leaning position, both when in use and in storage. If this is not possible, lay tools with their points or sharp edges downward.

Your choice of garden tools depends on the kind of garden you have. If your garden is in the ground, the most important tools are:

- Spade or shovel
- Rake
- Hoe
- Spading fork (maybe)

If you have a container garden, all you need is a small hand shovel (trowel), or some other digging tool. An old spoon will work, too.

Talk with your adult helper about the tools you may need as your garden grows. It's a lot easier to work with tools that are the right size for you.





GROW WHAT YOU KNOW

GARDEN SAFETY TIPS

How many of these Garden Safety Tips do you follow? Check them off!

- ☐ I carry hand tools with the sharp edges pointing down.
- ☐ I walk, don't run, with a tool! I know the garden isn't going anywhere—it will be there when I get there.
- ☐ I leave rakes, hoes, hand cultivators, and shovels pointed down if I set them aside while I'm working in the garden. Or I shovel the tool into the soil, handles up. This helps avoid tripping, having someone (even me) step on the sharp tines of a rake, or getting hit in the forehead by the handle.
- ☐ I put tools away when I'm finished for the day.
- ☐ I use the right tool for the right job. Digging with a hoe instead of a shovel can lead to accidents.
- ☐ I use tools that fit my size.
- ☐ I paint the top of wire stakes white, or cover them with a small piece of white adhesive tape so they're more visible. This may save an eye or prevent a permanent scar.
- ☐ I place stakes where they won't cause someone to fall.
- ☐ I prevent foot injuries by wearing shoes that protect my toes and feet when I'm using garden tools.
- ☐ I put hoses and watering cans where they belong, not laying in the yard.

Supplies: paper, pencil, your family or a few friends

This activity lets you practice your communication skills by playing charades. It helps others learn about using garden tools safely.

1. Get your family together. Play charades to see how many garden tools your family can guess. Act out how to use each garden tool without speaking until your family guesses what garden tool you are describing. For example, make a raking motion to show smoothing out soil with a bow rake. Be sure you show the correct way to lay the tool down when you're done using it.
2. Ask a family member to act out how to safely use a garden tool.



1. Discuss with your project helper how and why not using tools safely may be a problem in your family. How many of the garden safety tips do you already follow?

2. When playing charades, why do you think people see the same thing in different ways?

3. What are other ways you practice safety in your life?

4. What did you learn about relating to others that will help you in the future?



DIG DEEPER

Conduct a safety check of your house, yard, or outside structures. Tell your family what you found. What could be done to make it safer for everyone?

Make a list of safety tips to use with the tools and equipment in your kitchen. Put them all in a notebook ready for anyone to look at.

Find out about other tools by visiting stores that sell garden supplies. What tools were new to you? What are they used for?



Seeds Up Close

What are seeds?

What are seeds, and how do they sprout? When conditions are right—air, water, and warm temperatures—a seed sprouts or germinates. This happens in steps:

1. The seed takes in water through the seed coat.
2. It enlarges.
3. A root emerges first.
4. Then the shoot appears.

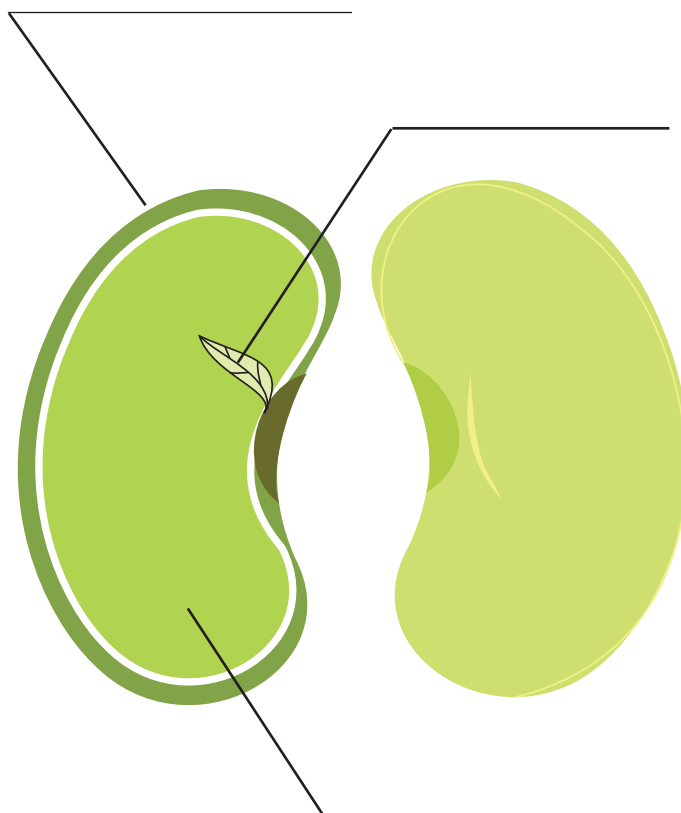
What does the have to do with gardening? After doing this experiment, you can understand why it's important to treat seeds with care if you want them to sprout.

- Seeds planted too deeply use up all the temporary food before the tiny plant can reach light.
- Seeds planted in dry soil don't have enough moisture to germinate.
- Seeds planted in soaking wet soil may not get enough air or may rot.

Part 1: Inside a seed

Supplies: 11 lima or kidney beans, 1 cup water, one glass, pencil

1. Look at a kidney or lima bean seed. Guess what is inside the seed.
2. Soak the lima beans in the water overnight (24 hours).
3. Ask an adult helper or friend to help you carefully peel the outer coat from one of the seeds. Split the coatless seed in half with a fingernail. Draw what you see.
4. Label the seed diagram with these parts of the seed: *seed coat*, *cotyledon*, *embryo*. Learn more about these seed parts by looking up the words in the glossary on pages 40-41.



Part 2: Germinating seeds

Supplies: several paper towels, small plastic bag, long sheet of paper, pencil, magnifying glass (optional), 10 seeds soaked overnight from part 1

1. What question do you have about sprouting? I wonder ...

2. Sprout a guess. I predict ...

3. Get growing.
Dampen a paper towel. Fold it once, and place all the seeds on it. Fold it again, and place it in a plastic bag for a week. Keep it in a warm place. Write down the date. Moist seeds should sprout in 7 to 10 days.
4. Record what you see.
 - Make a folding “book,” so it’s easy to write down what you see. Fold a long strip of paper so it looks like an accordion.
 - Look at the seeds every day. Every time you observe a change in your seeds, draw on one section of your folding book.
5. Harvest your findings.
After a week or so, unfold your book and look at the pictures. What happened? You probably have a storyboard about “How a Seed Sprouts.”

Learn what new words mean by matching the words in the list below with their definitions.

Seed coat	A tiny plant complete with leaf, stem, and root parts
Cotyledon	To begin to grow; sprout
Embryo	Contains temporary food until the plant can grow up to make food with its leaves
Germinate	Contains the stem and leaves
Shoot	Protects the embryo



**GROW
WHAT
YOU
KNOW**

Science is a way of looking at the world. It's like a game for understanding what's going on around us, and like all games, it has rules. Science is played by special rules called the scientific method. The scientific method has eight basic steps:

- Ask a question.
- Gather information about the question.
- Make a guess about the answer (hypothesis).
- Test your guess, usually by doing an experiment.
- Get the answers.
- Compare your answers with your guess.
- Decide what it means (conclusion).
- Tell others what you found.

DIG DEEPER

Go on a scavenger hunt in your kitchen to find other examples of seeds. How many different seeds did you find? Sort them by color, shape, size, texture (how it feels), and/or weight. Is the seed size an indicator of the plant size? Why or why not? Give examples.

Part 2 of this activity is also a way to test whether the seeds you save from one year to another can be used again. It's called a germination test. If four or five seeds out of 10 germinate, they're not in good shape, but you can still use them if you have to. If six or more of the 10 seeds germinate, your seeds are in good shape. If eight or more seeds germinate, they're excellent!

Some seeds can last for a long time before sprouting. Go online and research the Svalbard Global Seed Vault. How long will those seeds last?

Design a way to investigate if other factors besides moisture affect sprouting. Think about the things that plants need—light, water, air, warm temperatures, and food).

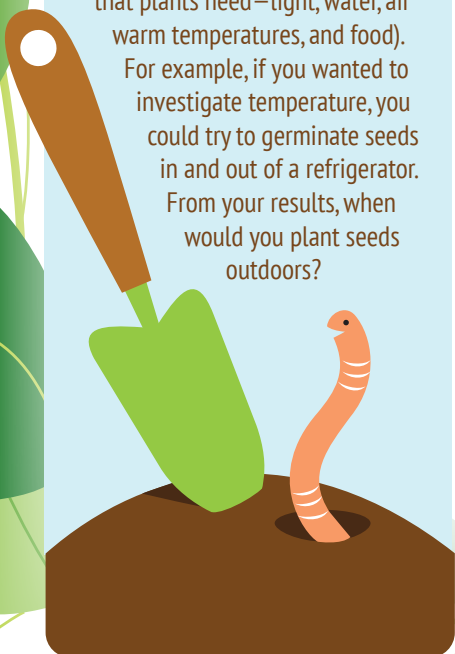
For example, if you wanted to investigate temperature, you could try to germinate seeds in and out of a refrigerator. From your results, when would you plant seeds outdoors?

1. Share with your project helper what you predicted would be inside the seed, and what really was inside the seed.

2. How did different parts of the seeds change during your week of observation?

3. Where else, besides in school, can you use your skills of observing, questioning, predicting, investigating, making conclusions, and communicating?

4. How might you use these skills in the future?



Plant It

Part 1: Preparing garden soil

Supplies: Tape measure or yardstick, shovel, string, rake, four short stakes, organic matter, hoe

1. Check the measurements in the garden plan you made in First You Plan. Use a tape measure or yardstick to lay out the plot. Mark the area of your garden with four short stakes, one at each corner. Tie string from stake to stake so you can see the boundaries of your garden.
2. If you already have a family garden plot that was used last year, you don't need to dig up your area. Just remove all grass (by shaking the soil loose), rocks, weeds, and other trash. Skip to step 4.
3. To dig up an area for your garden, ask a project helper or some friends to help you. Start at the outside edge with your back to the garden site, and dig down about 12 inches with a shovel (or at least as deep as your garden tool goes). Turn over a shovelful of earth. Continue digging across the width of your garden. Start a new row, and continue digging and turning over. Try not to step on the earth you just turned over so you don't pack it down again.
4. Use your hoe to break up the chunks of soil. You may need to do this more than once. Pull out any remaining grass, weeds, or large rocks.
5. Add some organic matter. Spread about 2 inches on top of the soil.
6. Use a rake to smooth out all the lumps and bumps. Remove the string around your garden. Think about getting a chicken-wire fence to go around the garden, especially if a lot of rabbits live nearby. Now you're ready to plant!



What is soil?

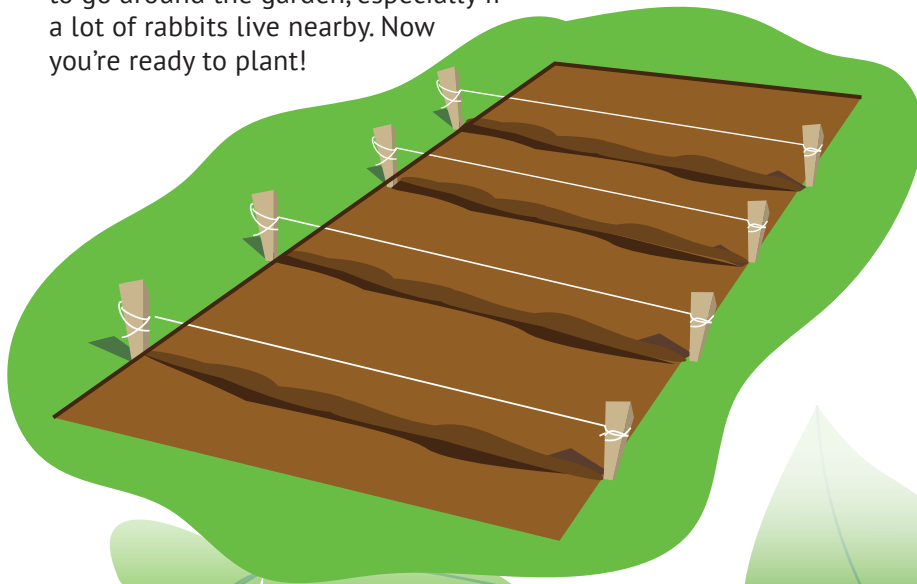
Every gardener checks out the soil in the garden before planting. What is soil? Good garden soil isn't the same thing as plain brown dirt. Dirt is something you need to wash off, especially when your mom or dad sees it on your hands. Soil is something special because it's your vegetables' home—where they live, work, eat, and drink!

Vegetables do not grow well in ground that is hard as rock. The best garden soil is soft and loose. It allows water to drain easily and lets roots feed and breathe.

A gardener usually needs to add something to soil to help make it soft and loose. That's why organic matter is added to garden soil; it's food for your soil. Organic matter keeps earthworms and other soil life working in your soil, and it helps hold moisture for your plants. Some examples of organic matter, also called compost, include:

- Old mulches, such as old grass clippings, bark chips, peat moss
- Old leaves
- Dried manure

You will learn more about compost in the next 4-H Gardening manual.





GROW WHAT YOU KNOW

THE WETNESS TEST

How can you tell when soil is dry enough to work? Squeeze a handful of soil.

- If it crumbles, the soil is ready to work.
- If it clings, the soil is still too wet. Let it dry out more before you work it. If you don't wait, the soil will stay hard and cloddy for weeks.

Part 2: Planting seeds

Supplies: *garden seeds, two short stakes, garden markers, string, hoe or trowel*

Check the dates you wrote down in your garden plan for the best time to plant your garden.

1. Before you start planting, look at your garden plan to see where you're planting each vegetable and how much distance to allow between the rows.
2. Mark the row to be planted. Place stakes at both ends of a row. Tie or wind a string around one stake and stretch the string to the other stake. Tie this end, too. Now you have a marker to help keep your rows straight.
3. Use the string as a guide to make a shallow trench, or furrow, by dragging the handle of a hoe or trowel down the row.
4. Now you're ready to plant your seeds! Check the seed packet to find out how deep to plant them. Drop the seeds along the furrow a couple of inches apart. If the seeds are too tiny to plant one by one, sprinkle them right out of the package all along the row.
5. Pat some soil gently but firmly over the seeds, but not too much. Seeds planted too deeply won't sprout. Small seeds should be barely covered. Larger seeds should be planted twice as deep as their diameter.
6. Label the rows, so you'll know what vegetable is planted in each row.
7. Water your seeds with a little water. Don't drown them—they could wash away in a flood! Wait for the water to sink (absorb) into the soil, then water again.
8. Wait for your seeds to sprout. This might take up to two weeks. In the meantime, keep the soil moist but not soaked.
9. When your seedlings have two pairs of leaves, it's time to thin them. That means pulling out any that are growing too close to each other. Or you can snip them with scissors right where the sprout meets the soil. You thin the plants to give their roots room to grow. Use the guidelines on the seed packet to see how far apart to space your plants.

Planting a container garden

If you're growing vegetables in a container, you need soil that's different from garden soil. It needs to be lighter and drain water better.

You can buy a commercial potting mix for gardening in a container, or make your own light soil by mixing equal amounts of:

- garden soil
- organic matter, like sphagnum peat moss
- a fast-draining material such as sand, vermiculite, or perlite

Make sure your container has good drainage. It should be at least 6 inches deep.

1. Make a hole in the bottom if there isn't one there already. Cover the drain hole with a rock, piece of broken clay pot, or landscape fabric so soil won't fall out or drain out. Do not completely plug the hole so water can still drain.
2. Fill the container with your light soil mix up to about an inch from the top. Now you're ready to plant your seeds!
3. Check the seed packet for how deep your seeds should be planted. Poke holes in the soil with your finger to that depth. Place the seeds in rows or clusters, depending on the size and shape of the container. You can space seeds a little closer in a container than in a ground garden, but be careful not to overcrowd them.
4. Place a seed in each hole. Lightly press some soil over the seed. See step 5 for in-ground gardens.
5. Label your garden, then continue as in steps 7, 8, and 9 for an in-ground garden. Soil dries out faster in a container than in a ground garden, so check if you need to water often. Raise the container off the ground so extra water can drain out.

DIG DEEPER

Go to a local garden center or greenhouse, and find out more about other types of organic material for garden soil.

Experiment by planting seeds at different depths in the ground or in a container. What happened? Why?



1. Share with your project helper how you prepared your garden soil and what vegetables you planted.

2. Why is it important to know how soil must be prepared before planting a garden?

3. For seeds to grow, they must absorb water. For you to learn new things, you must absorb knowledge. How do you keep learning new things every day?

4. What are some new things you want to learn about in the future?

