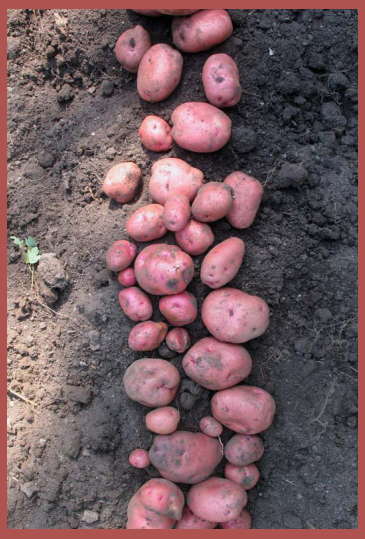
THE GARDEN STARTER

FOR NEW GARDENERS **OR** GARDENERS WHO ARE STARTING OVER

Grow Well MISSOURI



WELCOME TO GROW WELL MISSOURI'S GARDENING GUIDE - THE GARDEN STARTER.

The goal of this guide is to help you make the most of your garden – from garden to dinner table.

There are many ways to garden. Please feel free to take what you like from this guide and leave the rest. Gardening is an activity best learned by doing. Trial and error is a great teacher. Don't be afraid to give it a try and see what happens.

Gardening is also an activity that can be learned from others. Consider the people in your life. Do you know any gardeners? It could be a family member, friend, neighbor, or local farmer. Sit down with them over coffee or tea to hear their stories and learn from their experience.

TABLE OF CONTENTS

FOUNDATIONS OF GARDENING

Let's start with the basics – what you need to know for gardening success.

Soil - Focusing on the soil is the cornerstone of a successful garden. Like humans, plants have immune systems to fight off insects and disease. By building good soil, we can grow strong plants that have the ability to thrive. Follow these suggestions for great soil:

Only work the soil when it is NOT TOO WET! Test the soil for wetness by picking up some soil and making a soft fist. If the soil breaks apart when you poke at it, it is ready to be worked. If it stays in a clump, the soil is too wet. Give it some time to dry out.

Treat the soil with respect. Avoid too much walking in planting areas. This can compact the soil and make it hard for roots to grow. Tilling can also be hard on soil. Digging, turning, or cultivating by hand may be all that is needed to loosen the soil for planting. See To Till or Not To Till on page four.

Add compost or aged manure on a regular basis. About once a year or anytime you do some planting, spread a 2-3 inch layer across the planting area and mix it in. See page five to learn more about composting.

Fertilizer can be used in the garden, but keep in mind that chemical fertilizer produces short term results without leading to long term improvement of the soil. Consider using a slow release natural or organic fertilizer that also provides micronutrients. Look for N-P-K (Nitrogen, Phosphorous, and Potassium) numbers that are eight or under. A number over eight normally indicates the presence of a chemical fertilizer or ingredient.

Sun - Most vegetables need 6-8 hours of direct sunlight each day to be productive. Direct sunlight means that the sun is not blocked by the shade of a tree, house, or shed. Anything that produces a fruit such as peppers, tomatoes, squash, or melons will prefer all-day sun. Leafy crops such as lettuce, spinach, cabbage, and other greens can get by with a little less than 6-8 hours.

Water - With too much water, plants can't breathe. With too little water, plants dry out. Most vegetable gardens need about one inch of rain per week during the summer. It is best to make sure vegetables have a consistent supply of water throughout the year, as opposed to periods of wet and dry.

Spacing - Make sure plants are not too crowded so that air can circulate around them. This will help cut down on fungal diseases and improve yield. Try to use standard plant spacing guidelines (see our Planting Calendar on pages 8-9). Growing vining plants like cucumbers and pole beans on a fence will help save space.

Location - Consider these points when deciding where to plant:

Avoid low spots. Vegetable plants don't do well if they have to sit in standing water. Choose a site that is a little higher if you are able.

Stay within range of a water spigot.

Protect your spot. All manner of wildlife may want to be a part of your garden. Low fencing such as chicken wire is often enough to keep out rabbits. If deer are an issue, you may need to consider a tall fence (8 ft.) or other methods to keep them away.

Timing - Don't try to be first. The early bird gets the worm but may miss out on tasty veggies! Swings in spring temperatures can make it feel warm enough to start planting. However, it is best to stick to a trusted planting calendar (see our Planting Calendar on pages 8-9) for best results. The problem with planting too early is that the soil temperature (compared to the air temperature) may be too low to encourage seeds to sprout quickly. Cold soil also prevents transplants from taking hold and growing new roots.

Weeding - Weed early and often. Fewer things in gardening are worse than planting a garden, leaving for two weeks, and returning to find a carpet of weeds. Consider gardening a daily activity. Use a good sharp hoe to make weeding easier. Mulching heavily in the pathways with straw, hay, or grass clippings will cut down on the amount of time you spend weeding.

Garden smarter - Over time, you will pick up ideas that make gardening easier. That is part of the fun of gardening! For example, you might find that using raised beds can help you be more productive within a defined area. Be creative and take notes from others.

TO TILL OR NOT TO TILL?

Some gardeners are fans of a technique called "no till gardening." The basic idea includes slathering your garden with thick layers of different organic materials and not doing any digging or turning of the soil, ever. Check out examples of no-till gardening on the internet.

There are some advantages to not tilling. In addition to the time and cost of keeping a tiller running, repeated tilling creates a hardpan, a layer just under the tilled portion of the soil that becomes hard like a clay pot. Hardpan prevents roots from growing deeply in the soil, thereby reducing the amount of nutrients and water available to plants. Especially when starting out, gardening by hand will help you keep the size of your garden manageable and hopefully make gardening a more peaceful and therapeutic activity.

START A COMPOST PILE

The beauty of composting is that it makes use of FREE materials to create PRICELESS benefits for your garden.

Compost bins can be made out of anything. Consider old pallets, cement blocks, fencing, or other sturdy materials to create a three-sided bin that is approximately 5 ft. high by 5 ft. wide by 5 ft. tall. One bin will do. Two bins are better. Three bins are best.

Compost materials (what you put in your bin to make compost) are all around you. Examples include grass clippings, kitchen scraps, brown leaves in the fall, weeds, and old dead plants from the garden.

There are many ways to do composting right and just a couple of ways to do composting wrong. Follow the Basic Composting tips below:

Cover food scraps with leaves to keep critters away. Bottom right: finished compost.

BASIC COMPOSTING

Keep the ratios of brown vs. green materials in mind. Brown materials are anything dry and brown (brown leaves in the fall, old hay, corn stalks, straw). Green materials tend to be green and fresh (vegetable scraps from the kitchen, live plants, green grass clippings). Without getting too complicated, you generally want to include more brown materials than green materials. Stockpile brown materials if you are able.

Whenever you add green materials (especially food scraps), cover them with a big bunch of brown materials. This helps keep critters away.

Do not put pet waste in your compost bin. Other items to avoid include meat, cheese, and oils.

Compost takes time. To speed up the process, turn (mix up) the pile every few months.

If you are not in a hurry, let it sit. This is called the "slow method" and requires two to three bins. The idea goes like this: In year one, add materials to bin one. In year two, add materials to bin two. In year three, add materials to bin three and harvest compost from bin one. Keep the cycle going.

BUILDING A GARDEN

Gardens are not built in a day. The best advice is to start small and expand the size of your garden over time. By starting small, you'll learn how much time and effort are required to take care of your garden. If you like how things are going, add beds, increase the size of your garden, or add more containers over the course of the growing season. Summer and fall are great times to build or expand your garden since things are on the drier side.

If the idea of getting started seems physically challenging, ask friends, family, and neighbors for help. Gardeners tend to be a generous group and are often willing to share their time helping fellow gardeners.

Depending on where you live or how much work you want to put into building a garden, here are three ways you can get started.

CREATE AN IN-GROUND GARDEN

An in-ground garden is simply that…a garden that is directly in the ground. It can be level with the ground or slightly raised. Start by marking off the edges of your garden. Remove grass or whatever else is growing in the space. Here are three ways to make that job easier:

Shovel method -Dig down 6-8 inches and turn over clumps of soil. Pull out as many plants as you can by hand. Break up the clumps with the shovel as you go. Do this for one section or strip of garden at a time. Work backwards to avoid standing on areas you've already dug.

Stiff-tined garden fork

Stiff-tined garden fork method - Stick the fork 6-8 inches in the ground and rock it back and forth, lifting and loosening the soil, but not turning it over. Pull out as many plants as you can by hand. Do this for one section or strip of garden at a time. Work backwards.

Another way to clear your new garden area of weeds and grass involves covering it with card board or black plastic. Hold the materials down with bricks, logs, or anything heavy. Cover the fall before and remove it when you are ready to plant. Most of the weeds will die over the winter.

Whether a shovel or stiff-tined fork is used, once the garden is clear of grass and other plants, do your best to get a hold of some compost or well-aged manure and work that into the soil. Spread a 2-3 inch layer over the garden and work it in with a shovel or garden fork.

No-dig method - Instead of digging, smother the garden area with organic materials like grass clippings, straw, old hay or compost. Make sure the total depth of materials is about 8-12 inches. Use a combination of materials or whatever you have on hand. Layer it and let it sit. When spring comes, you can plant directly into the materials, making sure that your plants or seeds have some contact with the soil beneath. Or, you can rake up the materials, compost them, or reuse them as mulch.

YEAR 2 AND BEYOND

If you are in your second year of gardening or beyond, **congratulations**! Your work will be a little easier this year. To get started, rake leaves or other debris to the side to give the soil a chance to dry out. Once it has dried sufficiently, loosen up the soil and remove any weeds. See Building a Garden (page 6) for ideas on loosening the soil. Invest in the soil by working in 2-3 inches of compost. Try to prepare a couple of sections in the fall to get a jump on next year's season. Simply work up an area and cover it in a layer of mulch. Then, in the spring, pull off the mulch, do some light cultivation, and you're ready to go. At a minimum, before winter sets in, remove dead plants and weeds from the garden.

CREATE A RAISED BED GARDEN

Raised bed gardens improve drainage and can be easier for people who have trouble bending down. They usually have some type of framing around them. They can be made with wood, concrete blocks, big stones, garage door panels, and many other objects. They can range in height from six inches on up.

Start by making the frame. It can be any length, but it is best to make it only three to four feet wide. Why? Because you want to be able to reach the center of the bed from either side. Make sure the corners of the frame are securely fastened with big screws or lag bolts.

Good topsoil will need to be found or purchased to fill the bed. Better yet, use a 50/50 mix of good topsoil and compost.

Before filling the bed, you may want to lay down cardboard to help smother the weeds and grass. Simply put the soil on top of the cardboard when you are ready.

CREATE A GARDEN WITH CONTAINERS

Containers are ideal for many settings including rentals or if bending is a challenge.

Image source: Mike Lieberman.
Image link: https://www.flickr.com/photos/canarsiebk/3808146974/
License: https://creativecommons.org/licenses/by/2.0/legalcode
Photo has been cropped.

Containers should be at least 4-5 gallons. For vegetables, the bigger the better. Smaller containers can be used for herbs.

Use a drill with a half inch bit to make holes in the bottom of your containers to let the water drain out.

Be creative. Look for found objects to grow in. As long as they didn't hold harsh chemicals in the past, you should be okay.

The soil you use is important. Straight top soil won't work because it is too heavy and won't let water drain out of the container. Use a store bought "potting soil" or "potting mix." If you can find what's called a "compressed bale" you'll get more for your money. There are many recipes for making your own on the internet. Search for "homemade potting soil."

If your soil doesn't have any added fertilizer, add some slow release natural or organic fertilizer to the mix when you start and every 3-4 weeks during the growing season.

When replanting your garden the next year, try to add some fresh compost and a bit of slow release fertilizer to your soil mix. Dump all of the old soil onto a tarp, add new compost and fertilizer, mix it up, then refill your containers. The amount of new compost should equal about ¼ to ⅓ the total volume of soil.

Grow Well MISSOURI

Planting Calendar

This calendar shows the average recommended planting times for Central Missouri. Gardeners in Northern Missouri and the Ozarks may want to plant a little later, while those in Southeast Missouri may be able to plant a little earlier. See http://bit.ly/gwmoresources for a Planting Calendar for your area.

Missouri Planting Regions

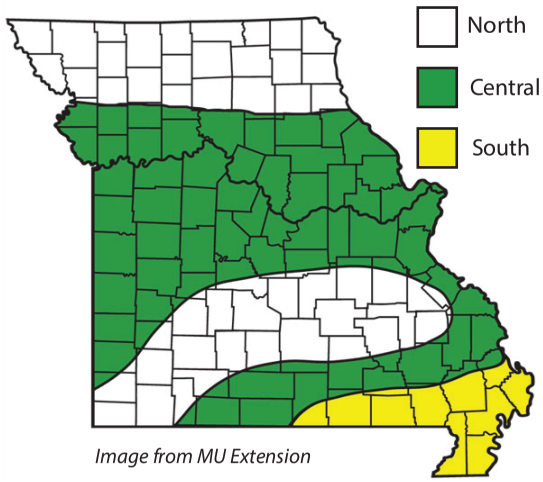


Image from MU Extension

Direct Seed - growing plants from seed sown right in the garden.
Transplant - a young plant grown to about 6 weeks old in a greenhouse or other heated, protected environment.

Planting Dates	How to Plant	Spacing (in.) Within Row (Between Rows)	Mar 15-31	Apr 1-14	Apr 15-30	May 1-14	May 15-31	Jun 1-14	Jun 15-30	Jul 1-14	Jul 15-31	Aug 1-14	Aug 15-31
Beets	Direct Seed	3 *(18)*	■	■							■		
Black-Eyed Peas (Cowpeas)	Direct Seed	3 *(24)*				■	■	■	■				
Broccoli	Transplant	24 *(30)*	■	■							■		
Brussels Sprouts	Transplant	24 *(30)*	■	■							■		
Cabbage	Transplant	24 *(24)*		■	■						■		
Cantaloupe	Direct Seed	60 *(48)*					■	■					
Carrot	Direct Seed	3 *(18)*	■	■							■		
Cauliflower	Transplant	24 *(30)*		■	■						■		
Collard Greens	Direct Seed	12 *(24)*	■	■							■		
Corn, Sweet	Direct Seed	10 *(36)*				■	■	■	■	■			
Cucumber	Direct Seed	48 *(36)*					■	■					

Eggplant	Transplant	24 *(24)*												
Green beans	Direct Seed	3 *(24)*												
Kale	Direct Seed	12 *(24)*												
Kohlrabi	Direct Seed	4 *(24)*												
Lettuce	Direct Seed	6 *(18)*												
Mustard	Direct Seed	3 *(18)*												
Okra	Direct Seed	12 *(30)*												
Onions	Bulbs/sets	3 *(18)*												
Peas, snap & snow	Direct Seed	3 *(24)*												
Peppers	Transplant	18 *(30)*												
Potatoes	Potatoes	12 *(30)*												
Radishes	Direct Seed	3 *(18)*												
Rhubarb	Transplant	36 *(48)*												
Spinach	Direct Seed	3 *(18)*												
Summer/Winter Squash & Zucchini	Direct Seed	48 *(48)* 60 *(48)*												
Sweet Potatoes	Transplant	12 *(48)*												
Swiss Chard	Direct Seed	3 *(18)*												
Tomatoes	Transplant	36 *(48)*												
Turnips	Direct Seed	3 *(18)*												
Watermelon	Direct Seed	96 *(96)*												

Adapted from MU Extension Vegetable Planting Calendar at http://extension.missouri.edu/publications/DisplayPub.aspx?P=G6201.

PLANTING A GARDEN

PLANNING & PREPARING

People go about this in different ways. The ultimate goal is to get some idea of what you want to plant and where you want to plant it. If you already have seeds, spread them out on the kitchen table and start making some choices. If you still need to pick up seeds, use seed catalogues or the internet and start making a list. Consider what you like to eat and how much space you have. Sort your options between cool and warm season vegetables. To finish, make a map.

PLANTING WITH TRANSPLANTS

You've worked hard for it by doing the homework, building the garden, and planning it. Now it is time to plant.

For planting transplants, gently remove each plant from its plastic container. Place the plants where you intend to plant them. Use recommended spacing suggestions from the Planting Calendar (pages 8-9).

1. Go back to each plant and dig a small hole. Gently drop in the plant and fill the hole with soil.

2. When planting, mound up a little soil in a ring around the plant. This helps the new plant collect water.

3. Unlike seeds, transplants do need to be watered right after planting. Give each individual plant a good drink.

STOP & SMELL THE SOIL

At this point, it is important to remind yourself not to be in a hurry. Really, through every step of gardening, take your time and enjoy the moment. There is a tendency to feel like you have to do everything in one day. Gardening can be much more enjoyable if you spread out the different tasks over days or weeks.

PLANTING WITH SEEDS

1. Once the soil is loose, use a hoe or other tool to break the top couple of inches of soil into finer bits. Then, use the long handle of a garden tool to make a furrow (little ditch) by using your hands or stepping on it to push the handle firmly into the ground. Consult the Planting Calendar on pages 8-9 for "between-row spacing".

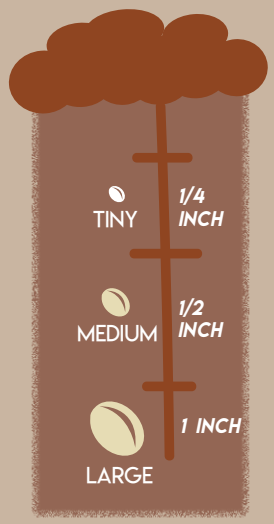
2. Go back to each furrow, pour some seeds in the cup of one hand, and use your other hand to pinch a small amount of seed between your first finger and thumb.

3. Working close to the soil, gently roll your first finger and thumb while moving your hand along with the furrow, releasing small amounts of seed as you go.

4. Don't plant too thick. Consult the seed packet or Planting Calendar for the "within row spacing" suggestions. Once the seeds are placed in the furrow, go back and cover the seeds with a little bit of soil, working with one vegetable at a time, then gently press down the soil.

COVERING SEEDS WITH SOIL

Cover the seeds with soil according to their size.



TO WATER OR NOT TO WATER
WHILE WAITING FOR SEEDS TO SPROUT?

Consider not watering your seeds right after planting. A couple of reasons why:

1. In the spring and early summer, there should be enough moisture in the soil to sprout the seeds without adding water, especially if the directions in #1 (above) are followed for making your furrow.
2. Watering cools the soil, slows the germination process, and can invite fungus that can kill seedlings before or after they emerge from the soil.

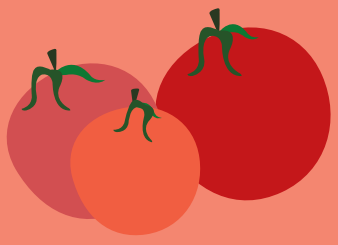
TAKING CARE OF A GARDEN

You've come along way. Now is the time to tend to the investments you made. The most important thing you can do is make gardening a daily habit. This doesn't mean you have to actually work in the garden every day. Rather, it means that you do a daily check on the garden to see what might need tending, whether it is replanting, weeding, watering, mulching, or harvesting. Whether you can get to it that day or on the weekend, you'll know what needs to be done. Below are some tips to help you along.

Weed early and often. We've said it before, and we are saying it again here. This helps you keep on top of the weeds and manage them when they are small, rather than full grown plants. Use a sharp hoe or other weeding tool to make the job easier.

Water as needed. Before it gets too hot, figure out how to keep your garden watered during the summer. Watering in the morning is best for conserving water and reducing fungal diseases. Soaker hoses, available at most hardware stores, can help you conserve water. If using a sprinkler, be sure to only water where you need to water. Use a rain gauge in the garden to see how much natural rainfall you receive and to measure the amount of water you are giving the garden if using a sprinkler.

Use mulch. Grass clippings, straw, or hay can be spread around plants and within garden rows to both hold in moisture and keep weeds down. These materials will eventually break down and help enrich the soil.



TOMATOES

For many, fresh, home grown tomatoes are the reason for gardening. Protect and increase your harvest by supporting your tomatoes and keeping them off the ground. This helps cut down on fungus by increasing air flow around the tomato plants. The fruits will also be less prone to rotting and being eaten by wildlife.

A sturdy wooden stake can be driven into the ground at the base of the plant when it is young.

As the tomato grows, tie the plant loosely to the stake, leaving some slack between the tomato and the stake. Do this until you've run out of room on the stake.

You can also buy big, sturdy tomato cages. The small, thin cages work best for peppers and eggplant. You can make your own from wire fencing or concrete reinforcing wire.

Cattle panels can be put up like a fence. You'll need to weave the plants into the panels or tie them to the panels as they grow.

PESTS & DISEASE

Pests and disease in the garden are a fact of life. The first step is to observe and identify what is really happening. Too often, at the first sign of trouble, people go for harsh chemicals that can harm beneficial insects like bees. For every insect pest, there is another insect or animal that likes to eat it. One of the problems with using harsh chemicals is that they tend to kill everything in sight, good or bad. Consider these options:

Soil health, proper spacing, and garden maintenance may be your best prevention. By giving plants what they need to grow, they will have natural defenses to many pests and disease. In addition, weeds in the garden can be home to certain pests. Diseased plants can spread disease to other plants.

Healthy plants can withstand some damage. Vegetables can still be productive even when they are exposed to minor to moderate insect damage.

Look for disease-resistant varieties. Some vegetables, either naturally or through plant breeding, can ward off certain diseases on their own.

Try row cover. This is a light, woven fabric that can be placed over plants to form a screen to keep insects from ever landing on your plants.

Handpicking is an option. For large insects, it may be possible to pick them off by hand, especially if you catch them early. Simply pick and put them in a jar of soapy water. Children can be good helpers with this activity.

If you must use a pest control product, consider organic options that have been reviewed by the Organic Materials Review Institute (check their website or look for OMRI listed on the label). Bacillus thuringiensis (under names such as Bt, Dipel, or Thuricide) is effective on caterpillars. Insecticidal soaps can be effective on some pests. Others pesticides that include pyrethrins, rotenone, pure neem, or spinosad can also work well. Always use pesticides according to the instructions on the label.

Image source: *John Flannery.*
Image link: *https://www.flickr.com/photos/drphotomoto/3866724753*
License: *https://creativecommons.org/licenses/by-sa/2.0/legalcode*
Photo has been cropped.

DETERRING WILDLIFE

From voles to deer, wildlife can be a problem. There are many ideas on the internet for controlling wildlife. Perhaps the most effective but most expensive solution for most wildlife is fencing. For deer, the fence needs to be at least 8 feet tall. Shorter fencing ideas are out there and some make use of electric fencing. For rabbits and groundhogs (woodchucks), a three-foot-tall chicken wire border with a portion buried in the ground may be effective. A full list of ideas can be found at the National Pesticide Information Center, Problem Wildlife in Garden and Yard webpage at http://npic.orst.edu/pest/wildyard.html.

HARVESTING

Now is the time to reap the rewards from all of your efforts. Keeping up with harvesting on a daily basis will help you make the most of your garden and reduce waste. Proper storage will help keep vegetables fresh longer. Keep these tips in mind:

When is it ready? The right time to pick varies from vegetable to vegetable, so check your seed packet for information or use the MU Extension Vegetable Harvest and Storage publication at http://extension.missouri.edu/p/g6226.

Harvest produce in the coolest part of the day. If possible, pick produce in the morning. Picking when it is dry will help reduce spoilage.

Handle produce gently. Bruises, nicks, and cuts all cause the produce to spoil faster. When picking, place items gently into a bucket or tote. Don't throw or drop produce. Use scissors or shears to remove vegetables rather than ripping or tearing plants.

Wash and disinfect harvest bins, buckets, and anything that comes into contact with produce frequently. Dirt and grime can transfer bacteria from produce to people. Use water (hot water if available) and soap to wash bins. Then, disinfect them with dilute household bleach (50-200 ppm or 1 teaspoon to 1 tablespoons per gallon of water). Use a good brush to keep containers and surfaces clean. Let air dry.

A few supplies will make harvesting and storing vegetables easier. Consider plastic tubs, totes, or bins for harvesting, along with a good pair of shears for cutting produce from plants. A supply of clean plastic bags is nice to have on hand for storing produce in the refrigerator. A large pot or tub and a colander or salad spinner are great for washing and draining produce in the kitchen.

RESOURCES FOR ORGANIC GARDENING

FOR HELP IDENTIFYING INSECTS, use this resource from Purdue University: http://bit.ly/idinsects

FOR TIPS ON CONTROLLING INSECTS without chemicals, use this Mother Earth News article: http://bit.ly/controlinsects

WASHING PRODUCE

When should produce be washed? Always wash produce before you eat it. However, you should AVOID washing tomatoes, cabbage, okra, summer squash, berries, and peas until you are ready to eat them. The extra moisture can make them rot.

STORING

Store most produce in the refrigerator. Most vegetables will keep best when stored in plastic bags. However, there is always an exception to the rule. The following are vegetables that don't need to be stored in the refrigerator: **Tomatoes** can be stored on the counter. They will continue to ripen at room temperature. They can be picked before they are fully ripe. **Cantaloupe and watermelon** can be stored at room temperature until cut. **Potatoes, sweet potatoes, and winter squash** should go into a dark, cool place like a basement.

COOKING

Check online or at your local public library for countless recipe options. We also recommend MU Extension's Seasonal and Simple (http://seasonalandsimple.info/) and Leanne Brown's Good and Cheap (https://www.leannebrown.com/cookbooks/).

WE HOPE THE GARDEN STARTER HAS INSPIRED YOU!

It has been fun to write, to share what we know, in the hopes of helping people get started in gardening or grow bigger and better gardens. If you have comments or questions, feel free to contact Bill McKelvey, University of Missouri, at McKelveyWA@missouri.edu.

FOR MORE GARDENING INFORMATION

Go to the Grow Well Missouri Resource page at http://bit.ly/gwmoresources or check with your local Extension office.

Written and developed by Bill McKelvey, project coordinator, Interdisciplinary Center for Food Security, Department of Rural Sociology, Division of Applied Social Sciences, University of Missouri. Contact: McKelveyWA@missouri.edu. Design and editing by the Health Communication Research Center at the Missouri School of Journalism, hcrc@missouri.edu. Additional assistance provided by Darren Chapman.

Funding for this publication provided in part by the Missouri Foundation for Health, a philanthropic organization whose mission is to improve the health and well-being of individuals and communities most in need.

Interdisciplinary Center
for Food Security
http://foodsecurity.missouri.edu/