SURVIVAL

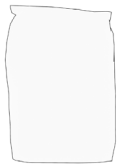
ILLUSTRATED

Jessica W.

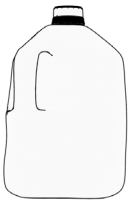
How to Store Food

This chapter explains the basics of food storage. You'll learn how to calculate your food needs, create storage space, basic food preservation, and what foods store best. Later chapters will cover advance food preservation like canning. For now, you're just focused on the essentials.

A Conversion Cheat Sheet



1 lb = 16 oz, .45 kg, .47 liters



1 gal = 4 qts, 128 oz, .45 kg, 3.8 liters

1 qt = 4 cups, 32 oz, .9 kg, .94 liters

1 pt = 2 cups, 16 oz, .45 kg, .47 liters

1 cup = 8 oz, .24 liters

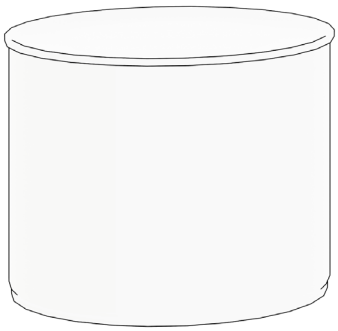
1 tbsp = 3tsp, 15 ml

1 tsp = 5 ml, 3-5 g

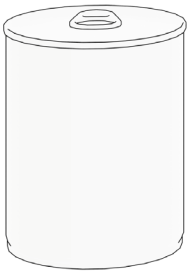
Abbreviations

Pound (lbs), gallon (gal), quart (qt), pint (pt), ounce (oz), table spoon (tbsp), tsp (teaspoon),

A Few More Conversions



1 #10 Can = 104 oz, 13 cups, 3 liters



1 #401 can = 28 oz, 3.5 cups, .83 liters

1 mason jar = 3 cups, 24 oz, .7 liters

1 #2 can = 20 oz, 2.5 cups, .59 liters

1 #303 can = 17 oz, 2 cups, .5 liters

1 #300 can = 15 oz, 1.9 cups, .44 liters

#300 and #301 cans are commonly used for vegetables.

How Much Do You Need?

You can find plenty of food calculators online. They give similar answers. Below, you'll see how much food one adult needs for one month. It's about the same for children over seven.

One Adult/One Month

Grains (33 lbs/15kg)

Wheat
Flour
Corn meal
Rice
Oats
Pasta

Meats (2 lbs/.9kg)

Jerky
Canned tuna/salmon

Legumes (6 lbs/2.72 kg)

Dry Beans
Split Peas
Lentils
Lima Beans
Soy Beans
Dry Soup

Milk (8 lbs/3.6kg)

Condensed Milk
Evaporated Milk

Fruits & Veggies (26 lbs/11.8 kg)

Dry Bananas
Dry Blueberries
Raisins
Dry Broccoli
Spinach/Kale Flakes
Dry Carrots
Dry Strawberries
Dry Corn

Fats & Oils

Peanut Butter (1lb/.45 kg)
Salad Dressing (1 qt/.94 liters)
Vegetable Oil (1 gallon/3.8 liters)
Shortening (1 qt/.94 liters)
Mayonaise (1 qt/.94 liters)
Olive Oil (1 qt/.94 liters)

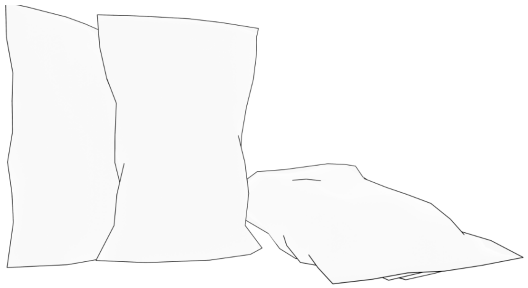
Cooking Essentials

Baking Powder (1 lb/.45 kg)
Salt (1 lb/.45 kg)
Vinegar (1 gallon/3.8 liters)
Yeast (1 lb/.45 kg)

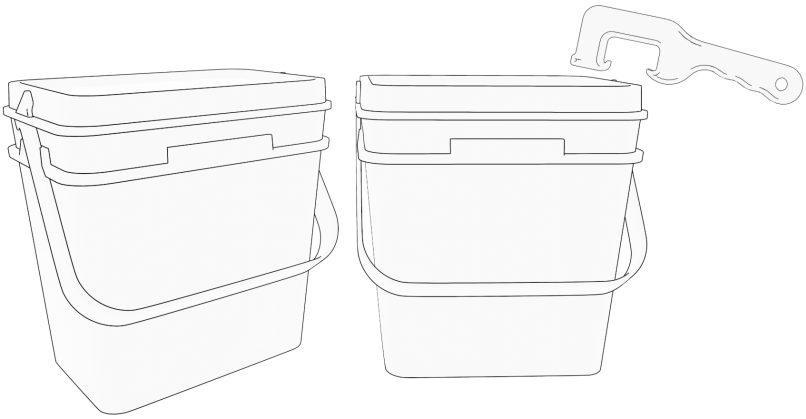
Sugars (5 lbs/2.27 kg)

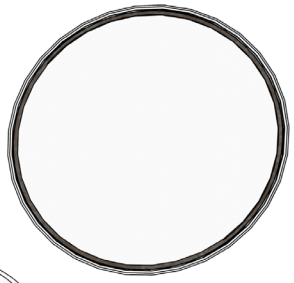
White Sugar
Honey
Syrup
Brown Sugar
Jelly/Jam

How Do You Store It?

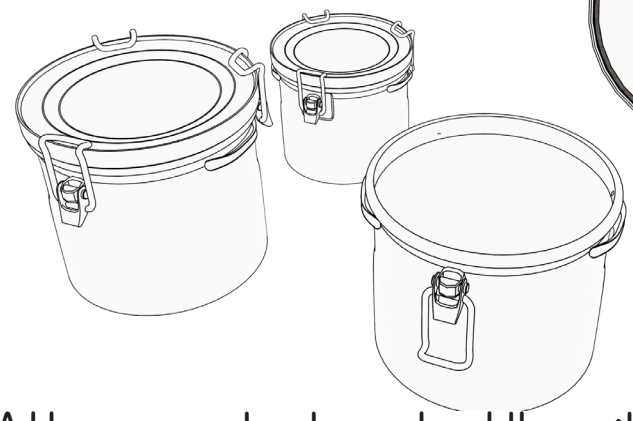


You can store dry foods like wheat berries, oats, rice, beans, lentils, and pasta for 10+ years in mylar bags. Keep a bucket opener near them. (They can be hard to open.)

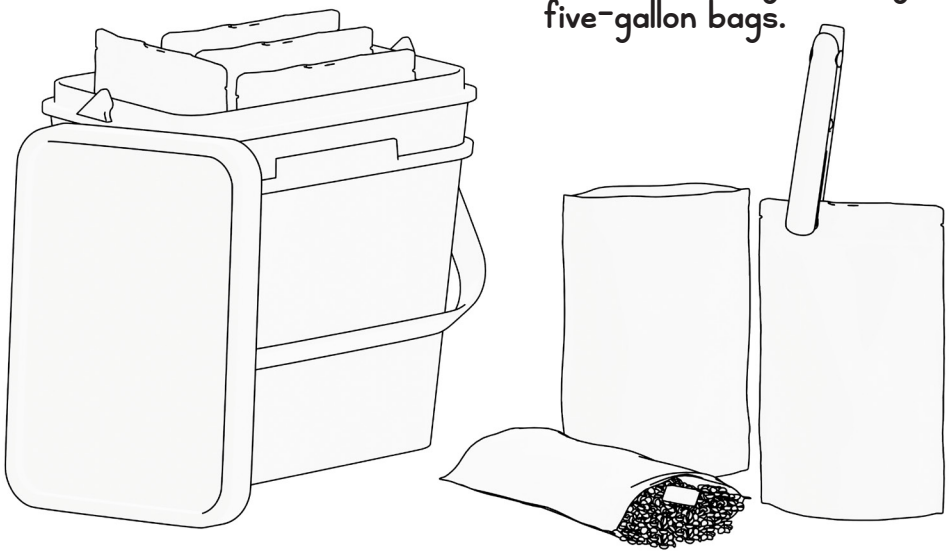




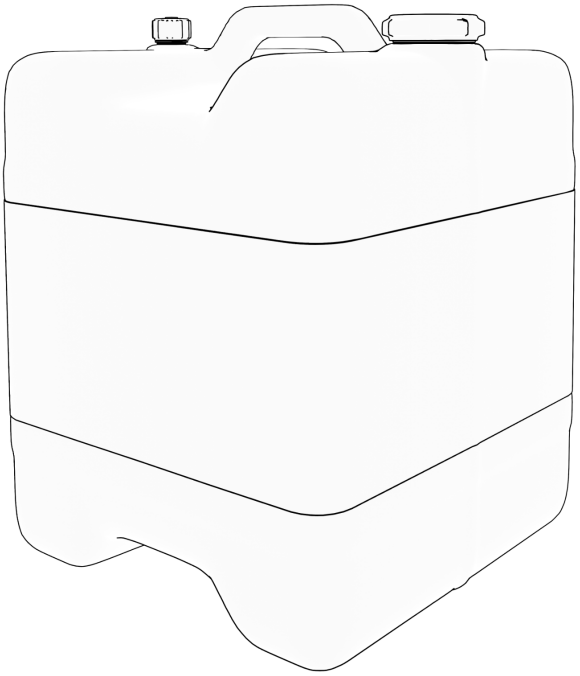
Large containers made with foodgrade steel (304 or 306) work well for rotating bulk foods. They have silicone seals and latches to keep out air. Keep scoops inside and transfer food to smaller containers as needed. When you open up a food bucket, pour it into one of these if you don't want to keep resealing the containers over and over.



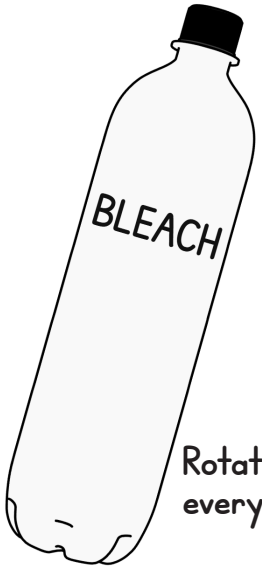
Add an oxygen absorber and seal them with a flat iron. Put the bags in foodgrade 4-gallon buckets. Use 500 cc size absorbers for gallon bags and 2 1000cc size absorbers for five-gallon bags.



How Do You Store Water?



One person needs at least 30 gallons of water for a month of hydration and basic sanitation. Aquatainers are great, foodsafe containers for storing water. A standard Aquatainer holds 7 gallons. Some models are stackable, but they hold slightly less. Wash them out first. When you're washing, use the same formula as you do when storing water. Just a little bleach in water will sanitize the container if you shake and roll it.



You can maximize your water's life by adding 1/2 tsp of regular, unscented household bleach (8.25%) to 8 gallons and mixing thoroughly. For an Aquatainer, use just shy of 1/2 tsp. For 6% bleach, use 2/3 tsp.

Rotate through your stored water every 6-12 months.

Where Do You Put It All?

You can convert a standard closet into a food storage pantry. This closet measures 2X6 ft and 90 inches in height. (Everything is to scale.) Store heavier items like food buckets and water containers on the bottom. Make sure you screw brackets to studs to hold the weight.

30 #10 Cans
(96 oz/2.8 liters)

14 100 oz (2.95 liters)
Latchlid Jars

20 17 oz (.5 liters)
Latchlid Jars

22 32 oz (.94 liters)
Latchlid Jars

30 Mason Jars
(24 oz, .7 liters)

64 14 oz (.41 liters)
Cans

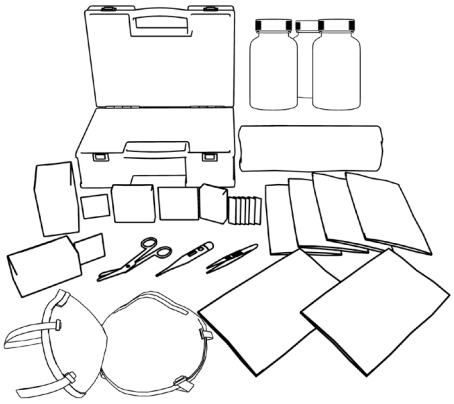
16 4-gallon
food buckets

8 7-gallon
Aquatainers

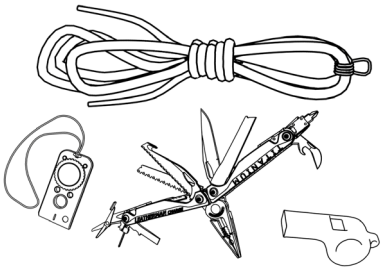
The average person needs 180-200 lbs (81.6 kg) of food per month. One standard closet could hold about 700-750 pounds of food and 56 gallons of minimum drinking water, sustaining 3-4 adults for one month. You can adjust the ratios of grains, legumes, fruits, vegetables, and other essentials for your needs.

How to Bug Out (or In)

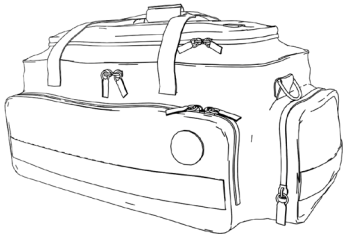
This chapter covers the basics of bugout packing. Bugout bags can double as bug-in bags, consolidating emergency items into one load. Even if you're not going anywhere, it's good to have a bag.



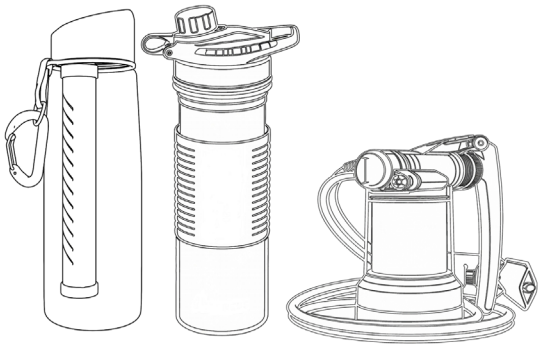
Anyone can build a bugout bag. You don't have to pack for weeks, and you don't have to buy pre-made kits. It's better to make your own, for your needs, something you know you can carry. According to conventional advice, you should plan for specific emergencies. However, we live in a world where multiple threats can hit anywhere, even at the same time. So, pack a multipurpose bag.



Sometimes, you'll bug out. Other times, you'll shelter in place. It depends on the nature of the danger and how much heads up you get. Either way, a good emergency bag will have the essentials you need to stay alive for a few days, or a few weeks.

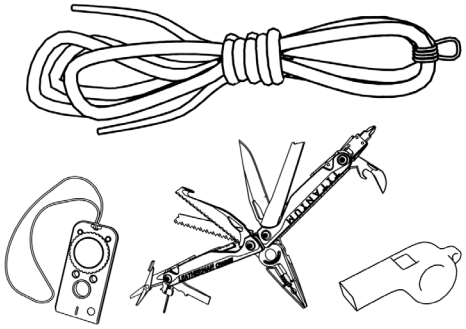


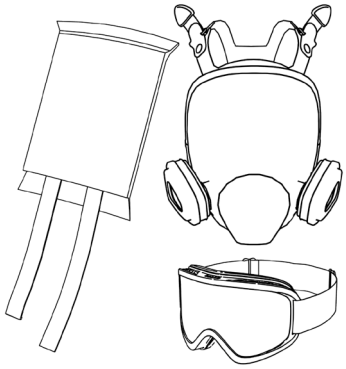
What Goes in a Bag?



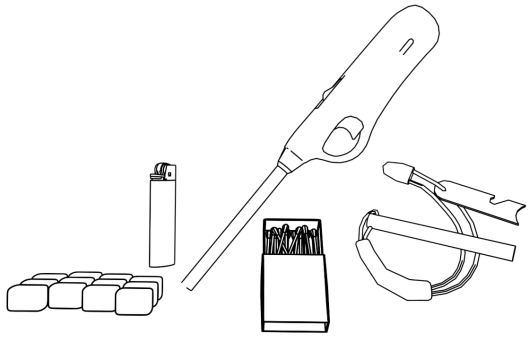
Water: 2L of water, water purifier

Basic tools: paracord, compass, multitool, camping cookware, folding stove, whistle



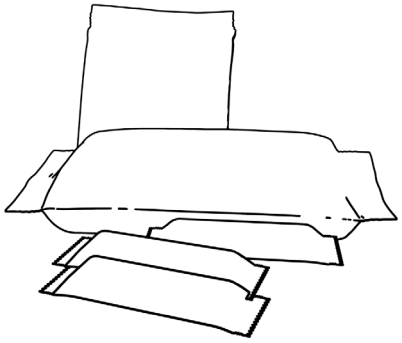


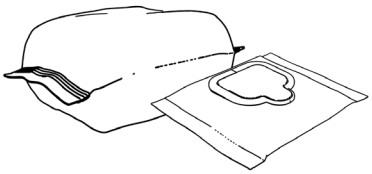
Hazard gear: fire blanket, respirators, goggles



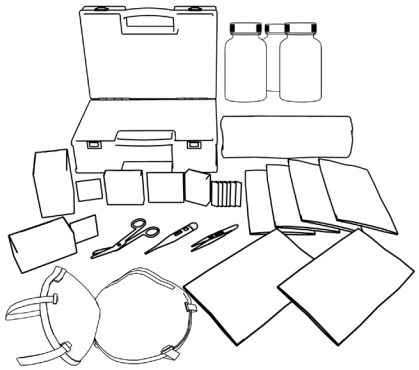
Fire: Lighters, matches, ferro rods, fuel tablets

Emergency Food: freeze-dried meals & energy bars



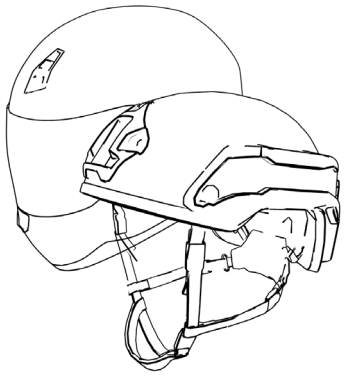


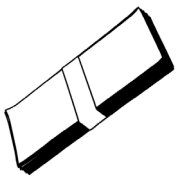
Kids: diapers, wet wipes, powdered baby formula, baby sling/harness carrier, toy



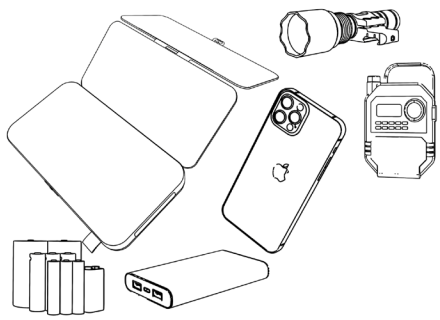
Medical: N95 masks, clotting agents, bandaids, gauze, alcohol pads, painkillers, extra meds, thermometer

Protection: helmet, pepper spray, tire thumper, other weapons.

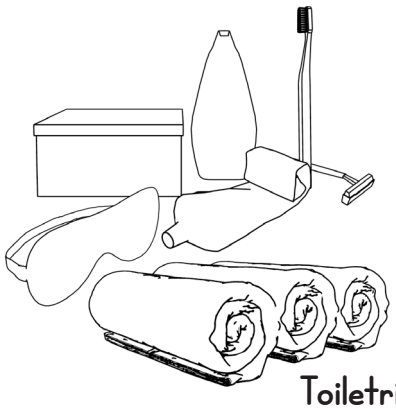




Transactions: Cash, personal identification, security key, flash drive, external hard drive

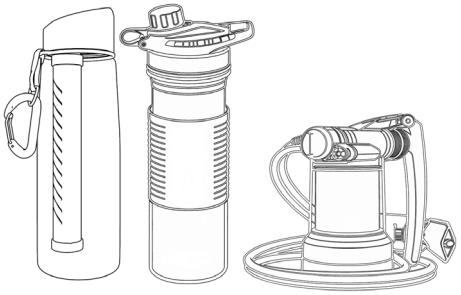


Electronics: portable solar charger, batteries, power bank, extra phone, weather radio, flashlight

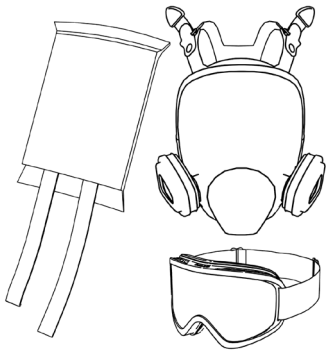


Toiletries

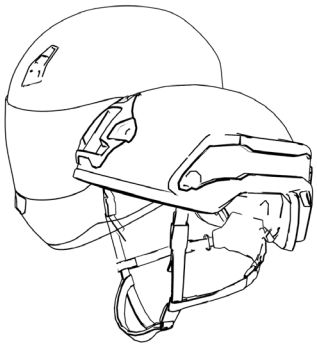
Important Details



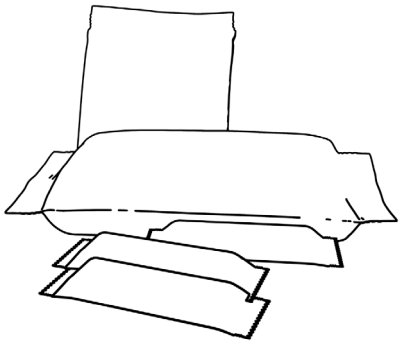
Lifestraws and Sawyer filters meet the minimum requirements. MSR Guardian filters out 99 percent of viruses and bacteria. Grayl Geopress filters out 99 percent of everything, including some heavy metals. Filters will last almost indefinitely if they're kept in their package and stored well. The highest quality purifiers have shorter lifespans once you start using them, so pack replacement filters if you can.



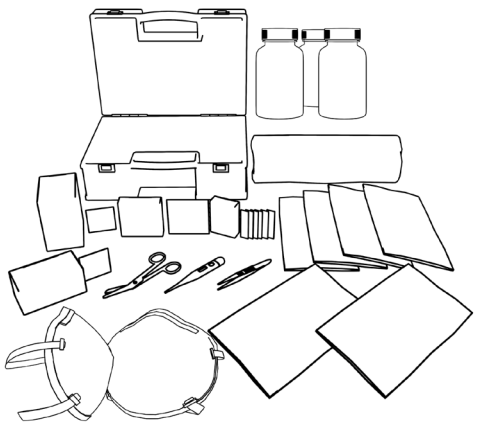
Most people in North America will choose between different half-face and full-face respirators from 3M. The easiest ones use bayonet P100 filters. The 69026 model covers the most VOCs (volatile organic compounds). With half-face respirators, use goggles from Bolle or HexArmor. If you were glasses, you can order spectacle kits for respirators. Some Hexarmor goggles have side groves to fit over glasses. Most goggles are vented, allowing small amounts of air through. Nonvented goggles almost always fog up and obstruct vision.



Motorcycle helmets offer superior head protection during emergencies like storms, and they're affordable. Tactical impact helmets are called bump helmets. They're less bulky but cover less of your head, and they're more expensive. Ballistic helmets offer protection against low-caliber gunfire, and sometimes high-caliber rounds. Some ballistic helmets also provide impact protection, but they're very expensive. Choose something that fits your budget and offers reasonable protection.

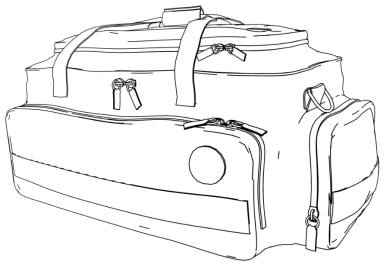


Freeze-dried meals last for years, but they're expensive. Many of them also contain a lot of sodium and other preservatives. They remain safe to eat, and they provide calories for basic survival, but their nutrients degrade over time. You can make your own with dehydrated foods, oxygen absorbers, and mylar bags. Rotate through them every 1-3 years. See the food storage chapter for more details.



A full medical kit starts with band-aids, bandages, gauze, alcohol pads, clotting agents, scissors, tweezers, a thermometer, and N95 masks. You might also want duct tape, military bandages, latex gloves, liquid skin, painkillers, stomach meds, tourniquets, antibiotic ointment, cold compresses, eyedrops, and extra prescription meds.

Types of Bags



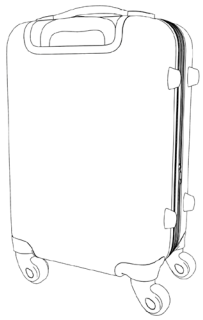
Everyday Carry (15-20L)

For emergency medical kit, gas mask, a bottle of water or two, flashlight, multitool, other small items, 1-2 meals. For shorter durations. First responder and patrol bags work well.

Tactical Backpack (20-30L)

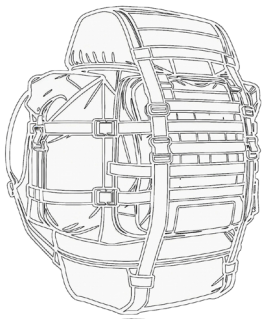
Can hold all items plus 2 1-liter bottles of water and 1-2 days of meals for one person. Good for short bugout, looking for a place to stay in another city. Basically a bookbag with pouches.

15-20 lbs (7-9kg)



Rolling Suitcase (40-50L)

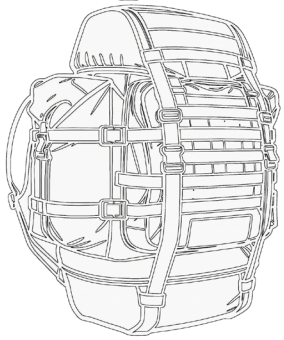
Can hold all items plus a solid 2 days of food and water. Good for longer bugouts. Good for car camping and emergency road trips. Also good for saving your back.



Medium Backpack (40-60L)

Can hold all items plus 3 days of meals for one person. A heavier bugout bag meant for longer bugouts and emergencies where food and water will be scarce.

40-50 lbs (18-22kg)

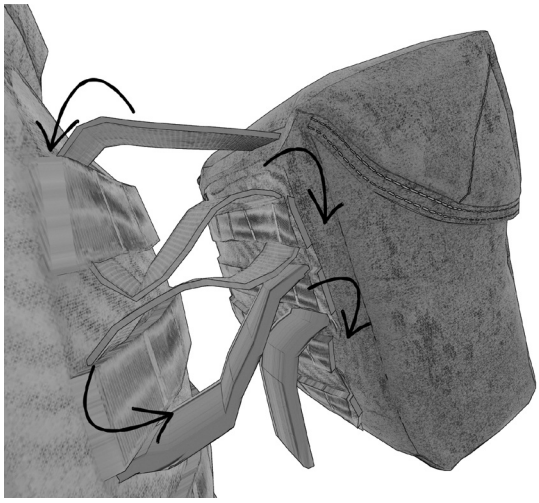


Large Backpack (60-80L)

Can hold all items plus 4-5 days of meals for one person. A very heavy backpack meant for longer term emergency situations.

How to Use MOLLE

MOLLE means modular lightweight load-carrying equipment. MOLLE packs and vests let you weave smaller pouches onto the back or sides. That way, you can expand your carrying capacity without having to buy an entire new bag.



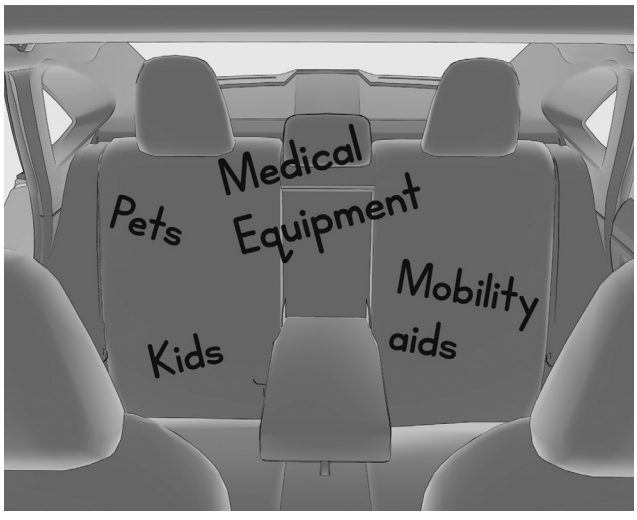
MOLLE pouches are good for emergency medical kits, water filters, gas masks, or other items that you might want to access without having to dig through your bag. You can also get MOLLE water pouches.

MOLLE vests and fanny packs let you carry tools, cash, or energy bars. They're a good addition for a light bugout bag or a camel pack. With a MOLLE system, you have more options to scale up and down your bugout plan. Many preppers love them.

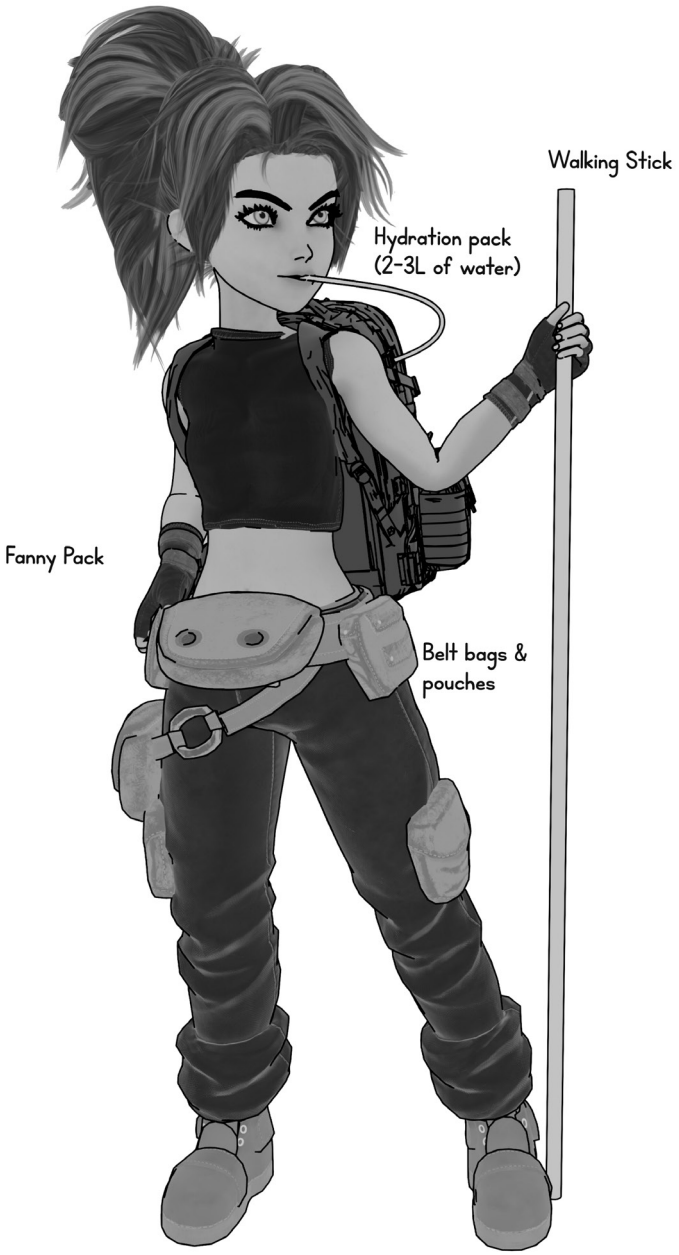
What Fits in a Car?

Even a smaller compact car can usually fit two 60-85L bags and two 20-30L bags in the trunk. That leaves room in the cabin for people and personal items. Someone can hold a first responder bag in their lap.

You'll also want to think about room for pets and pet carriers, baby carriers, walkers, and other items you'll be taking.



Bugging Out on Foot



Pro-tip: Trying to drink your own urine will only dehydrate you faster. Don't do it!

Not everyone has a car. Not everyone will be able to get to it in time.

Sometimes, you're much better off bugging out on foot if you can. Roads and highways can back up with traffic. They can turn into their own disasters.

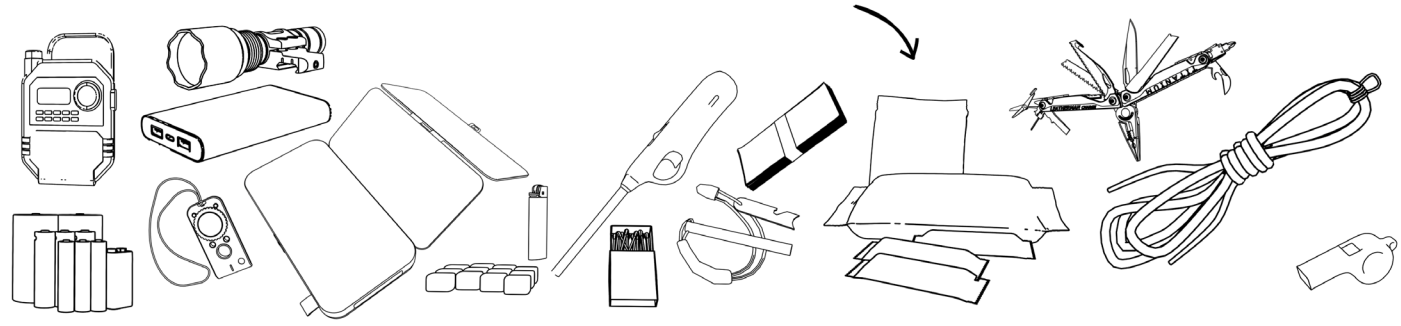
You might have to leave your car behind if things go from bad to worse.

Some preppers keep a smaller ejection pack in their larger bugout, or they just take a hydration (camel) pack with them everywhere they go. They're light. Some of them still hold 15L-20L of other gear. If you can't or don't want a bunch of extra weight, it's a good way to go.

Water is by far the most important thing you'll need during a major emergency. You can go days without food. You can find or make shelter. Your walking stick can double as a weapon. The one thing you can't go long without is... water.

Hydration packs distribute the weight better than water bottles, but you can pack a couple of those too, especially with filters or filter adapters.

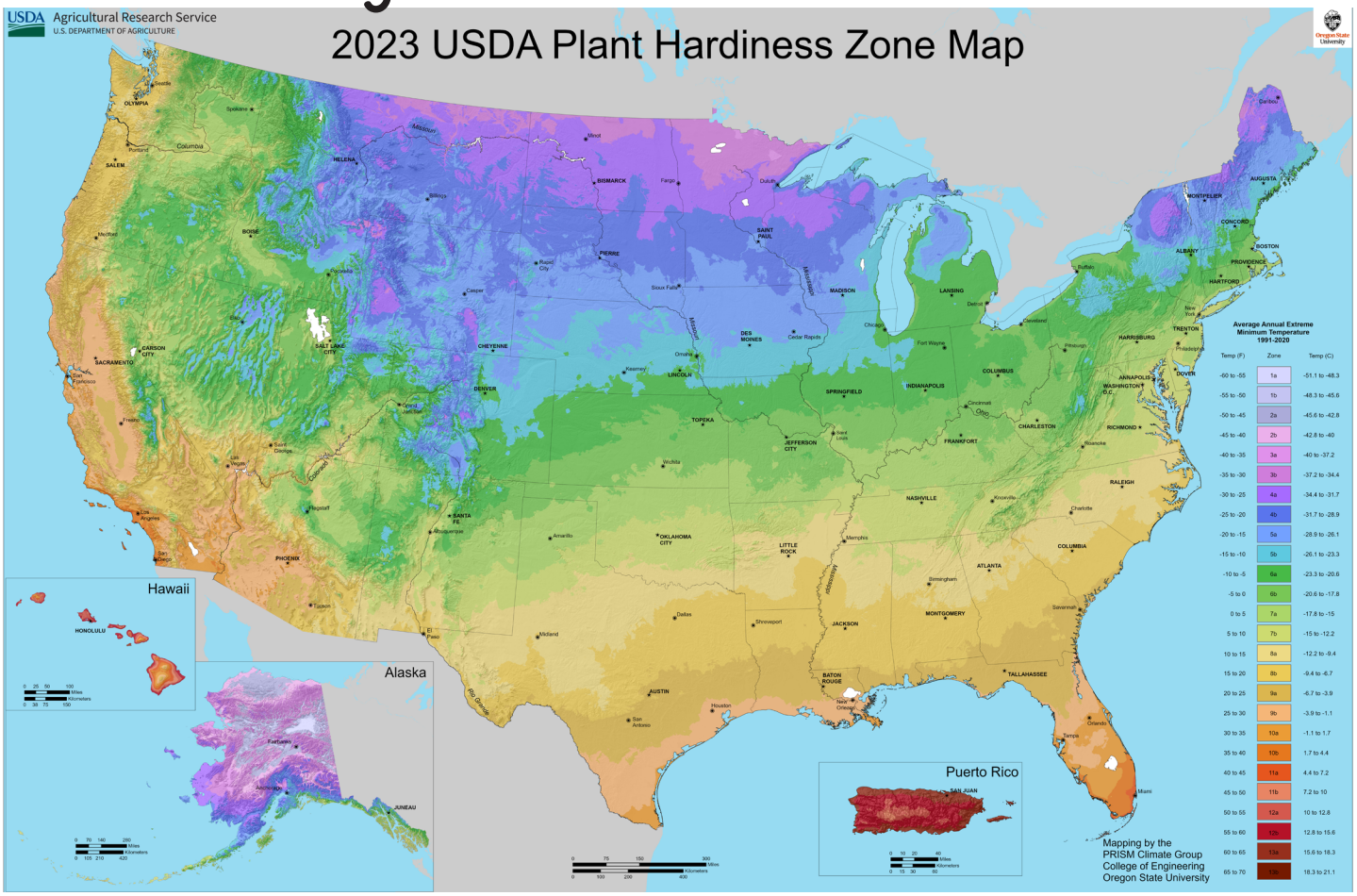
You can fit a lot of this into pouches and smaller packs



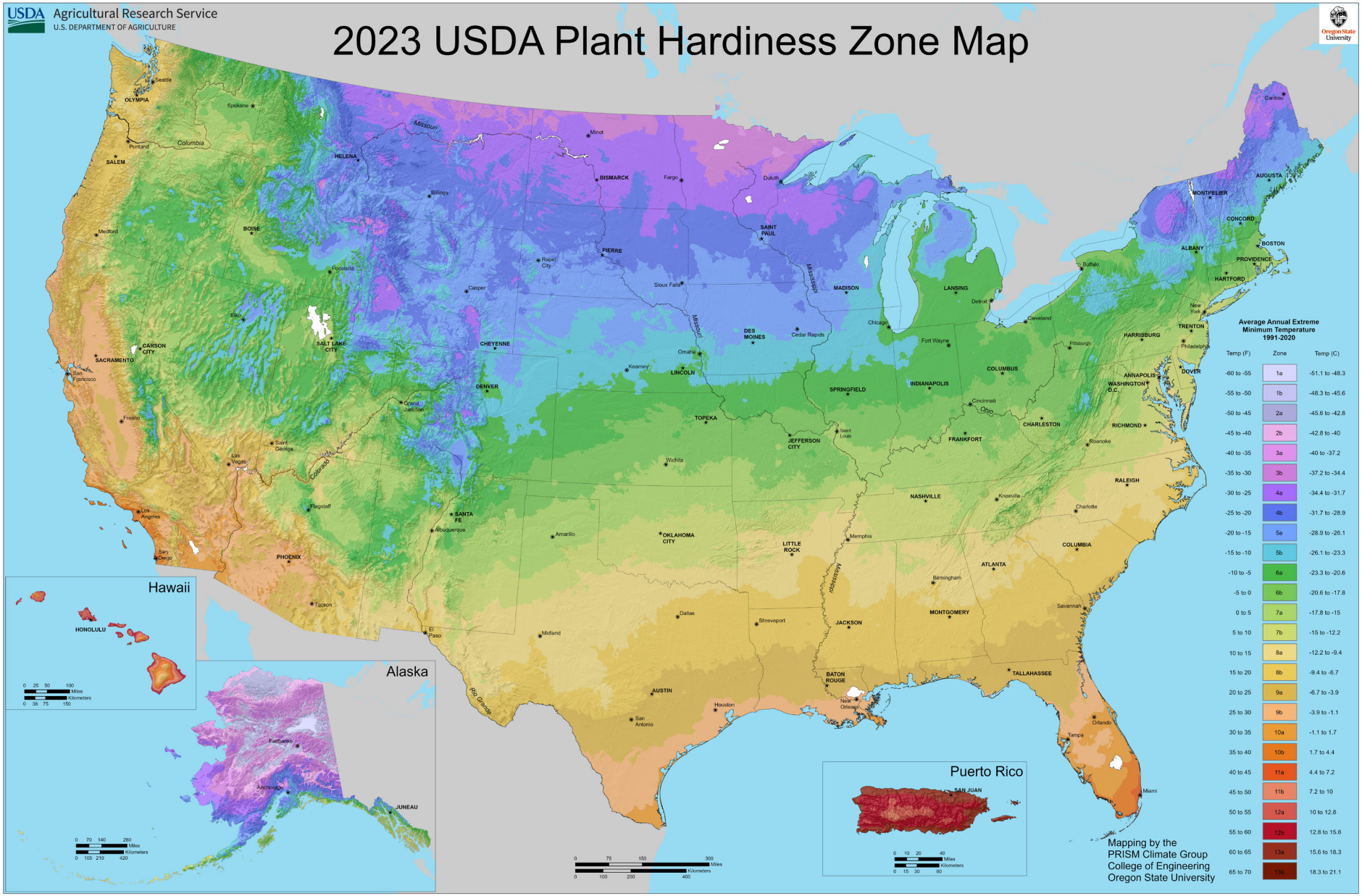
How to Grow Food

This chapter covers the basics of gardening. We're going to talk about hardiness zones, planting, and watering. You'll also find a list of common fruits and vegetables with vital information about ideal growing conditions, pollination, and pests.

Understanding Hardiness Zones



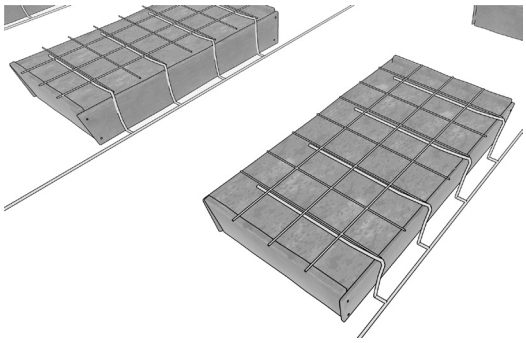
The first step is figuring out what to grow where. A hardiness zone map illustrates temperature ranges, so you have a basic idea of what plants would survive through winter. From there, you can start to gather other important information about first and last frost dates, annual and monthly precipitation, and humidity. Hardiness zones especially matter for anyone who wants to grow food during the winter. With the right equipment (like greenhouses, tunnels, row covers, outdoor blankets, etc.) it's possible. As the years go by, the hardiness zones will shift a lot. It's a good idea to start practicing and stretching your skills, growing fruits and vegetables in more extreme conditions and learning how to protect them. Start thinking about what crops you'll be growing 5-10 years from now, and what you'll need to do that.


USDA Agricultural Research Service
U.S. DEPARTMENT OF AGRICULTURE
2023 USDA Plant Hardiness Zone Map
Oregon State University
Average Annual Extreme Minimum Temperature 1991-2020
Temp (F) Zone Temp (C)
-60 to -55 1a -51.1 to -48.3
-55 to -50 1b -48.3 to -45.6
-50 to -45 2a -45.6 to -42.8
-45 to -40 2b -42.8 to -40
-40 to -35 3a -40 to -37.2
-35 to -30 3b -37.2 to -34.4
-30 to -25 4a -34.4 to -31.7
-25 to -20 4b -31.7 to -28.9
-20 to -15 5a -28.9 to -26.1
-15 to -10 5b -26.1 to -23.3
-10 to -5 6a -23.3 to -20.6
-5 to 0 6b -20.6 to -17.8
0 to 5 7a -17.8 to -15
5 to 10 7b -15 to -12.2
10 to 15 8a -12.2 to -9.4
15 to 20 8b -9.4 to -6.7
20 to 25 9a -6.7 to -3.9
25 to 30 9b -3.9 to -1.1
30 to 35 10a -1.1 to 1.7
35 to 40 10b 1.7 to 4.4
40 to 45 11a 4.4 to 7.2
45 to 50 11b 7.2 to 10
50 to 55 12a 10 to 12.8
55 to 60 12b 12.8 to 15.6
60 to 65 13a 15.6 to 18.3
65 to 70 13b 18.3 to 21.1
Hawaii
Alaska
Puerto Rico
Mapping by the
PRISM Climate Group
College of Engineering
Oregon State University

How to Prepare The Soil

Next, you'll want to study your soil. You can pick up a simple soil test kit from a number of different hardware and gardening stores. You'll learn your soil's pH levels, as well as the levels of key nutrients like nitrogen, phosphorous, and potassium. The better these levels, the healthier your plants.

Most suburban yards have poor soil. They're built on fill dirt that has very little in terms of nutrients. Years of overlandscaping and pesticides have probably made things worse. Fortunately, you can fix that buy adding soil and compost. You can have it delivered from local companies. You can probably even hire someone to move it for you. Start your own compost heap and grow your garden, and you'll eventually restore the soil.



Raised bed gardening makes the most sense for urban and suburban farming. Many beds run 2x6 ft or 4x8 feet. Use square foot gardening when planning your beds. It makes everything else easier. Most plants need 1 or 2 square feet to thrive. You can plant 3-4 smaller crops in one square.

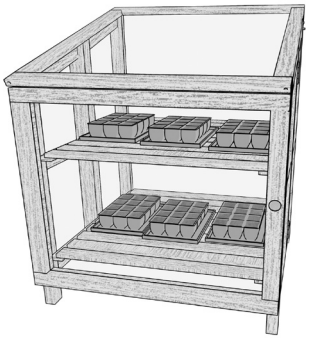
Fill the bottom with soil and dirt. Save your compost for the top six inches. Mix it with soil. You can also just scoop compost into the holes for your plants, if you don't have much. Once you've planted, you can add mulch to help conserve moisture and keep your compost from washing away.

How to Plant Seeds: The Basics

Most urban and suburban gardeners will want to start seedlings indoors 4-6 weeks before the last frost. Depending on your hardiness zone, the last frost could happen anywhere from March through April. Starting early means you get the most out of your peak growing season. Keeping seedlings indoors protects them from the elements, and from critters.

You can start seedlings in several different types of containers, even egg cartons. Some kits come with pre-filled soil trays or peat pots. You plant most seeds simply by poking a hole in the soil with a finger or a chop stick, about 1/4-1/2 inch. (Wash your hands first.) Cover and pat the soil firm so the seed has good contact. Give them all a good water. One seed goes in each hole if you don't want to thin them out later. Some seeds won't germinate, so anticipate that by planting more.

Baby plants need warm temperatures, plenty of water, and plenty of sun. Keep the soil moist, but not soggy. Give them as much as 12-16 hours of light a day. It helps if you have a cold frame to maximize their exposure to the sun while keeping them warm. If you can't do that, grow lights and grow bulbs do the job.

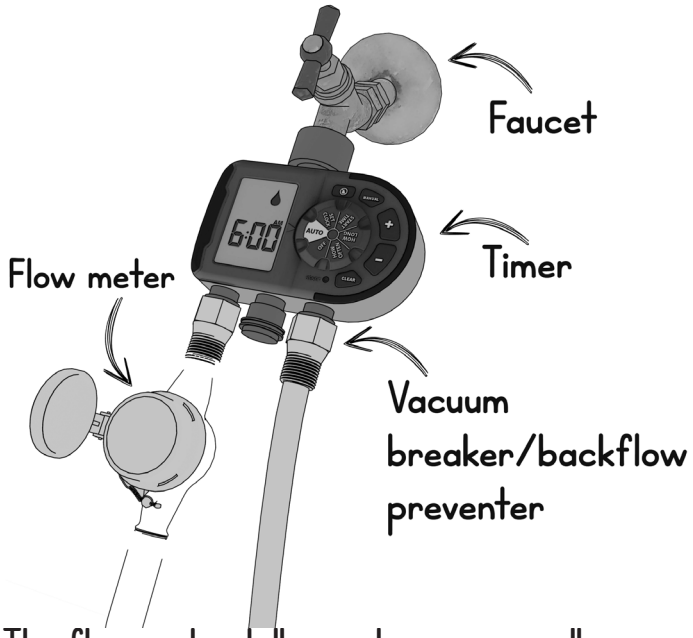


Around 4 weeks, plants are often ready to transfer outside. They should have 1-2 sets of adult leaves. Harden them off for a week. Right before transplanting, water the plant and the new soil. Hold them by root soil and leaves, not the stem.

Pat the soil down around the roots. Give them one more water.

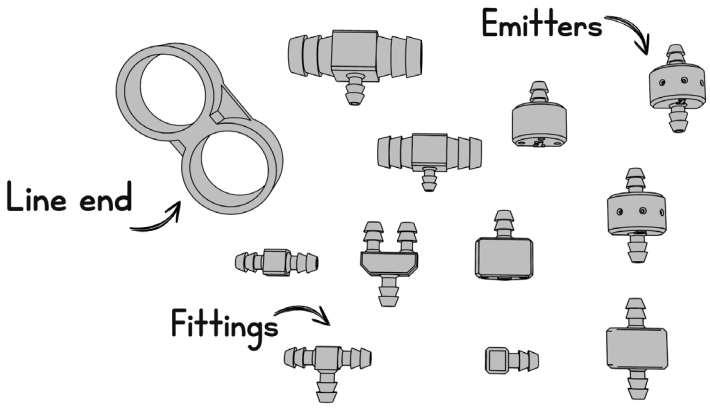
Drip Irrigation: The Basics

While your seeds take hold, you might want to rig up a drip irrigation system. They save a lot of water, and they can also make your life a lot easier. It looks complicated at first, but the parts make sense.



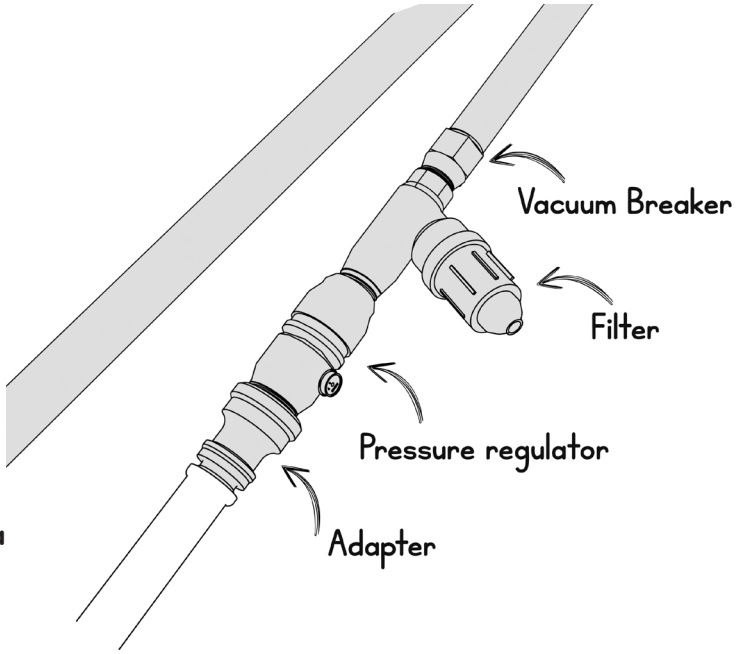
The flow meter tells you how many gallons per minute or hour are coming out of your faucet. You'll need this figure for some important calculations that help you decide on the size of your system and whether you'll need more pressure.

You'll need tubing and emitters. You'll need a vacuum breaker, also known as a backflow preventer. You'll need a filter and a pressure regulator and a flow meter. You'll also want a hose timer. Some come with up to five hose splitters, so you can set up different schedules for different beds or "zones" of your garden.



Fittings and drip emitters come in different sizes, from 1/2 GPH to 2 GPH. You'll probably want 1/2 gallon emitters. You can buy some drip irrigation tubing with emitters pre-installed.

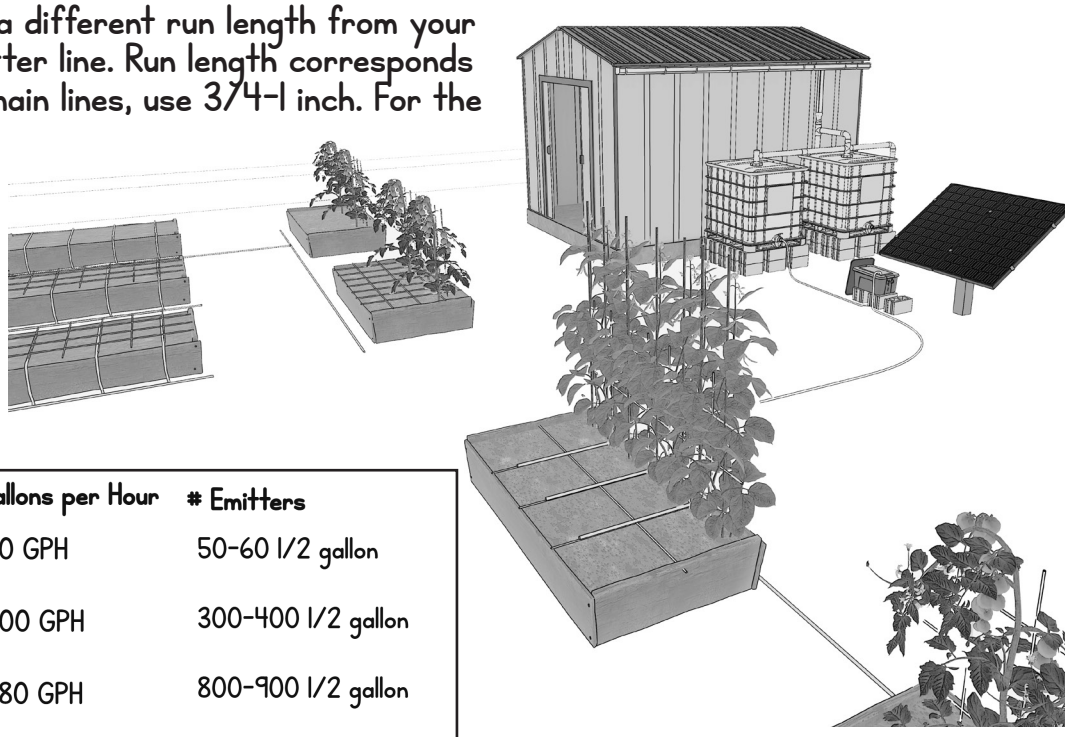
Gardeners offer different approaches to the rest of the setup. Many also strongly recommend you install a vacuum breaker closer to the junction where hose meets irrigation line. Then you'll need to install a filter and a pressure regulator. The filter keeps water going to the plants extra clean. The pressure regulator ensures 10 PSI is going to the drip lines. You don't want it any stronger. Finally, you'll need a hose to drip irrigation adapter.



Drip Irrigation: Continued

To figure out how long and how far to run your drip irrigation system, you'll need to calculate how much water you need. You can use the same basic formula we use for rain catchment. Multiply inches/centimeters of rain needed by the square footage of your crops, then multiply by .623, and that gives you gallons (liters) of water needed per week.

Drip irrigation hose comes in different diameters. Each diameter accommodates a different run length from your water source to the emitter line. Run length corresponds to gallons per hour. For main lines, use 3/4-1 inch. For the emitters, use 1/4 inch.



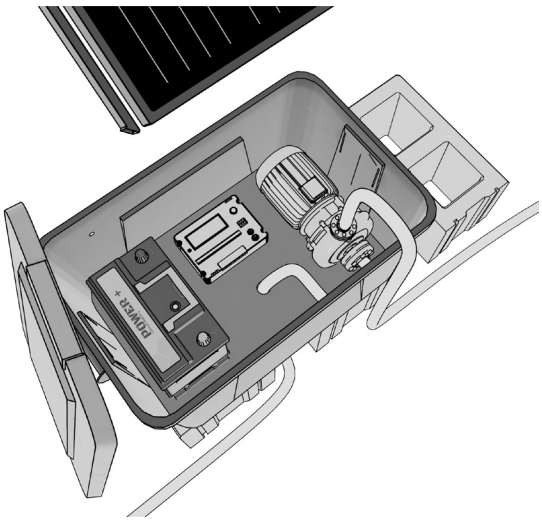
Tube Diameter	Run Length	Gallons per Hour	# Emitters
1/4 inch	30 Feet	30 GPH	50-60 1/2 gallon
1/2 inch	200 Feet	200 GPH	300-400 1/2 gallon
3/4 inch	480 Feet	480 GPH	800-900 1/2 gallon
1 inch	960 Feet	960 GPH	1,500-1,800 1/2 gallon

A standard outdoor faucet delivers about 5-6 gallons a minute at 40-50 PSI. That's about 300 gallons per hour. It can provide enough pressure for about 100 feet of hose. Drip irrigation systems significantly extend a hose's reach because they use less water pressure. The pressure regulator drops your hose from 40 PSI to 10.

Let's say you have 500 square foot of beds with plants that need 1 inch of water per week. That's about 311 gallons of water total.

If one plant takes up one square foot, and one emitter emits 1/2 gallon per hour, then the system should run a little more than 1 hour per week. Divide that by 7, and you have your daily watering schedule. Run the drip irrigation for about 9-10 minutes a day. Watch your moisture levels and plant health. Adjust as needed. Every garden is different.

If your drip irrigation system can't get enough pressure, it's okay. You can make a booster with a simple transfer pump and a battery. You can even rig one up to run on solar energy. If that fails, you can install a manual pump. It's not ideal, but it works.



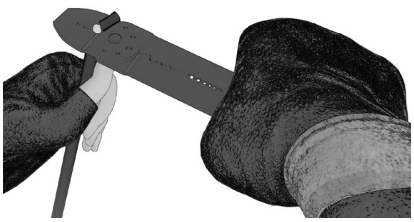
Wiring a Solar Drip Pump

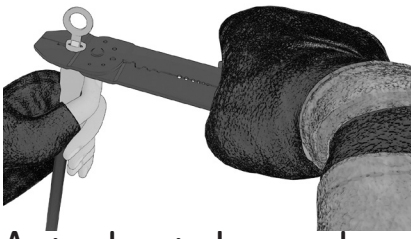
This guide devotes an entire chapter to solar power systems and wiring. For now, we're going to do a short but important rundown on wiring, so you can connect your pump to your charge controller. It boils down to a few basic steps:

Stripping wires: Use wire strippers to remove the insulation from the end of the positive and negative wires from your pump.

Next, strip the ends of two more positive and negative wires (if you need more length).

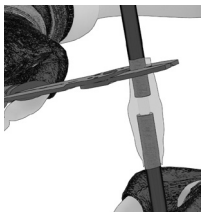
Use the wire strippers to crimp terminal connections onto the ends of the extra wires. Make sure you get the kind that matches your battery terminals.





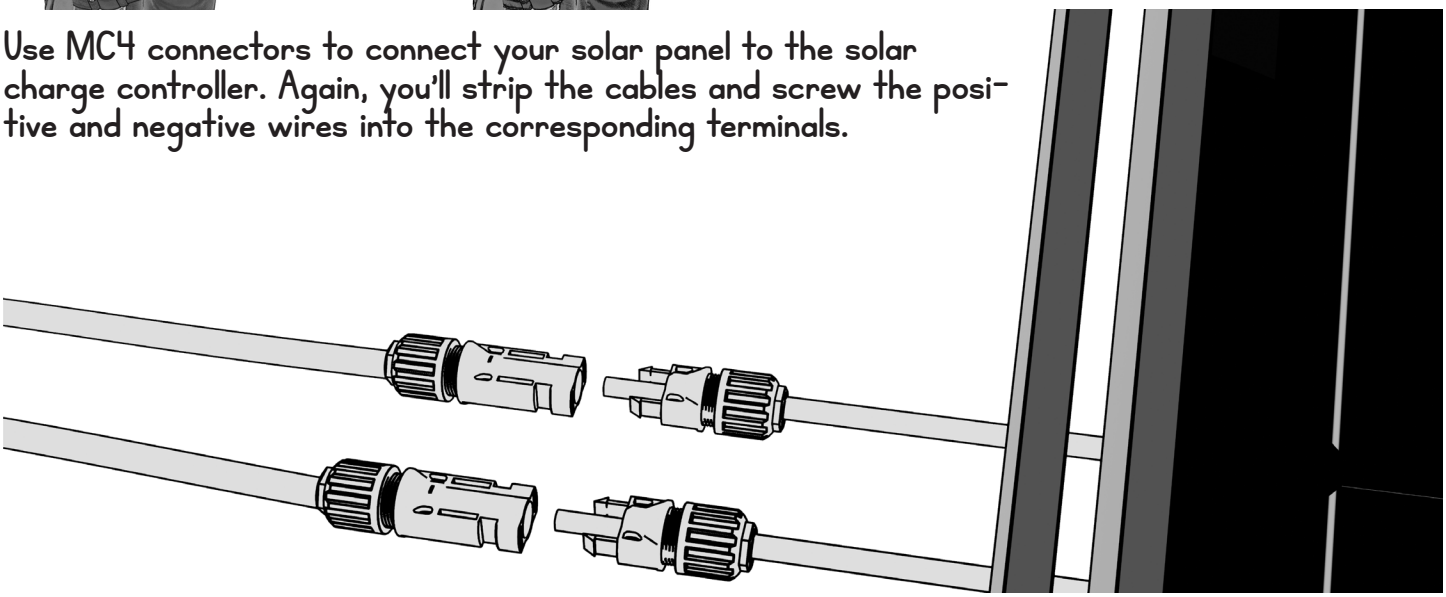
A ring terminal connector goes on battery terminals. When you're crimping, leave a little bit of wire uncovered by the insulation.

Sometimes, you'll need to splice two wires. Strip the ends. Slip them into a butt splice connector. Use a heat gun to shrink the seal.



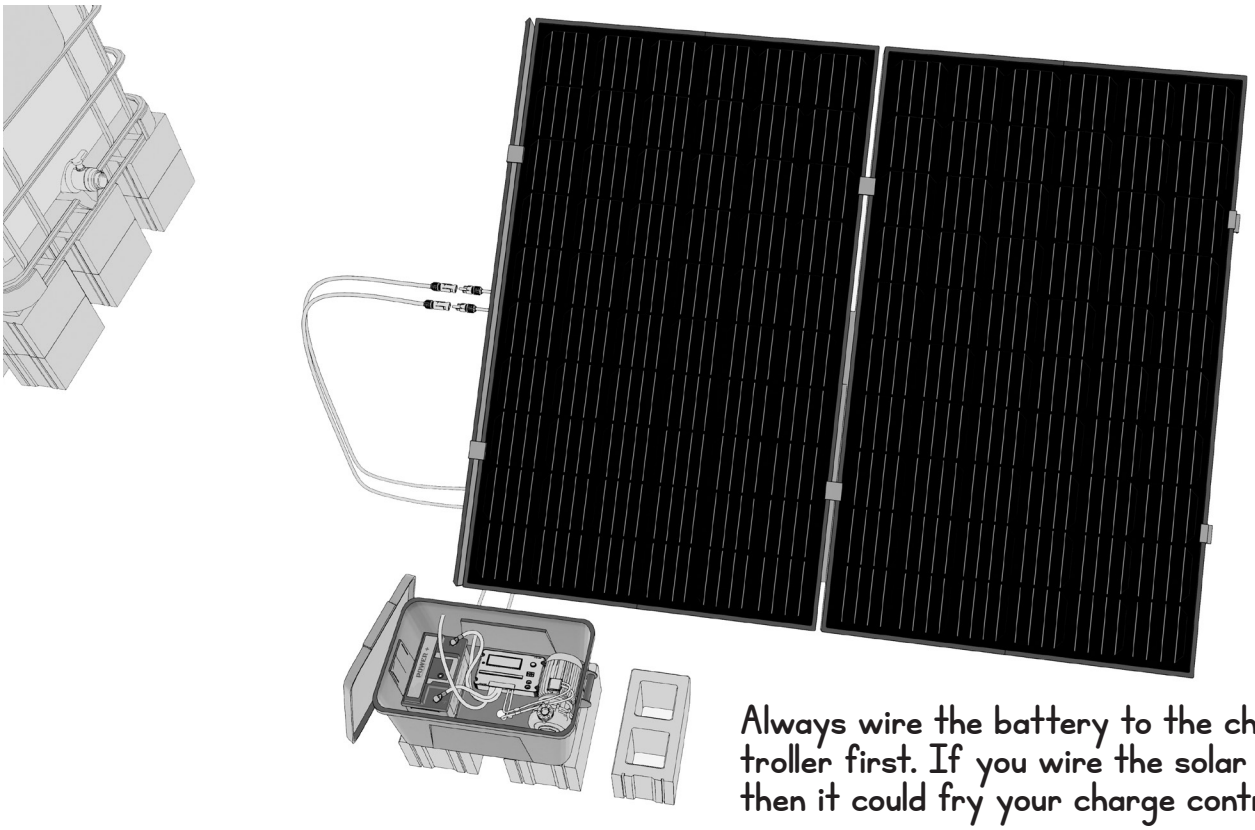
Always connect positive wires to positive terminals and negative wires to negative terminals. Otherwise, very bad things happen. They're almost always clearly marked. If they're not, don't risk it!

Use MC4 connectors to connect your solar panel to the solar charge controller. Again, you'll strip the cables and screw the positive and negative wires into the corresponding terminals.

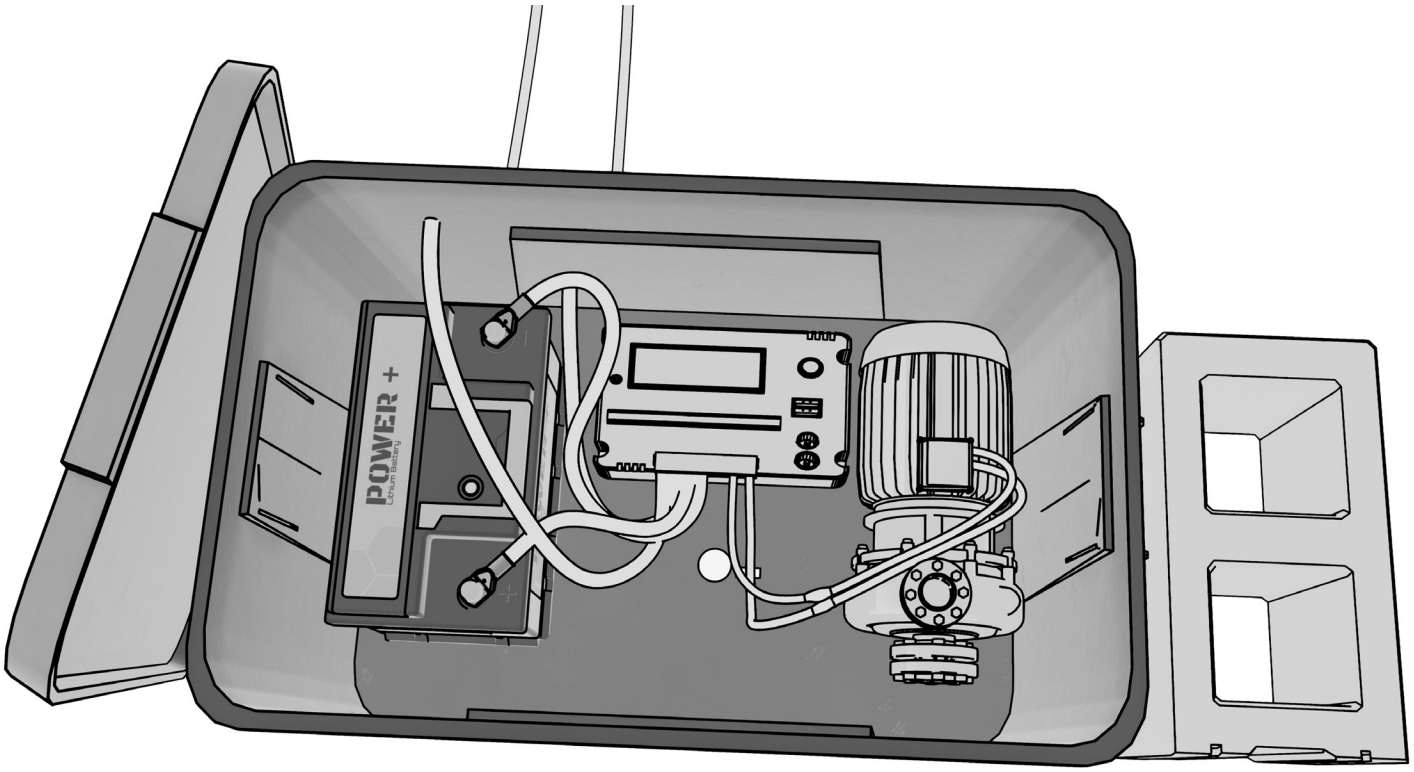


Wiring a Solar Drip Pump: Continued

Below, you see the finished setup. The solar panel sends electricity through the MC4 connectors to the charge controller. The charge controller sends electricity to your battery. It also routes electricity from the battery to any device you wire up, like a pump. The charge controller regulates everything and keeps it all from bursting into flames. We'll talk about it more later.



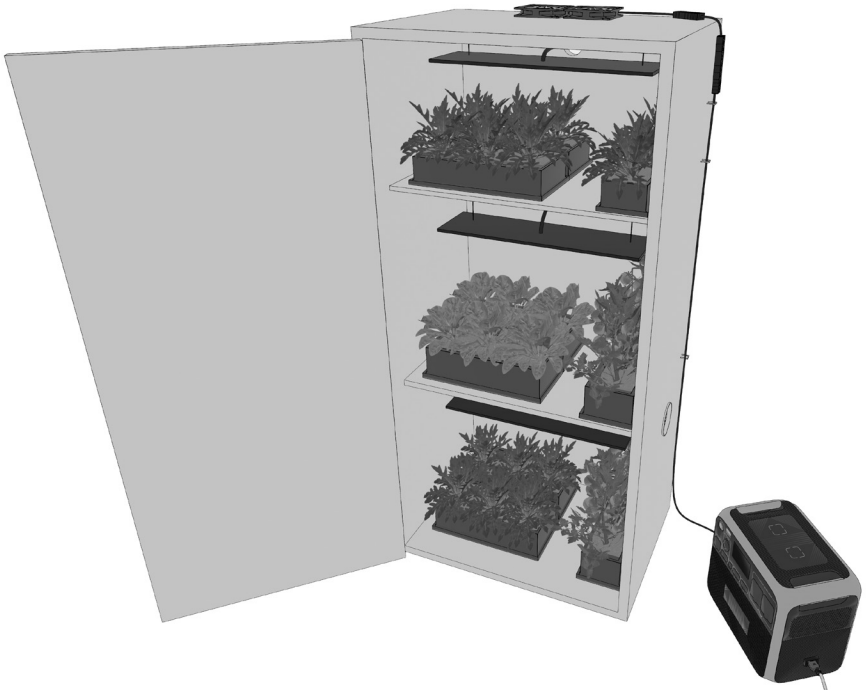
Always wire the battery to the charge controller first. If you wire the solar panel first, then it could fry your charge controller.



Growing in an Apartment

Even if you live in an apartment, you can still grow vegetables. You simply have to change strategies. You can grow herbs and microgreens in a window, on a patio, or on a balcony.

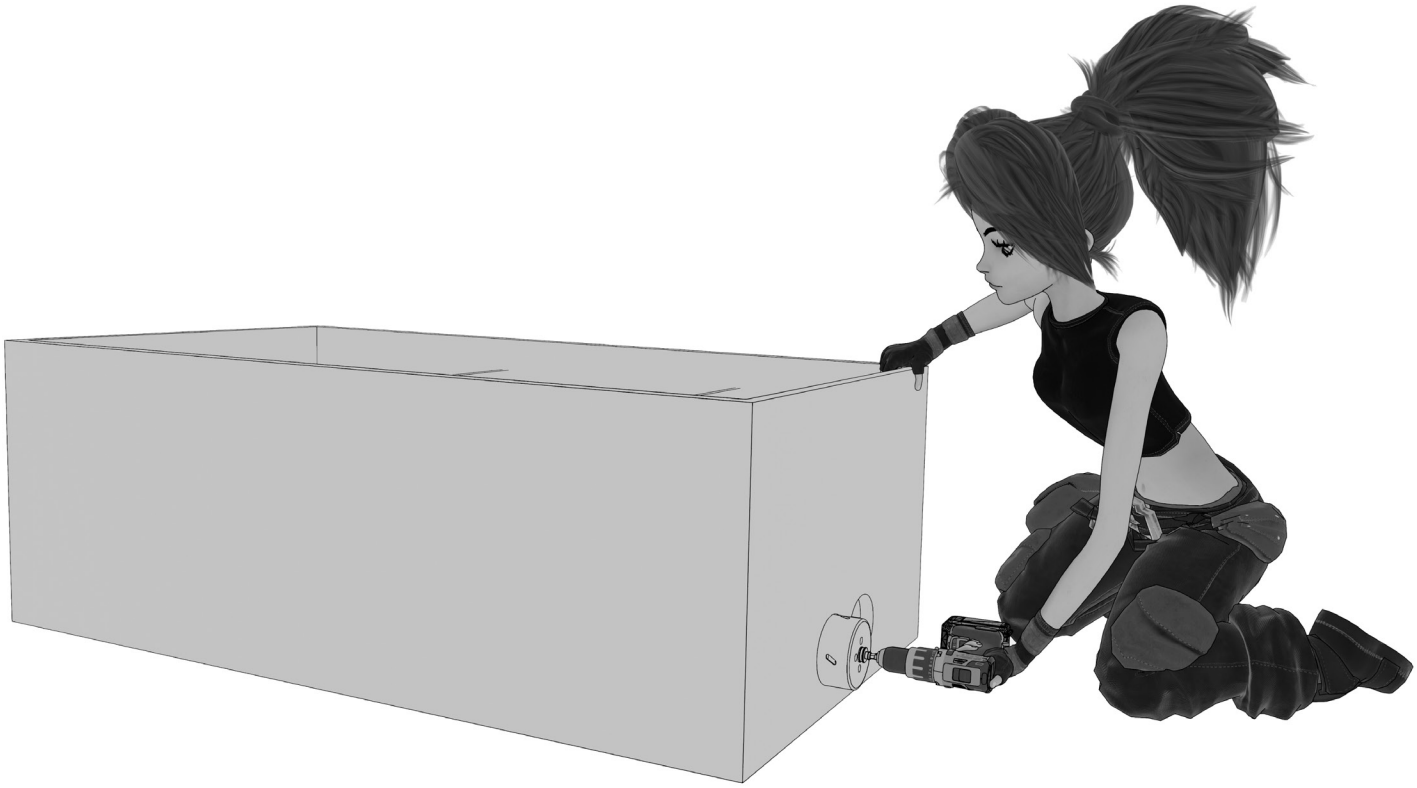
You can install window boxes. You can get railing planters, even deck planters that attach to edge beams. You can also grow plants indoors with grow lights and grow closets.



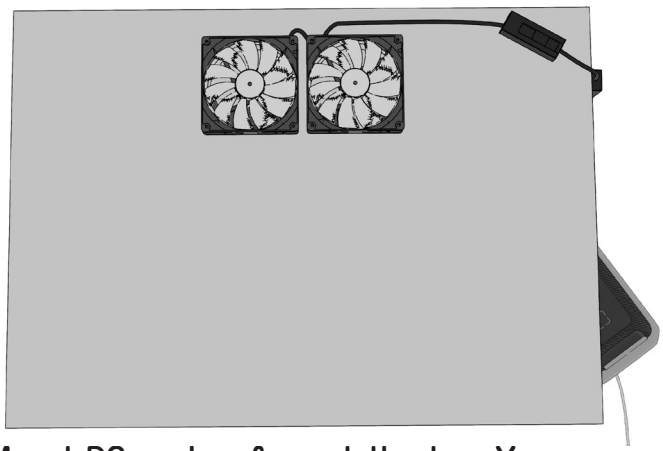
Grow closets make use of LED grow lights, usually 35 watts per square foot. They have vents at the sides and tops to facilitate airflow.

How to Make a Grow Closet

If you have limited windows and sunlight, you can still grow microgreens and herbs using grow lights. Some hardcore indoor growers use grow tents or even make grow closets to maximize control over the environment. You can make one by converting a cabinet or portable wardrobe. Use a hole saw to drill ports for the vents.



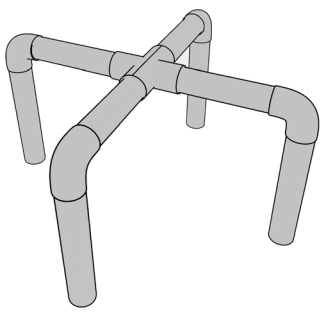
You'll also drill holes in the back to pass cables through for the grow lights. Hang the grow lights with screw hooks.

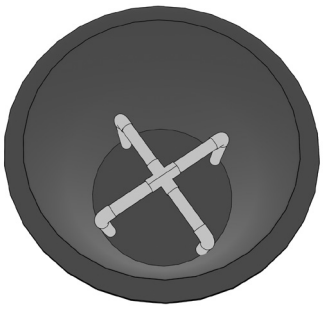


Mount PC cooling fans at the top. You can usually buy them in pairs or threes, with AC adapters for convenience.

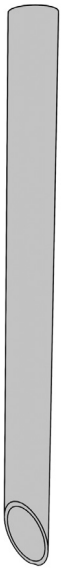
How to Make a Self-Watering Planter

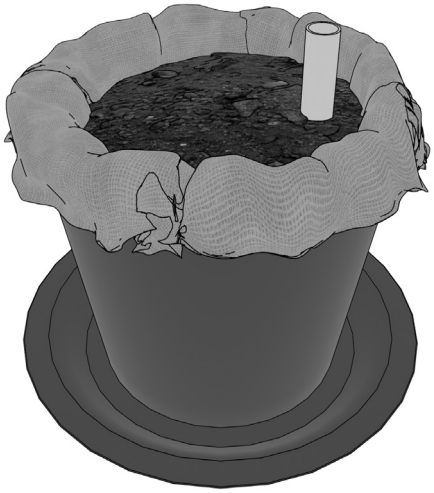
Self-watering planters can help you manage the mess of gardening and keep things neater. You pour water into a reservoir, and it travels back up through the soil via osmosis. You can make them yourself, even better than the ones sold in stores.



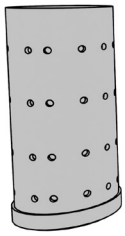


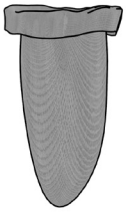
Start by making a base with PVC pipe, elbow fittings, and a cross fittings. Make it about 3 inches high.

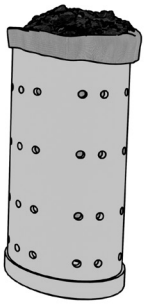




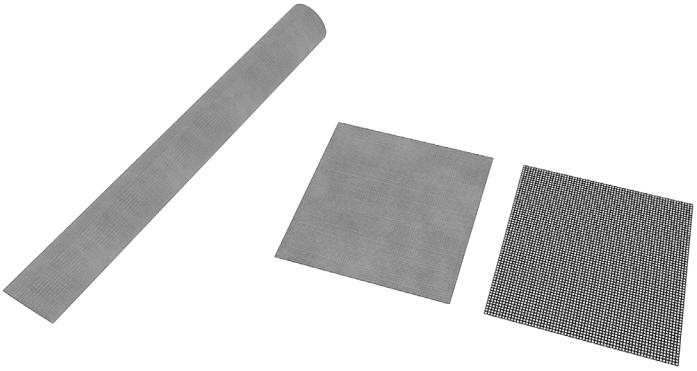
Cut a slant into a PVC pipe, tall enough so that it sticks up above your planter's rim.



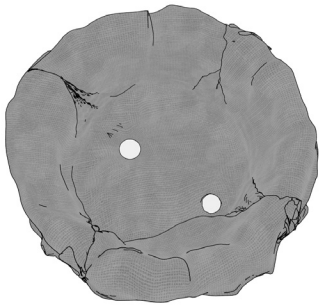


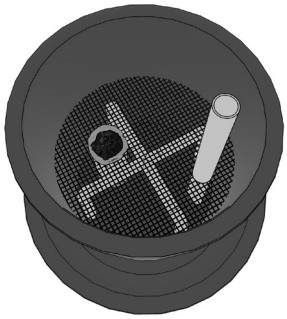


Cut about 3 inches of PVC pipe. Put a cap on the bottom. Drill holes through it. Then make a liner with burlap roll. Stuff moist soil into this chamber.

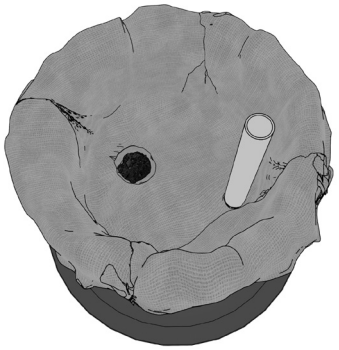


Measure and cut some hardware cloth to fit over the base. Cut two holes for the chamber and watering pipe.





Cut two holes into a sheet of burlap or any landscape fabric or netting that can hold soil.

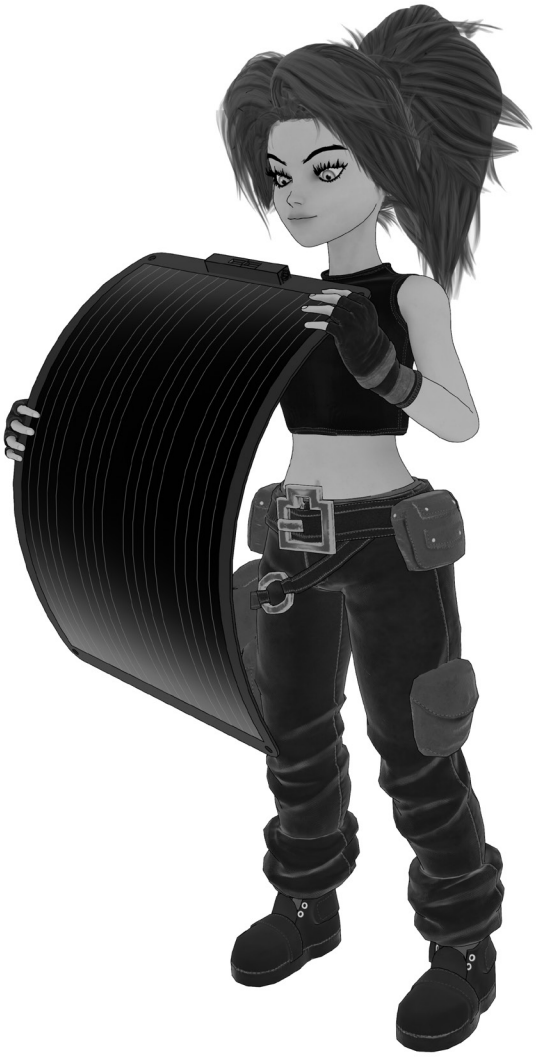


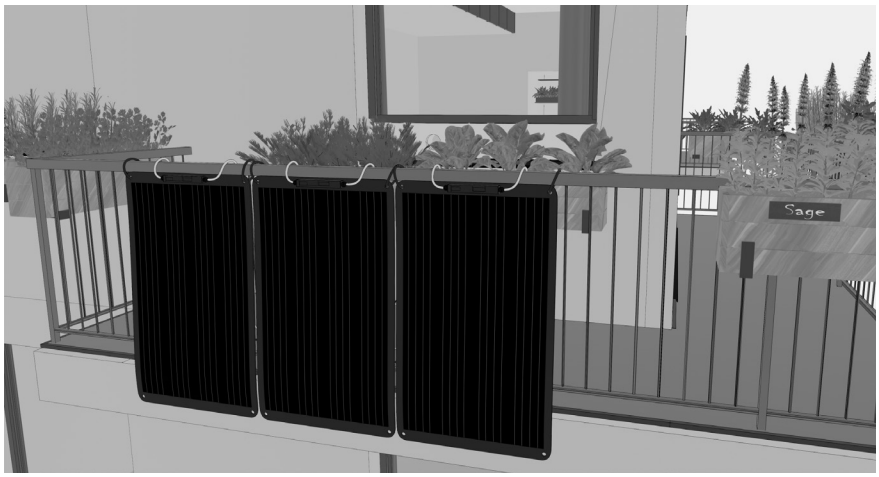
Put the burlap over the screen. Now add your soil. Water will move up from the reservoir through the dirt chamber, and your plant's roots will pull it up.

Drill an outlet hole about 3 inches high into your planter.

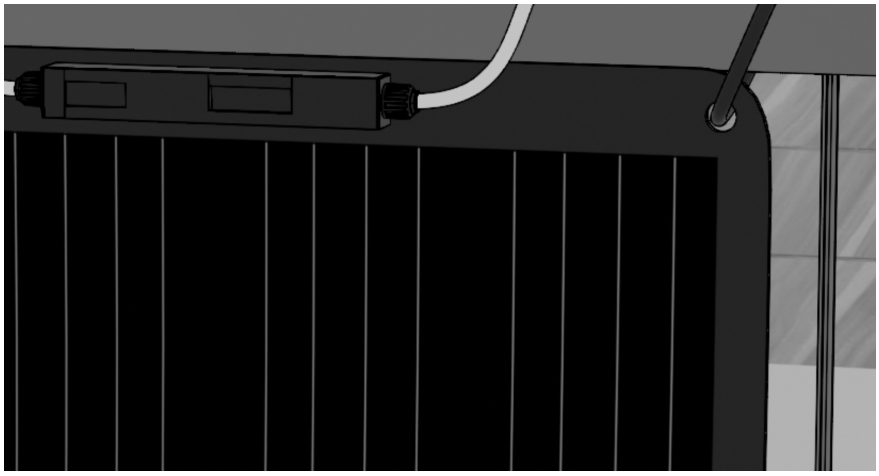
Solar Power in an Apartment?

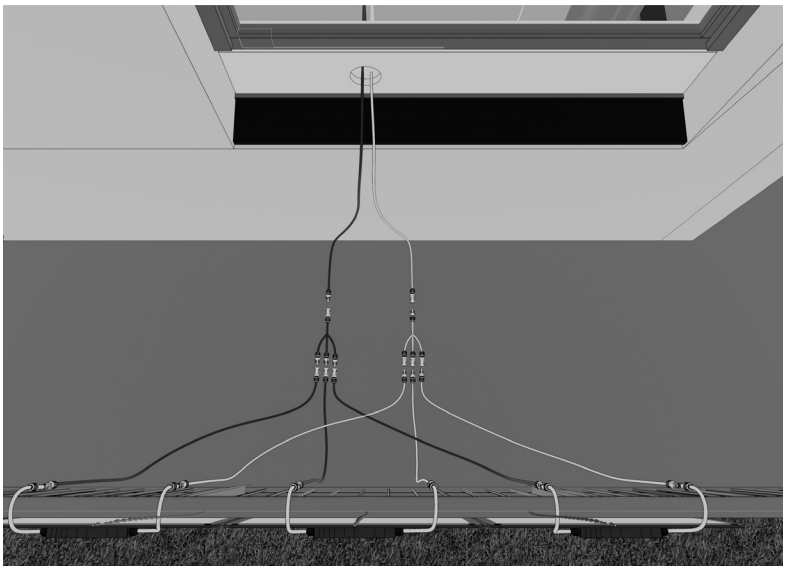
You can also harness solar power to run your indoor growing system. Companies have started making flexible solar panels that you can mount almost anywhere. Flexible solar panels can now provide anywhere from 100-300 watts per panel.





Use paracord to fasten the panels to a balcony rail or some other type of sturdy structure. Run the cord through the loop rings on the panel's edges.





Wire the panels in parallel, like it's shown in the section on solar panels. Then run them inside with a passthrough panel.

How to Manage Pests

You don't want to rely on chemicals to manage pests, because they eventually ruin your soil and also drive away helpful insects like pollinators. It's better to manage them through natural methods, especially companion planting.

Plant These To Control Different Pests

Marigolds	Aphids, Beetles, Many other Bugs, Rodents
Lavender	Mosquitoes, Moths, Fleas, Flies, Rodents
Daisies (Pyrethrum)	Mosquitoes, Flies, Mites, Many other Bugs
Chrysanthemums	Roaches, Ants, Ticks, Japanese Beetles
Nasturtiums	Aphids (Trap Crop), Beetles
Borage	Tomato Hornworms, Cabbage Worms
Catnip	Ants, Japanese Beetles, Squash Bugs, Roaches, Rodents
Lemon Grass	Mosquitoes, Other Bugs, Rodents
Daffodils	Mosquitoes, Other Bugs, Rodents

You can also plant a wide range of herbs to repel pests including basil, chives, mint, oregano, and rosemary. Chives and garlic do great against aphids. Thyme can repel deer. You can crush up daisies to make a powerful, natural insecticide. Sage, garlic, and onions also repel many pests, including rodents. Plant herbs like mint and rosemary in pots to keep them from spreading all over your garden.

Attract Helpful Predators

You can plant dill, yarrow, cosmos, and fennel to attract insects like ladybugs and laceings that eat other pests. These plants also attract birds.

Use Organic Sprays

You can make sprays from castile soap that works on aphids, mites, and other bugs with soft bodies. Sprays with capsaicin works well to kill insects and repel rodents.

How to Save Seeds

If you're after true self-reliance, then you'll need to learn how to save seeds. It's not extremely hard, but you have to follow a few basic guidelines. Annual plants produce plants at the end of the season, but biennials usually need to go dormant in winter (overwinter) and then produce seeds the following spring. Heat can often trigger plants to bolt early and "go to seed," so plant them in spring and let them grow into the summer. You won't harvest any plants you let go to seed, and you normally only have to let a few plants seed to produce enough for future seasons. Most seeds will last a few years, up to 5 or 10 if you freeze them. If you're starting out, plant heirloom seeds only. Hybrid seeds can give you bad results. If you start with heirloom seeds, then you'll continue producing heirloom seeds every season.

Some plants will cross-pollinate and ruin each other. Expert gardeners know how to prevent this, but it requires skill and patience. It's easier to just know which plants you should avoid growing during the same season. In fact, cole crops cross-pollinate so much, many experienced gardeners don't even bother trying to manage them.

Don't Plant These Together if You Want Seeds

Squash 1	Zucchini, Yellow Crookneck, Acorn Squash, Delicata, Spaghetti Squash, Pumpkin
Squash 2	Butternut Squash, Tromboncino, Long Island Cheese Pumpkin
Squash 3	Hubbard Squash, Buttercup, Kabocha, Giant Pumpkin
Cole Crops 1	Broccoli, Cabbage, Cauliflower, Kale, Brussels Sprouts, Kohlrabi, Collards
Cole Crops 2	Turnips, Bok Choy, Mizuna

In general, collect seeds by harvesting the pods or even uprooting the entire plant if you want to make sure it dries out in a controlled environment (like a greenhouse or garage). You'll let the plant dry for 1-2 weeks, then crush the pods and sift out the seeds. For wet seed collecting from plants like squash, cucumber, and tomato, let them sit in water for a few days. It's called fermenting. It helps remove gel coating that keeps seeds from germinating. In natural settings, the gel wears off as animals eat and spread the seeds. In our case, we want to remove it as soon as possible. Afterward, scrape off the top mush and then spread them out on a plate or rack to dry. Make sure you label as you go.

Herbs: Arugula

Pollination: Self
Lifespan: Annual

When to Plant

Start seedlings every 2-3 weeks for continuous harvest. Start early if planting outdoors, even before last frost. You can also plant in mid or late fall for an early winter harvest.

How to Plant

Plant seeds 1/4 inch deep, 1-2 inches apart and thin later or plant 4-6 inches apart. If you're planting outside, make 10-12 inches between rows. For square food gardening, plant 9-16 per square foot for baby arugula and less if you want it to grow bigger.

How Long It Takes

Produces food in 30-40 days (1-2 months).

Care/Best Growing Conditions

Sun: 6-8 hours full sun.
Temperature: 60-70F.
Water: 1-2 inches per week.
Soil pH: 6-7

Harvesting

Pinch or cut above leaf nodes. Harvest outer leaves first.

Nutritional Value

Vitamin K (100% DV), Vitamin A (47% DV), Vitamin C (47% DV), B9 (24% DV)
25 Calories per cup

Herbs: Basil

Pollination: Self
Lifespan: Annual

When to Plant
Start seedlings 4-6 weeks before last frost if planting outside. Start seedlings every 2-3 weeks for continuous harvest.

How to Plant
Plant seeds 1/4 inch deep, 1-4 per square foot.

How Long It Takes
Produces food in 30-40 days (1-2 months).

Care/Best Growing Conditions
Sun: 6-8hours full sun.
Temperature: 65-80F.
Water: 1-2 inches per week.
Soil pH: 6-7

Harvesting
Pinch or cut above leaf nodes. Harvest outer leaves first.

Nutritional Value
Vitamin A (3% DV), Vitamin K (43% DV), Calcium (4% DV), Iron (5% DV), Managanese (3% DV)
5 calories per tablespoon

Herbs: Dill

Pollination: Self
Lifespan: Annual

When to Plant

Start seedlings 4-6 weeks before last frost if planting outside. Start seedlings every 2-3 weeks for continuous harvest.

How to Plant

Plant seeds 1/4 inch deep, 4-9 per square foot.

How Long It Takes

Produces food in 30-60 days (1-2 months).

Care/Best Growing Conditions

Sun: 6-8 hours full sun.
Temperature: 60-70F.
Water: 1-2 inches per week.
Soil pH: 6-7

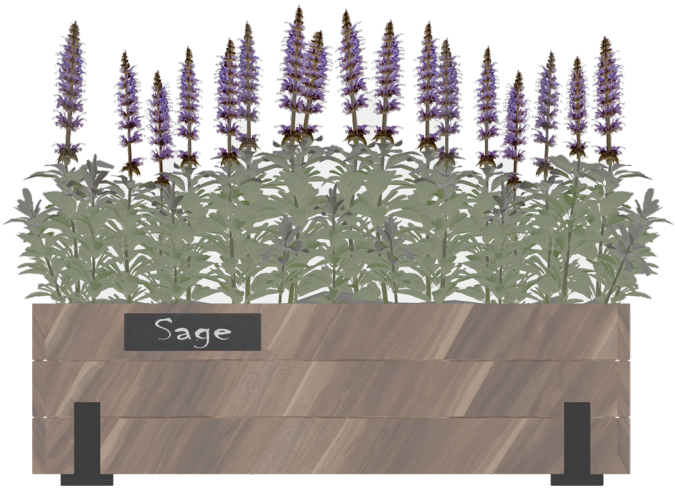
Harvesting

Pinch or cut above leaf nodes. Harvest outer leaves first.

Nutritional Value

Vitamin C (8% DV), Manganese (5% DV), Vitamin A (4% DV), Folate (3% DV), Iron (3% DV)
4 Calories per cup

Herbs: Sage



Pollination: Self
Lifespan: Perennial

When to Plant
Start seedlings 4-6 weeks before last frost if planting outside. Start seedlings every 2-3 weeks for continuous harvest.

How to Plant
Plant seeds 1/4 inch deep, 1-2 per square foot.

How Long It Takes
Produces food in 60-70 days (2-3 months).

Care/Best Growing Conditions
Sun: 6-8 hours full sun.
Temperature: 65-80F.
Water: 1-2 inches per week.
Soil pH: 6-7

Harvesting
Pinch or cut outer leaves near main stem, 1/3 of the plant or less. Harvest before flowering for best taste.

Nutritional Value
Vitamin K (10% DV), Iron (1% DV), Calcium (1% DV), Magnesium (1% DV), Antioxidants
2 Calories per cup

Herbs: Rosemary

Pollination: Self
Lifespan: Perennial

When to Plant
Start seedlings 4-6 weeks before last frost if planting outside. Start seedlings every 2-3 weeks for continuous harvest.

How to Plant
Plant seeds 1/4 inch deep, 1-2 per square foot.

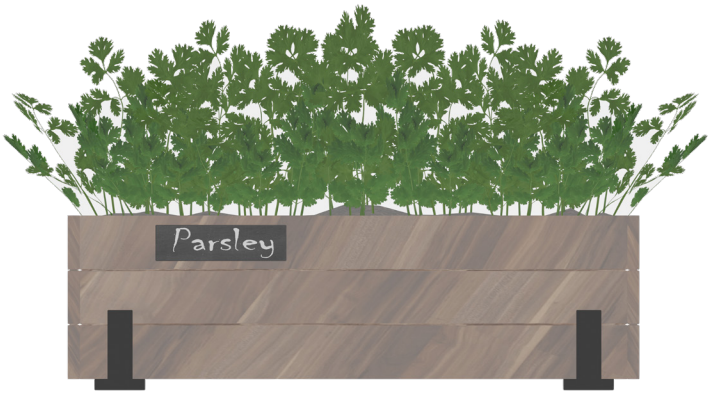
How Long It Takes
Produces food in 6-12 months.

Care/Best Growing Conditions
Sun: 6-8 hours full sun.
Temperature: 70-85F.
Water: 1-2 inches per week.
Soil pH: 6-7

Harvesting
Cut 2-8 inches of newer stems, just above leaf node.

Nutritional Value
Calcium, Potassium, Magnesium, Phosphorus, Iron, Vitamin A, Vitamin C, Vitamin B6, B9
11 Calories per cup

Herbs: Parsley



Pollination: Self
Lifespan: Biennial

When to Plant
Start seedlings 4-6 weeks before last frost if planting outside. Start seedlings every 2-3 weeks for continuous harvest.

How to Plant
Plant seeds 1/4 inch deep, 1-4 per square foot.

How Long It Takes
Produces food in 70-90 (2-3 months).

Care/Best Growing Conditions
Sun: 6-8 hours full sun.
Temperature: 50-75F.
Water: 1-2 inches per week.
Soil pH: 6-7
Common pests:

Harvesting
Cut or pinch outer, lower leaves near the base. Don't harvest more than 1/3 of the plant at once.

Nutritional Value
Vitamin A (12% DV), Vitamin C (16% DV), Vitamin K (154% DV)
2 Calories per cup

Dry Beans (Pole and Bush)

Pollination: Self
Lifespan: Perennial

When to Plant

Start seedlings 2-4 weeks before last frost. Plant successions through early summer for continual harvest. You can also plant in early fall for harvest in winter.

How to Plant

Plant seeds 1 inch deep
Indoors: 2-3 seeds per plug. Thin after sprouting. Can start them in a cold frame/ small greenhouse. Supplement sun with grow light as needed. Transfer after 3-4 weeks. Harden off for 7-10 days.
Outdoors: Plant right after last frost. 2-3 seeds per 3-4 square inches. Thin after sprouting.
Between plants: 3-4 inches.
Between rows/trellises: 18-24 inches.
By square foot: 1 per square foot.

How Long It Takes

Produces food in 90-120 days (2-3 months).

Care/Best Growing Conditions

Sun: 6-8 hours full sun.
Temperature: 70-85F.
Water: 1-2 inches per week.
Soil pH: 6-7
Common pests: Aphids, spider mites, bean beetles, leafhoppers, stink bugs, thrips, weevils.

Collecting Seeds

Let bean pods dry until they're brittle. If you expect wet or humid weather, cut an entire stalk and let it dry indoors. Harvest the pods and shell them, then let them dry an additional 1-2 weeks. Store them in envelops or glass/ metal containers with silica gel packs. Beans last 3-5 years.

Notes

Best to plant directly in ground after last frost. Plant 3-4 seeds at the base of trellises 24-36 inches apart. Good for soil. Add nitrogen to the ground.

Harvesting

Wait for leaves to drop. Pick the pods and let them dry further on a tray or rack. You can also pull the entire plant and hang it somewhere dry with good air flow. Shell them into a container. Drying takes 2-3 weeks. If you're storing them longterm, dry them an extra week. Test humidity, should be 10-12 percent. If you hit them with a hammer, they should crack, not crush.

Broccoli

Pollination: Insects
Lifespan: Biennial

When to Plant

Start seedlings 4-6 weeks before last frost. Plant successions through early summer for continual harvest. You can also plant in early fall for harvest in winter.

How to Plant

Plant seeds 1/8-1/4 inch deep
Indoors: 2-3 seeds per plug. Thin after sprouting. Can start them in a cold frame/ small greenhouse. Supplement sun with grow light as needed. Transfer after 3-4 weeks. Harden off for 3-4 days.
Outdoors: Plant right after last frost. 2-3 seeds per 17 square inches. Thin after sprouting.
Between plants: 12-20 inches.
Between rows: 12-20 inches.
By square foot: 1 per square foot.

How Long It Takes

Produces food in 60-100 days (2-3 months).

Care/Best Growing Conditions

Sun: 4-6 hours full sun.
Temperature: 60-70F. Can tolerate brief freezes if covered.
Water: 1-2 inches per week.
Soil pH: 6-6.5
Common pests: Caterpillars, aphids, flea beetles, slugs, snails, harlequin bugs, cabbage maggots, whiteflies

Collecting Seeds

Let a plant bolt and produce flowers. It will then form seed pods. Let them turn brittle. If you expect wet or humid weather, cut the stalks and dry them indoors for 1-2 weeks. Crush the pods and sift out the seeds. Dry the seeds 2-3 more days, then store them in envelopes or glass/metal containers with silica gel packs. Seeds last 3-5 years.

Notes

Heavy feeder. Needs plenty of fertilizer/compost. Fertilize again after 4 weeks.

Harvesting

Cut stem 6-8 inches below the head. Cut at a slant to help prevent rot and encourage extra shoots. For best results, harvest before noon.

Brussels Sprouts

Pollination: Self
Lifespan: Biennial

When to Plant

Start seedlings 4-8 weeks before last frost. Plant successions through early summer for continual harvest. You can also plant in early fall for harvest in winter.

How to Plant

Plant seeds 1/4 inch deep
Indoors: 2-3 seeds per plug. Thin after sprouting. Can start them in a cold frame/ small greenhouse. Supplement sun with grow light as needed. Transfer after 3-4 weeks. Harden off for 3-4 days.
Outdoors: Plant right after last frost. 2-3 seeds per 17 square inches. Thin after sprouting.
Between plants: 12-18 inches.
Between rows: 24-36 inches.
By square foot: 1 per square foot.

How Long It Takes

Produces food in 80-100 days (3 months).

Care/Best Growing Conditions

Sun: 6-8 hours full sun.
Temperature: 50-65F
Water: 1-1.5 inches per week.
Soil pH: 6-7.5
Common pests: Cabbage aphids, cabbage worms, flea beetles, harlequin bugs, cutworms, aphids, whiteflies, moth larvae, loopers.

Collecting Seeds

Let a plant bolt and produce flowers. It will then form seed pods. Let them turn brittle. If you expect wet or humid weather, cut the stalks and dry them indoors for 1-2 weeks. Crush the pods and sift out the seeds. Dry the seeds 2-3 more days, then store them in envelopes or glass/metal containers with silica gel packs. Seeds last 3-5 years.

Notes

Heavy feeder. Side-dress after transplanting and once per month until harvest. Stake tall plants. Likes mulch.

Harvesting

Cut stem 5-6 inches below the head, at an angle. Plants will produce second, smaller heads. After the season, pull their roots up and compost them.

Cabbage

Pollination: Insects/Wind
Lifespan: Biennial

When to Plant

Start seedlings 6-8 weeks before last frost. Plant successions through early summer for continual harvest. You can also plant in early fall for harvest in winter.

How to Plant

Plant seeds 1/8-1/4 inch deep
Indoors: 2-3 seeds per plug. Thin after sprouting. Can start them in a cold frame/ small greenhouse. Supplement sun with grow light as needed. Transfer after 4-6 weeks. Harden off for 3-4 days.
Outdoors: Plant right after last frost. 2-3 seeds per 18-24 square inches. Thin after sprouting.
Between plants: 12-24 inches.
Between rows: 18-30 inches.
By square foot: 1 per square foot.

How Long It Takes

Produces food in 60-100 days (2-3 months).

Care/Best Growing Conditions

Sun: 6-8 hours full sun.
Temperature: 60-65F. Can tolerate brief freezes if covered.
Water: 1 inch per week.
Soil pH: 6-6.8
Common pests: Cabbage aphids, cabbage worms, flea beetles, harlequin bugs, cutworms, aphids, whiteflies, moth larvae, loopers.

Collecting Seeds

Let a plant bolt and produce flowers. It will then form seed pods. Let them turn brittle. If you expect wet or humid weather, cut the stalks and dry them indoors for 1-2 weeks. Crush the pods and sift out the seeds. Dry the seeds 2-3 more days, then store them in envelopes or glass/metal containers with silica gel packs. Seeds last 3-5 years.

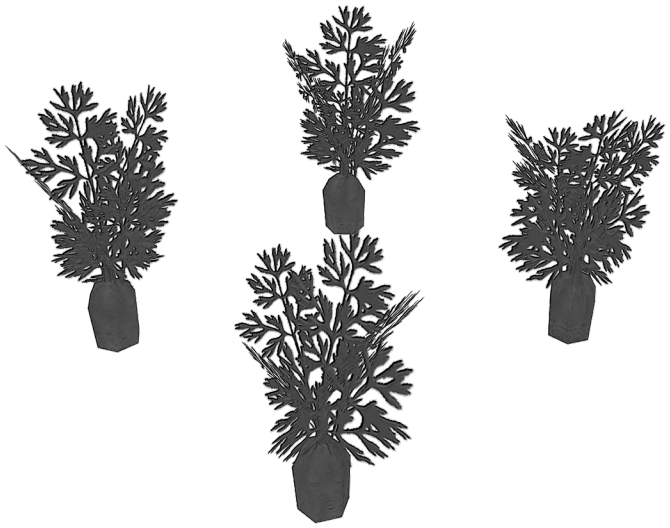
Notes

Heavy feeder. Benefits from regular side-dressing. Likes mulch.

Harvesting

Cut stem right below the head. Leave a few outer leaves to encourage secondary heads.

Carrots



Pollination: Insects
Lifespan: Biennial

When to Plant

Start seedlings 4-6 weeks before last frost. Plant successions through early summer for continual harvest. You can also plant in early fall for harvest in winter.

How to Plant

Plant seeds 1/8-1/4 inch deep
Indoors: 2-3 seeds per plug. Thin after sprouting. Can start them in a cold frame/ small greenhouse. Supplement sun with grow light as needed. Transfer after 3-4 weeks. Harden off for 3-4 days. Be careful with root.
Outdoors: Plant right after last frost. Dense seeds per 12 square inches. Thin after sprouting.
Between plants: 2-3 inches.
Between rows: 12-18 inches.
By square foot: 16 per square foot.

How Long It Takes

Produces food in 50-80 days (2-3 months).

Care/Best Growing Conditions

Sun: 6-8 hours full sun.
Temperature: 60-75F
Water: 1 inch per week.
Soil pH: 6-6.8
Common pests: Carrot rust flies, aphids, wireworms, nematodes, cutworms, carrot weevils, celery worms, flea beetles, whiteflies

Collecting Seeds

Let a plant bolt and produce flowers. It will then form seed pods. Let them turn brittle. If you expect wet or humid weather, cut the stalks and dry them indoors for 1-2 weeks. Crush the pods and sift out the seeds. Dry the seeds 2-3 more days, then store them in envelopes or glass/metal containers with silica gel packs. Seeds last 3-5 years.

Notes

Harvesting

Loosen the soil with a garden fork, then pull them up by the greens. Cut the greens off before cooking or storing.

Cauliflower

Pollination: Self/Insects
Lifespan: Biennial

When to Plant
Start seedlings 4-7 weeks before last frost. Plant successions through early summer for continual harvest. You can also plant in early fall for harvest in winter.

How to Plant
Plant seeds 1/8-1/4 inch deep
Indoors: 2-3 seeds per plug. Thin after sprouting. Can start them in a cold frame/ small greenhouse. Supplement sun with grow light as needed. Transfer after 3-4 weeks. Harden off for 3-4 days.
Outdoors: Plant right after last frost. 2-3 seeds per 18-24 square inches. Thin after sprouting.
Between plants: 18-24 inches.
Between rows: 24-36 inches.
By square foot: 1 per square foot.

How Long It Takes
Produces food in 60-80 days (2-3 months).

Care/Best Growing Conditions
Sun: 12 hours as seedlings, then 6-8 hours full sun.
Temperature: 60-65F
Water: 1-2 inches per week.
Soil pH: 6-7
Common pests: Cabbage maggots, slugs, snails, aphids, flea beetles, cabbage worms, loopers

Collecting Seeds
Let a plant bolt and produce flowers. It will then form seed pods. Let them turn brittle. If you expect wet or humid weather, cut the stalks and dry them indoors for 1-2 weeks. Crush the pods and sift out the seeds. Dry the seeds 2-3 more days, then store them in envelopes or glass/metal containers with silica gel packs. Seeds last 3-5 years.

Notes
Heavy feeder. Tie outer leaves over head when plant reaches 2-3 inches tall. Keeps them tender.

Harvesting
Cut stem right below the head. Leave a few outer leaves to encourage secondary heads.

Collards

Pollination: Insects
Lifespan: Biennial

When to Plant

Start seedlings 4-6 weeks before last frost. Plant successions through early summer for continual harvest. You can also plant in early fall for harvest in winter.

How to Plant

Plant seeds 1/4 inch deep
Indoors: 2-3 seeds per plug. Thin after sprouting. Can start them in a cold frame/ small greenhouse. Supplement sun with grow light as needed. Transfer after 3-4 weeks. Harden off for 3-4 days.
Outdoors: Plant right after last frost. 2-3 seeds per 18 square inches. Thin after sprouting.
Between plants: 18-24 inches.
Between rows: 24-36 inches.
By square foot: 1 per square foot.

How Long It Takes

Produces food in 40-50 days (1-2 months).

Care/Best Growing Conditions

Sun: 6-8 hours full sun.
Temperature: 60-70F
Water: 1-1.5 inches per week.
Soil pH: 6-6.8
Common pests: Caterpillars, aphids, flea beetles, harlequin bugs, cutworms, thrips, whiteflies

Collecting Seeds

Let a plant bolt and produce flowers. It will then form seed pods. Let them turn brittle. If you expect wet or humid weather, cut the stalks and dry them indoors for 1-2 weeks. Crush the pods and sift out the seeds. Dry the seeds 2-3 more days, then store them in envelopes or glass/metal containers with silica gel packs. Seeds last 3-5 years.

Notes

Harvesting

Cut large, outer leaves near the base. Cut at a slant to prevent rot, etc.

Corn

Pollination: Wind
Lifespan: Annual

When to Plant
Start seedlings 2-4 weeks before last frost. Plant successions through early summer for continual harvest. You can also plant in early fall for harvest in winter.

How to Plant
Plant seeds 1/2 inch deep
Indoors: 2-3 seeds per plug. Thin after sprouting. Can start them in a cold frame/ small greenhouse. Supplement sun with grow light as needed. Transfer after 2-4 weeks. Harden off for 3-4 days.
Outdoors: Plant right after last frost. 2-3 seeds per 8-12 square inches. Thin after sprouting.
Between plants: 12 inches.
Between rows: 36 inches.
By square foot: 1 per square foot.

How Long It Takes
Produces food in 60-100 days (2-3 months).

Care/Best Growing Conditions
Sun: 8-10 hours full sun.
Temperature: 77-90F
Water: 1-2 inches per week
Soil pH: 6-6.8
Common pests: corn rootworm, armyworms, cutworms, chinch bugs, corn leaf aphids, corn borers.

Harvesting
Twist the ear and pull it down to snap off.

Collecting Seeds
Wait until kernels are hard. Harvest the stalk and hang upside down, indoors for another 1-2 weeks to fully dry. Do this sooner if you're expecting wet or humid weather. Shell the kernels and dry another 1-2 weeks.

Notes
Heavy feeder. Benefits from regular side-dressing. Likes mulch.

Cucumber

Pollination: Insects
Lifespan: Annual

When to Plant

Start seedlings 3-4 weeks before last frost. Plant successions through early summer for continual harvest. You can also plant in early fall for harvest in winter.

How to Plant

Plant seeds 1/8-1/4 inch deep
Indoors: 2-3 seeds per plug. Thin after sprouting. Can start them in a cold frame/ small greenhouse. Supplement sun with grow light as needed. Transfer after 3-4 weeks. Harden off for 3-4 days.
Outdoors: Plant right after last frost. 2-3 seeds per 12 square inches. Thin after sprouting.
Between plants: 12-36 inches.
Between rows/trellises: 24-48 inches.
By square foot: 1 per square foot.

How Long It Takes

Produces food in 50-70 days (2 months).

Care/Best Growing Conditions

Sun: 6-8 hours full sun.
Temperature: 75-85F
Water: 1-2 inches per week.
Soil pH: 6-6.5
Common pests: Cucumber beetles, aphids, spider mites, whiteflies, leafminers, squash bugs, caterpillars

Harvesting

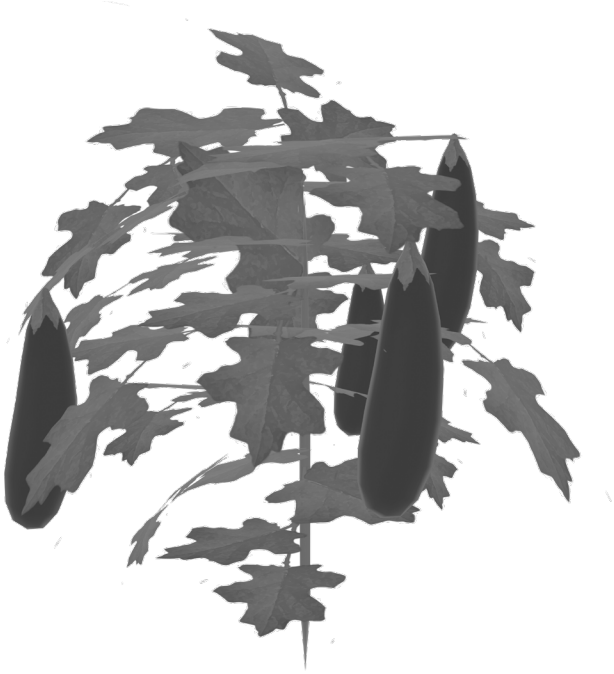
Cut the stem about 1 inch above the cap.

Collecting Seeds

Let a plant bolt and produce flowers. It will then form seed pods. Let them turn brittle. If you expect wet or humid weather, cut the stalks and dry them indoors for 1-2 weeks. Crush the pods and sift out the seeds. Dry the seeds 2-3 more days, then store them in envelopes or glass/metal containers with silica gel packs. Seeds last 3-5 years.

Notes

Eggplant



Pollination: Insects/Wind
Lifespan: Perennial

When to Plant
Start seedlings 8-10 weeks before last frost. Plant successions through early summer for continual harvest.

How to Plant
Plant seeds 1/4 inch deep
Indoors: 2-3 seeds per plug. Thin after sprouting. Can start them in a cold frame/ small greenhouse. Supplement sun with grow light as needed. Transfer after 3-4 weeks. Harden off for 3-4 days.
Outdoors: Plant right after last frost. 2-3 seeds per 18 square inches. Thin after sprouting.
Between plants: 18-36 inches.
Between rows: 36-48 inches.
By square foot: 1 per 2 square feet.

How Long It Takes
Produces food in 70-120 days (3-4 months).

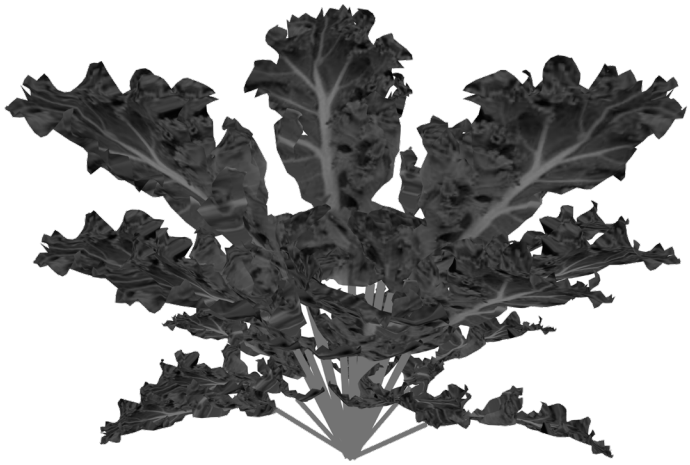
Care/Best Growing Conditions
Sun: 6-8 hours full sun.
Temperature: 70-90F. Can tolerate warmer weather.
Water: 1-2 inches per week.
Soil pH: 5.8-6.5
Common pests: Aphids, flea beetles, spider mites, hornworms, stink bugs, armyworms, slugs, snails

Harvesting
Cut stem about 1 inch above the cap.

Collecting Seeds
Let a plant bolt and produce flowers. It will then form seed pods. Let them turn brittle. If you expect wet or humid weather, cut the stalks and dry them indoors for 1-2 weeks. Crush the pods and sift out the seeds. Dry the seeds 2-3 more days, then store them in envelopes or glass/metal containers with silica gel packs. Seeds last 3-5 years.

Notes

Kale



Pollination: Insects
Lifespan: Biennial

When to Plant

Start seedlings 4-6 weeks before last frost. Plant successions through early summer for continual harvest. You can also plant in early fall for harvest in winter.

How to Plant

Plant seeds 1/8-1/4 inch deep
Indoors: 2-3 seeds per plug. Thin after sprouting. Can start them in a cold frame/ small greenhouse. Supplement sun with grow light as needed. Transfer after 3-4 weeks. Harden off for 3-4 days.
Outdoors: Plant right after last frost. 2-3 seeds per 12 square inches. Thin after sprouting.
Between plants: 12-18 inches.
Between rows: 18-30 inches.
By square foot: 1 per square foot.

How Long It Takes

Produces food in 55-75 days (2-3 months).

Care/Best Growing Conditions

Sun: 6-8 hours full sun.
Temperature: 50-75F. Can tolerate temporary freezes if covered.
Water: 1-1.5 inches per week.
Soil pH: 6-7.5
Common pests: Aphids, flea beetles, loopers, cutworms, slugs, snails, whiteflies, harlequin bugs, thrips

Collecting Seeds

Let a plant bolt and produce flowers. It will then form seed pods. Let them turn brittle. If you expect wet or humid weather, cut the stalks and dry them indoors for 1-2 weeks. Crush the pods and sift out the seeds. Dry the seeds 2-3 more days, then store them in envelopes or glass/metal containers with silica gel packs. Seeds last 3-5 years.

Notes

Heavy feeder. Side-dress after transplanting and once per month until harvest. Stake tall plants. Likes mulch.

Harvesting

Cut large, outer leaves near the base. Cut at a slant to prevent rot, etc.

How to Forage

This chapter explains the basics of foraging. You'll learn some basic strategies as well as the best plants and weeds to harvest. You can take this knowledge wherever you go. You can also use it to cultivate a food forest in your yard or nearby areas, growing edible plants on the sly.

Can you really eat weeds?

Yes, you really can eat several types of weeds. You can forage for them, or you can grow them in your back yard. You can plant them according to square foot gardening methods like any other plant, or you can just scatter them in your yard and make a weed paradise. You can also scatter them in nearby woods or other areas to harvest in a truly worst-case scenario. Caution, they'll absorb whatever pollutants they grow around. There's some value in scattering edible weeds across your lawn. It won't look like food to the average passerby. Depending on your situation, that might be useful to you and your group. Tip: Your HOA neighbors might not like you scattering weeds that grow aggressively, so take that into consideration.

Basic Principles of Foraging

* Forage lightly. Don't take more than you need. Leave some to regrow.
* Forage with caution. Stay away from weeds growing near areas with a lot of traffic or industrial waste. Also be careful around areas treated with pesticide or weed killer. In an emergency, consume at your own risk.
* Cultivate with care. You can grow many of these weeds just like you'd grow a normal plant. You can start them indoors as seedlings in late winter (late January or early February) and transfer them outside. Many of them are resilient and self-seeding. Once you start them, you probably won't have to repeat this process. You can plant a few weeds per square foot. For weeds with deeper tap roots, plant them 1 to a square foot.
* Most of these weeds tolerate a range of soil conditions, with a pH 6-7. Some of them can tolerate slightly higher soil pH in the mid 7s.
* Just like plants, you can protect weeds from extreme cold with tunnels and row covers.
* If you're cultivating weeds in a garden, you'll need to manage them to keep them from taking over your other plants. Keep them in dedicated areas or beds. If they show up in unwanted places, snip the heads so they don't seed. Uproot them. Compost them. Don't use weed killer.
* If you struggle to identify a weed in the wild, don't eat it. Some weeds have lookalikes that are toxic. This guide lists some of the most common dopplegangers.
* Many of these plants also have medicinal value, something covered later.

Burdock

Pollination: Self

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, 1 plant per square foot. Can start earlier indoors.

Hardiness

Prefers cooler weather 50-75F but can tolerate heat and drought.

Which Parts Can You Eat?

You can eat the root, stems, leaves, and immature buds. Foragers say the stalks taste like asparagus or artichoke.

Nutritional Value

Fiber, Vitamins B6 (18% DV), Iron (5%), Calcium (4%), Copper (11%), Magnesium (11%), Manganese (13%), Potassium (8%), Phosphorus (5%)
85 Calories per cup

How Do You Cook It?

Peel and boil the stem. Boil 2 minutes for crunchy, 8 minutes for full cook. Then you can fry or saute. For roots, clean and quick soak them in water with vinegar. Then chop and roast or stir fry. Add other spices or ingredients of your choice. Also makes a good soup.

Notes

Burdock lives for two years. Stems and leaves taste best during the first year, before it flowers and seeds. Harvest the plant during the first 8-12 months, and collect seeds to plant the following spring. It will also seed itself, making your life easier. If you're only harvesting roots, you can harvest during the second year to maximize size. Harvest before it flowers.

Clover

Pollination: Insects

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, scatter casually, about 2 ounces per 1,000 square foot.

Hardiness

Once established, tolerates heat and drought very well. Treat it like grass, it will thrive.

Which Parts Can You Eat?

You can eat every part, from root to flower.

Nutritional Value

Protein, Fiber, Iron, Calcium, Vitamin A, Vitamin E, Vitamin B, Vitamin K (90% DV), Selenium (500% DV), Chromium (158% DV)
25 Calories per cup

How Do You Cook It?

You can use the leaves raw in salads or cook them up like spinach. You can also use the flowers in salads or grind them into flour or powder. The flowers also make sweet tea. You can also cook the roots. Eat in moderation to avoid stomach trouble. Boil or steam to aid digestion.

Notes

Clover belongs to the legume family. They return nitrogen to the soil. Like many other weeds, you can direct sow them by scattering after last frost. It grows fast, and it's ready for harvest in 30-40 days. White and red clover are perennial, so they last several years. Clover seeds itself, but you can also collect seeds as a backup.

Chickweed

Pollination: Self

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, 2-3 plants per square foot. Can start earlier indoors.

Hardiness

Prefers cooler weather 50-68F. Doesn't do well in hot, dry weather. Does well in cold.

Which Parts Can You Eat?

You can eat every part except the root.

Nutritional Value

Vitamins A, C, D, B, Iron, Calcium, Potassium, Magnesium, Zinc, Phosphorous, Manganese, Copper, Antioxidants
25 Calories per cup

How Do You Cook It?

You can use the leaves raw in salads or cook them up like spinach. You can also use the flowers in salads or other recipes. You can use the entire plant (except root) to make tea or even pesto.

Notes

Chickweed stacks up well to spinach in terms of nutrients and flavor. You can direct sow it after last frost. Once established, it takes care of itself. Just snip the top flowers and leaves. It grows back. Like other self-pollinators, it can seed itself for the next growing season. Caution, experts note that it can reduce milk supply for breastfeeding moms.

Curly Dock

Pollination: Insects

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, 1 plant per square foot or even 2 square foot. Can start earlier indoors.

Hardiness

Prefers moist areas but tolerates drought. Can tolerate cold as well as heat.

Which Parts Can You Eat?

You can eat every part, but the roots are primarily used for medicine.

Nutritional Value

Protein (Seeds). Fiber. Vitamins A and C, Iron, Calcium, Potassium, Magnesium, Phosphorus.
20 Calories per cup

How Do You Cook It?

You can use the leaves raw in salads or cook them up like spinach. You can peel the stalks and prepare them like green beans. Roast the seeds or grind them into flour. Harvest leaves when they're young. Harvest the stalks before they flower. Harvest the seeds in late summer or fall.

Notes

Curly dock is a tough plant that can regrow from its long taproots. Sow it during early spring or early fall.

Dandelion

Pollination: Self

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, 1-4 plants per square foot. Can start earlier indoors.

Hardiness

Prefers temperatures 60-70F, but it tolerates heat and drought well.

Which Parts Can You Eat?

You can eat every part, including the root.

Nutritional Value

Protein, Fiber, Vitamins K, A, and C. Antioxidants. Calcium, Potassium, Iron.
25 Calories per cup

How Do You Cook It?

You can fry the flower heads or use them to make wine, jelly, and syrup. You can also use them in salads. You can make tea or coffee from the roots (no caffeine), or cook them up like carrots. You can technically eat the stem, but it's bitter.

Notes

Dandelion is one of the lowest maintenance plants, known for its resilience. It contains more Vitamin A than spinach, and more Vitamin C than tomatoes. You can harvest it at any time. For the best taste and nutrients, harvest the leaves in early spring. Harvest the roots in early spring or late fall.

Garlic Mustard

Pollination: Insects

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, 1 plant per square foot or even 2 square foot. Can start earlier indoors.

Hardiness

Prefers moist areas but tolerates drought. Can tolerate cold as well as heat.

Which Parts Can You Eat?

You can eat every part, but the roots are primarily used for medicine.

Nutritional Value

Protein (Seeds). Fiber. Vitamins A and C, Iron, Calcium, Potassium, Magnesium, Phosphorus.
20 Calories per cup

How Do You Cook It?

You can use the leaves raw in salads or cook them up like spinach. You can peel the stalks and prepare them like green beans. Roast the seeds or grind them into flour. Harvest leaves when they're young. Harvest the stalks before they flower. Harvest the seeds in late summer or fall.

Notes

Curly dock is a tough plant that can regrow from its long taproots. Sow it during early spring or early fall.

Japanese Knotweed

Pollination: Insects

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, several plants per square foot.

Hardiness

Prefers moderate temperatures and moist soil, but very good at tolerating extreme weather.

Which Parts Can You Eat?

You can eat every part, including the root (mostly medicinal).

Nutritional Value

Vitamins A and C, Potassium, Phosphorus, Zinc, Manganese, Antioxidants, Rutin, Quercetin (Antiviral), Resveratrol (Cardiovascular).

How Do You Cook It?

Harvest young stems and leaves for use in salads. You can also use the shoots in sauces, pies, etc. Older shoots need peeling, but they're still edible. Chop and grind the root as an antioxidant, for medicine or a supplement.

Notes

Like other invasive weeds, be careful. Because Japanese knotweed is so reslient, it can overtake a garden. It's considered highly aggressive. It can regrow from its deep taproot, or even fragments of root.

Jewelweed

Pollination: Self

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, 1-4 plants per square foot. Can start earlier indoors.

Hardiness

Prefers wet conditions. Doesn't tolerate heat or drought very well.

Which Parts Can You Eat?

You can eat every part, including the root (mostly medicinal).

Nutritional Value

Quercetein (Antiviral), Kaempferol (Antiviral), Lawsone (Antioxidant)

How Do You Cook It?

Use stems, leaves, and flower heads in salads. Soak and boil to make them taste less bitter. Pods contain seeds that taste like nuts.

Notes

Jewel weed contains high amounts of oxalic acid.

Lady's Bedstraw

Pollination: Self

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, 1-4 plants per square foot. Can start earlier indoors.

Hardiness

Prefers full sun. Once established, tolerates heat and drought very well.

Which Parts Can You Eat?

You can eat the flower heads, leaves, stems, and seeds.

Nutritional Value

Antioxidants, Silica, Iodine, Potassium
55 Calories per Cup

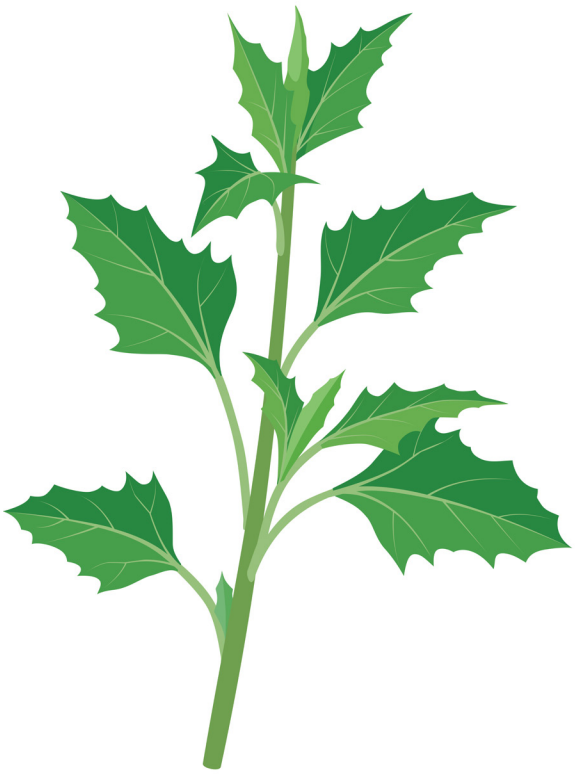
How Do You Cook It?

Use stems, leaves, and flower heads in salads. You can use the seeds for a coffee or tea substitute. Harvest when young. You can steam or roast any part to improve the texture and taste.

Notes

You can cultivate Lady's Bedstraw like many other plants. Sow in spring after the last frost. With minimal weeding and watering, it thrives.

Lambsquarter



Pollination: Self

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, 1-4 plants per square foot. Can start earlier indoors.

Hardiness

Prefers full sun, 60-70F, but can tolerate heat and drought.

Which Parts Can You Eat?

You can eat the flower heads, leaves, stems, and seeds.

Nutritional Value

Vitamin A (64% DV), Vitamin C (89% DV), Vitamin K (112 % DV), Calcium (31% DV), Iron (7% DV), Magnesium, Potassium
43 Calories per Cup

How Do You Cook It?

Use stems, leaves, and flower heads in salads. You can use the seeds in any dish, but especially soups and cereals. Cook older leaves to reduce oxalic acid.

Notes

Many parts of the world cultivate lambsquarter like spinach, because it tolerates heat and drought better. It's considered a weed in North America, despite its nutritional value. The base of leaves near the stems have a powdery white texture. It grows from late spring through early winter. You can cultivate it like many other plants, and it grows fast. You can often harvest it as early as 40 days after planting. Special note: Dog's Mercury looks like lambsquarter, but it's toxic. Dog's Mercury has hairy leaves with serrated edges, compared to lambsquarter's wavy edges. It smells bad when crushed. The leaves lack the white, powdery texture of lambsquarter leaves.

Milkweed

Pollination: Insects

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, 1 plant per square foot. Can start earlier indoors.

Hardiness

Does best with full sun and watering, but can tolerate drought and heat.

Which Parts Can You Eat?

You can eat the flower heads, leaves, stems, and seeds.

Nutritional Value

Protein (High), Amino Acids (High)

How Do You Cook It?

It's best to harvest when they're young. Important: Boil the entire plant and then saute. For older plants, harvest the young tender leaves. You can fry the flower heads like okra. You can harvest young seeds and pods for casseroles and soups.

Notes

Make sure you boil milkweed before eating. It's toxic when consumed raw. It's especially toxic to small animals and livestock.

Pineappleweed

Pollination: Self

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, 1 plant per square foot. Can start earlier indoors.

Hardiness

Does very well in hot, dry conditions as well as poor soil.

Which Parts Can You Eat?

You can eat every part, except the root.

Nutritional Value

Mainly Antioxidants

How Do You Cook It?

You can use young leaves in salads raw. You can cook older leaves in soups or stews. You can use the flower heads for tea, syrups, jellies, etc.

Notes

Pineappleweed grows fast, reaching maturity in less than 100 days. It grows throughout the year, but mainly spring through fall. If you're cultivating, sow it in spring after the last frost. The tea also works as a mild sedative, similar to chamomile, according to many foragers.

Plantago (Plantain)

Pollination: Self

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, 9-16 plants per square foot. Can start earlier indoors.

Hardiness

Does very well in hot, dry conditions as well as poor soil.

Which Parts Can You Eat?

You can eat every part, except the root.

Nutritional Value

Fiber, Vitamin B, Vitamin C (High), Potassium (High), Magnesium, Iron, Zinc, Calcium25 Calories per cup

How Do You Cook It?

You can use young leaves in salads raw. You can cook older leaves in soups or stews. You can also eat the flower head and cook the roots. The seeds can make meals similar to quinoa.

Notes

Plantago grows from late spring to early fall. You can cultivate it like many other plants, and it's low-maintenance. It also has medicinal value for mosquito bites and rashes. Chop or mash the leaves and put them on your skin.

Queen Anne's Lace

Pollination: Self

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, 1 plant per square foot. Can start earlier indoors.

Hardiness

Can tolerate heat, drought, and even poor soil very well.

Which Parts Can You Eat?

You can eat every part, including the root.

Nutritional Value

Vitamin C, Vitamin Bs, Calcium, Potassium, Anti-oxidants, Fiber.

How Do You Cook It?

You can cook the plants and stems like spinach. You can use the flower heads for syrups and jellies. You can grind the seeds as a spice. You can cook the roots up like carrots, and they taste similar.

Notes

Be careful with identification. Poison Hemlock looks similar to Queen Anne's Lace, except it has smooth stems (not hairy). It also smells bad. Queen Anne's Lace has a single purple spot on the flower head, but Poison Hemlock has purple spots on the stems.

Quickweed

Pollination: Self

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, 1-2 plants per square foot. Can start earlier indoors.

Hardiness

Can tolerate heat, but doesn't do well in drought.

Which Parts Can You Eat?

You can eat every part, including the root.

Nutritional Value

Protein, Fiber, Vitamin A, Vitamin C, Calcium (High), Magnesium, Potassium, Iron, Zinc, Vitamin Bs.

How Do You Cook It?

You can cook up the plants and stems like spinach. You can chop the root and roast, boil, or saute.

Notes

Quickweed earns its name by growing very fast.

Purslane

Pollination: Self

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, 4-9 plants per square foot. Can start earlier indoors.

Hardiness

Does very well in hot, dry conditions.

Which Parts Can You Eat?

You can eat every part, except the root.

Nutritional Value

Vitamin A (44% DV), Vitamin C (35% DV), Vitamin E (81% DV), Potassium (14% DV), Magnesium (17% DV), Iron, Calcium, Omega 3s20 Calories per cup

How Do You Cook It?

You can cook the entire plant like spinach, or just the leaves and stems. They also go well in salads, raw. You can also grind up the seeds as flour, or put them in dishes.

Notes

Purslane tolerates a range of conditions. It grows fast, and it's ready to harvest after about 50 days. It can even grow in sidewalk cracks. The seeds can last up to 40 years. Like other weeds, it's high in oxalic acid.

Stinging Nettles

Pollination: Self

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, 1 plant per square foot. Can start earlier indoors.

Hardiness

Prefers full sun. Does well in heat, but doesn't do well in drought.

Which Parts Can You Eat?

You can eat the stems, leaves, and seeds.

Nutritional Value

Vitamin K (High), Vitamin A (High), Vitamin C, Vitamin Bs

How Do You Cook It?

You can cook up the plants and stems like spinach. Unlike other weeds that can go in salads raw, you have to cook stinging nettles to neutralize the bristles. The seeds taste like nuts.

Notes

Make sure to wear gloves when harvesting, and harvest them when they're young. Adult plants don't taste good, and they develop cystoliths (crystals).

Thistle

Pollination: Self

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, 1 plant per square foot or even 2 square foot. Can start earlier indoors.

Hardiness

Prefers full sun. Once established, does well in heat and drought.

Which Parts Can You Eat?

You can eat every part, including the root.

Nutritional Value

Vitamin K (High), Vitamin A (High), Iron, Calcium, Magnesium, Phosphorus, Zinc, Copper, Fiber, Protein, Antioxidants

How Do You Cook It?

You can eat the root raw or cook it. You have to remove the spines from leaves. Eat or cook the rest like any other weed, as you prefer.

Notes

A relative of artichoke, thistle tastes and cooks up similar. Plant it in spring after last frost.

Wild Violets

Pollination: Self

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, 3-4 plants per square foot. Can start earlier indoors.

Hardiness

Does best with shade and watering, and not especially tolerant to heat or drought.

Which Parts Can You Eat?

You can eat every part, but the root is mostly medicinal.

Nutritional Value

Vitamin C (High), Vitamin A (High), Vitamin Bs, Magnesium Iron, Potassium, Manganese, Copper

How Do You Cook It?

You can eat the leaves and stems like spinach. Use the flower heads in salads, or to make jellies, syrups, teas.

Notes

Wild violets grow best in the spring, between last frost and the beginning of summer. They'll continue to grow through early fall. You can cultivate them like any other plant. They have additional medicinal value as pain killers and cold medicine, with some antiviral properties.

Wood Sorrel

Pollination: Self/Insect

Where Does it Grow?

Grows almost anywhere in temperate climates.

If You're Growing...

Direct sow after last frost, 9-16 plants per square foot. Can start earlier indoors.

Hardiness

Does best with full sun and watering, but can tolerate drought and heat.

Which Parts Can You Eat?

You can eat every part, including roots/tubers.

Nutritional Value

Vitamin C (High), Vitamin A (High), Vitamin Bs, Magnesium Iron, Potassium, Manganese, Copper

How Do You Cook It?

You can eat the leaves and stems like spinach. The flowers can go into any dish raw. You can eat the seeds, and you can treat the roots/tubers like potatoes. Warning: Like a few other weeds, wood sorrel contains oxalic acid.

Notes

Wood sorrel typically grows best in spring and early fall, but it can survive winter. It grows fast, ready for harvesting in 30-40 days.

How to Use Solar

This chapter explains the basics of solar power. You'll learn how to calculate your electricity needs and connect a basic system. You don't need to spend tens of thousands of dollars on an expensive rooftop system. A simpler setup can work well, and it could save your life during an emergency.

How much do you need?

The average American household uses 30kWh of electricity a day. It helps to think in terms of appliances and watt-hours. A central air conditioner uses anywhere from 3-5 kW per hour. A window unit uses about 300-500 watts. A refrigerator uses about 200 watts per hour. A chest freezer uses 100-400, and a stove uses 2-5 kW. It adds up fast.

How much can you get?

A typical rooftop solar setup can produce about 20-40 kW per day, depending on the weather. They can cost tens of thousands to install. Smaller, portable setups produce much less, but you can still generate enough to run some essential equipment if you develop a strategy.

The Basics of Electricity

We measure electricity in amps, volts, and watts. Amps refers to the amount of electricity flowing through a system. Voltage refers to force or velocity. We multiply amps by volts to get watts, the total load. It's important to know, because different equipment requires different voltage.

Volts x amps = watts
Watts/amps = volts
Watts/volts = amps

For example: You have to configure solar panels to deliver a specific voltage to run a solar charger or generator. Too much, and you'll damage the system. Not enough, and the system won't run. The same goes for amps. If your appliances demand too much, it can cause hazards. Plus, solar equipment is rated for maximum volts, amps, and watts.

Is there a quickstart?

It's easy to get overwhelmed when you start learning about solar panels, charge controllers, battery management systems, and inverters. Fortunately, there's a fast way to get solar that's much simpler (and safer). It's called a solar generator. It combines all the equipment you need in one package. Just configure your solar panels and plug them into the generator.

How to choose a generator

Several companies sell solar generators: Bluetti, Jackery, Ecoflow, Renogy, Anker, and Goal Zero. Some are expandable, which means you can add batteries to them to increase your capacity.

Generators run from a few hundred watts all way up to several thousand in terms of electricity storage. Think about your needs during different types of emergencies. For example, if you need to power a portable AC during a grid outage, that would require a generator with at least 1-2 kilowatts of capacity.

How to Match Solar Panels

Companies also sell generators and solar panels in premade kits. Every generator has a maximum PV (solar) input measured in watts. For many middle tier generators, it's about 1000w per hour.

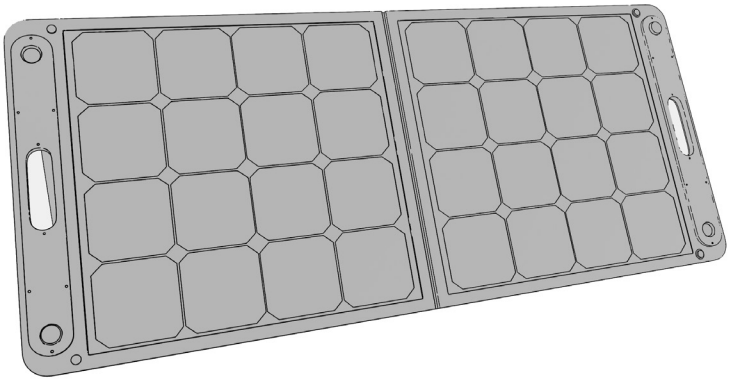
Most foldable, portable solar panels generate 200-400 watts per hour. So, many kits come with one generator and two panels.

It's okay to connect more solar panels than a generator's max wattage. It just won't draw the power. Some people deliberately "over panel" their systems to compensate for poor sunlight or to maximize solar input at the beginning and end of the day, when it's less bright.

You want to watch out for your amps at the other end, with how many devices you connect.

Solar Panel Specs

Solar panels also have technical specifications that matter when you're connecting more than a couple into one system. Here they are:



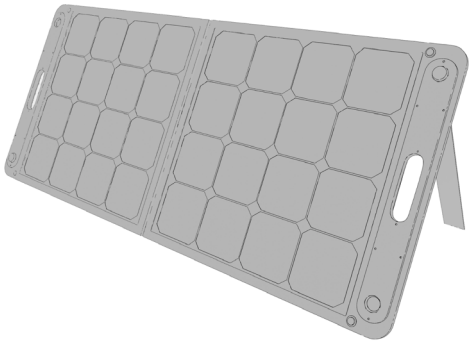
Pmax (Maximum Power Point): The max wattage a panel generates under ideal conditions.

OCV (Open Circuit Voltage)

Vmp (Voltage at Max Power)

Isc (Short Circuit Current): Use this to size fuses for panels in bigger setups.

Imp (Current/Amps at Max Power)



For example:

Pmax (Maximum Power Point): 350w

OCV (Open Circuit Voltage): 46.5V

Vmp (Voltage at Max Power): 37.5V

Isc (Short Circuit Current): 10.8 amps

Imp (Current/Amps at Max Power): 9.2 amps

This information tells us that we need a 15 amp fuse, and that we should connect the panels in parallel so we don't exceed the voltage range for most portable generators (12-60v). It will make sense in a minute...

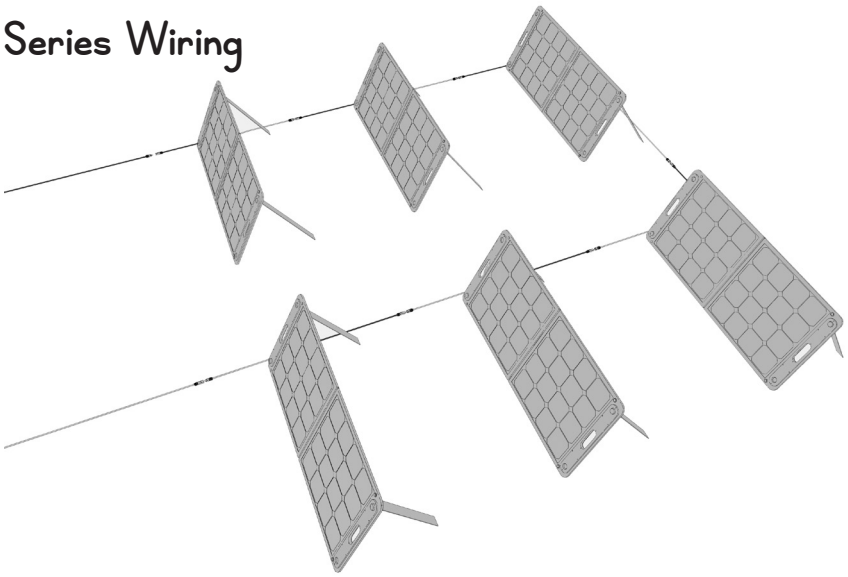
Series vs. Parallel Setup

You can hook up solar panels in two main ways: series and parallel. In series, solar panels add up or stack voltage as you connect positive to negative terminals. In parallel, they add up or stack amps as you connect positive-positive and negative-negative. Most of the time, you don't want to stack volts.

You can also hook up panels in series-parallel, discussed later.

Cables: MC4
Male and female connectors

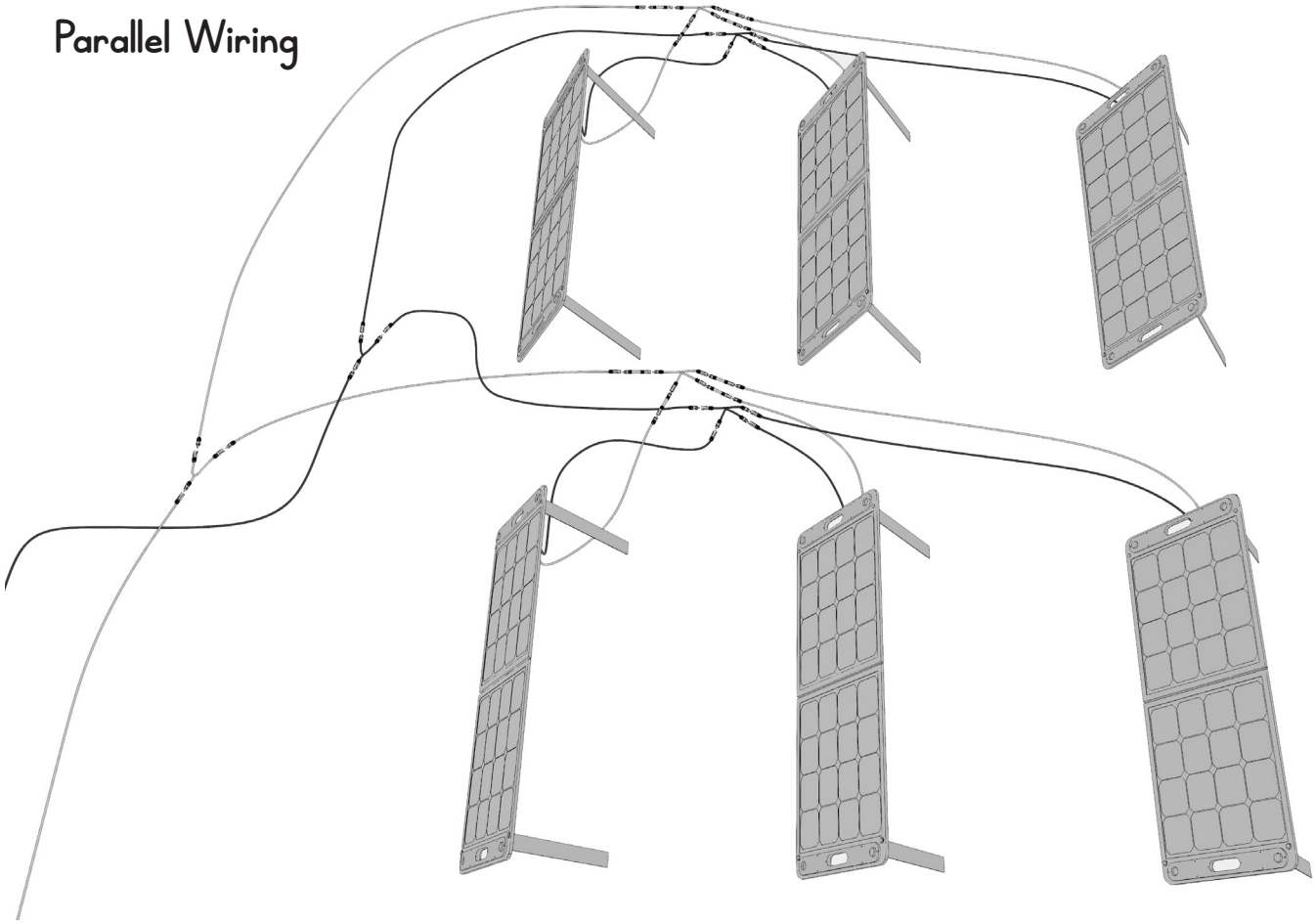
Series Wiring



Why Parallel?

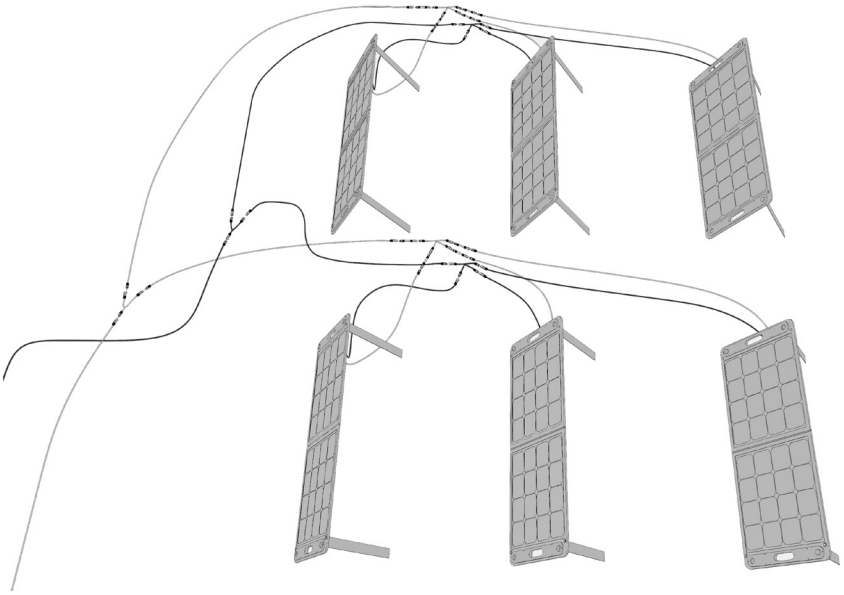
Most portable solar generators can't handle more than 60 volts, but they can handle plenty of amps. So you wire them in parallel. It requires more gear.

Parallel Wiring



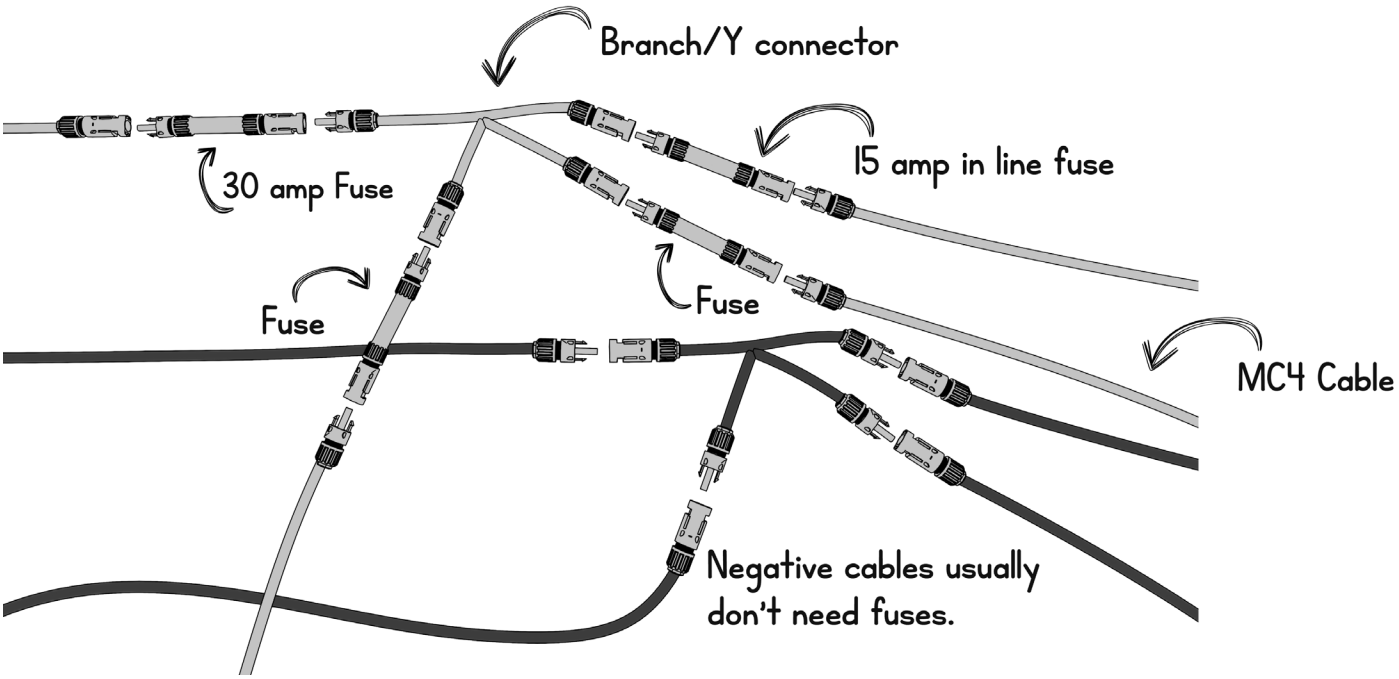
Parallel Setup in Detail

A parallel setup requires MC4 branch or y connectors, fuses, and extension cables. You're wiring all the positive wires together, and all the negative ones together, and feeding them into one positive and one negative cable. Those two cables run to your generator.



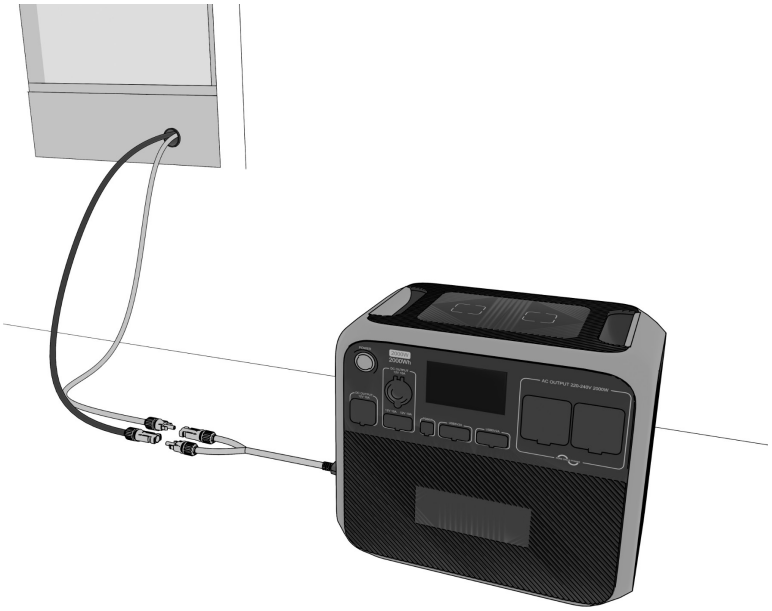
The gear

Generally, you'll want to use 6-8 awg cable when you're connecting 3-4 solar panels. It handles 40-50 amps or better. Remember, 4 solar panels with 9-10 Imp connected in parallel generate roughly 40 amps. Lower awg means higher load tolerance, because it's thicker wire. For multiple panels, go with 8 awg or lower (bigger). The short circuit current (Isc) tells you what size fuse you need. Generally, it's 1.5x the short circuit current, or 15. It's not hard to find 15 amp inline fuses at most solar retailers. For extra safety, use a 30 amp fuse after the branch connector (3x10 amps).



Running The Cables Inside

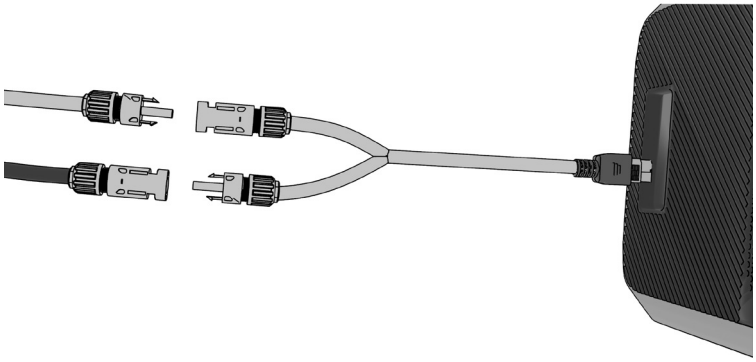
To run portable solar panels inside your home, you'll have to get creative. Try making a passthrough panel. Find some rigid foam insulation board at a hardware store. Cut it to fit a window. Use a hole saw to drill a 2-3/8 or 3-3/8 inch hole through it. That will fit the outside diameter of Schedule 40 PVC conduit pipe.



Now you can run the cables inside while keeping the elements and the bugs on the outside. To secure the window against intruders, use a security bar.

For maximum seal, run some weather stripping or rubber tape inside the pipe. The cables should come through snug, but not smothered.

Finally, you'll connect the MC4 cables to the adapter(s) that came with your generator. The XT60 is a popular one.



How to Harvest Rain

This chapter explains the basics of rain harvesting. You'll learn how to calculate rainfall in gallons (liters). You'll also learn how to harvest rain for drinking and irrigation without having to redo your entire roof.

How much water do you need?

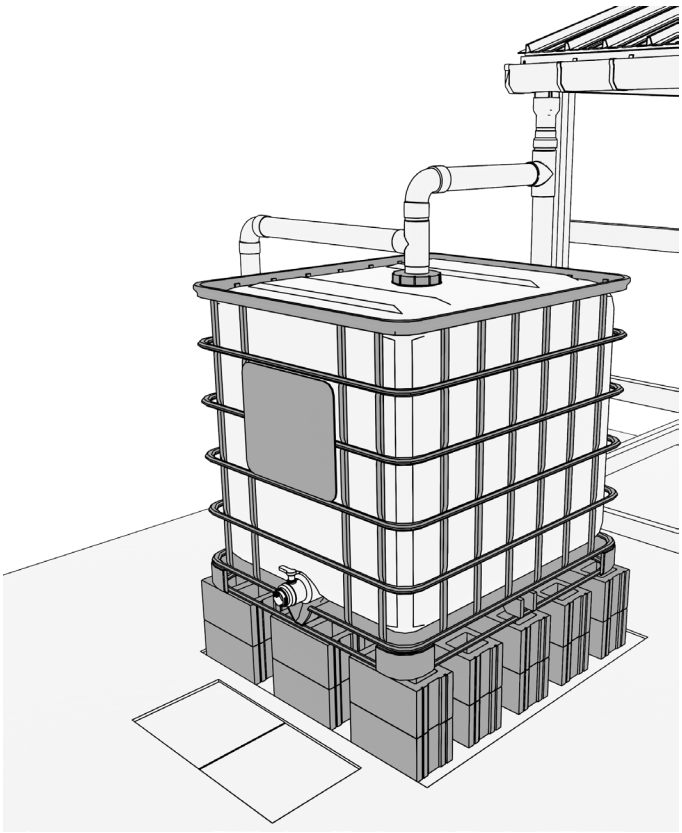
An average person needs a gallon of water a day for survival. That's 1/2 a gallon for drinking and 1/2 gallon for hygiene, or 30 gallons a month. If you're trying to grow food, you'll need thousands of gallons. Most vegetables need at least an inch of rain per week per acre. A 1/4 acre backyard homestead would need thousands of gallons of water a week to grow off the grid. During a bad drought, you could empty a 5,000-gallon cistern quickly.

How much water can a roof catch?

Here's a simple formula:

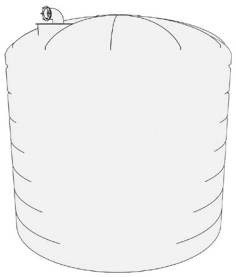
Area x inches (cm) of rain x .623 = amount collected

For example:
128 square foot (39m) x 4 inches (10 cm) x .623 = 319 gallons (1,207 liters)

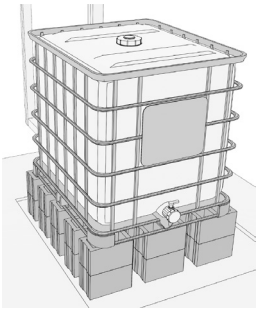


An average rain harvesting system measures about 1,000 square foot (304m) on one side of a roof. So it could collect about 2,500 gallons (9,464 liters) per month. That doesn't factor in spillage and evaporation, etc. A small rain harvesting system could supplement a backyard homestead and provide drinking water during an emergency.

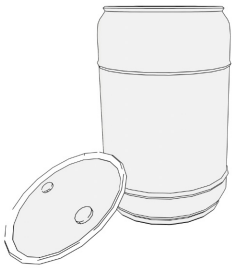
What Do You Store Water in?



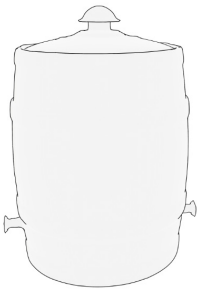
Large cisterns hold thousands of gallons, but they're expensive and hard to install. They usually require concrete slabs and special knowledge and skill to set up and maintain. The largest cisterns can hold 12,000 gallons (45K liters).



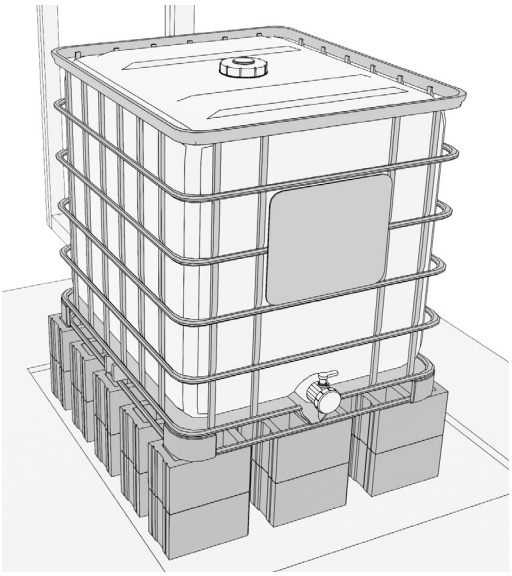
IBC Totes can hold 275 to 300 gallons (1,040 liters). They're easier to install and transport. You can find used ones online for affordable prices, and you can connect several together.



55-gallon drums (208 liters) hold small amounts of water, but they're the most affordable. Like IBC Totes, you can connect several together.



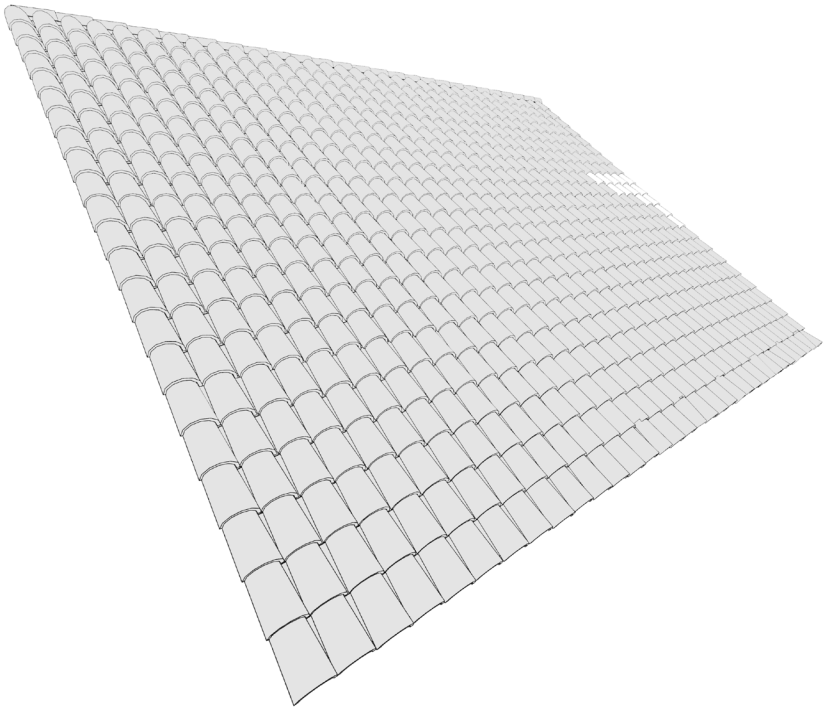
Rain barrels hold about as much as 55-gallon drums. They're pre-fitted with connections and easy to install, but they cost more.



Why an IBC Tote Makes Sense

Used IBC totes offer the best return if you can set them up. They're the best option for someone looking to do serious homesteading in a small suburban space. Rain barrels or drums still work well, but you'd need 5 barrels or drums to hold as much rain water as one IBC tote. The tote's heavy duty plastic and steel cage make them much more durable.

What Type of Roof Works Best?



Metal roofs offer one of the best surfaces for rainwater collection. They're durable, and they can produce potable water for drinking and irrigation. Enabled metal also works.

Clay tile roofs also work extremely well as a collection surface for the same reasons. The only downside is they can produce water with a higher pH, which could affect your plants.

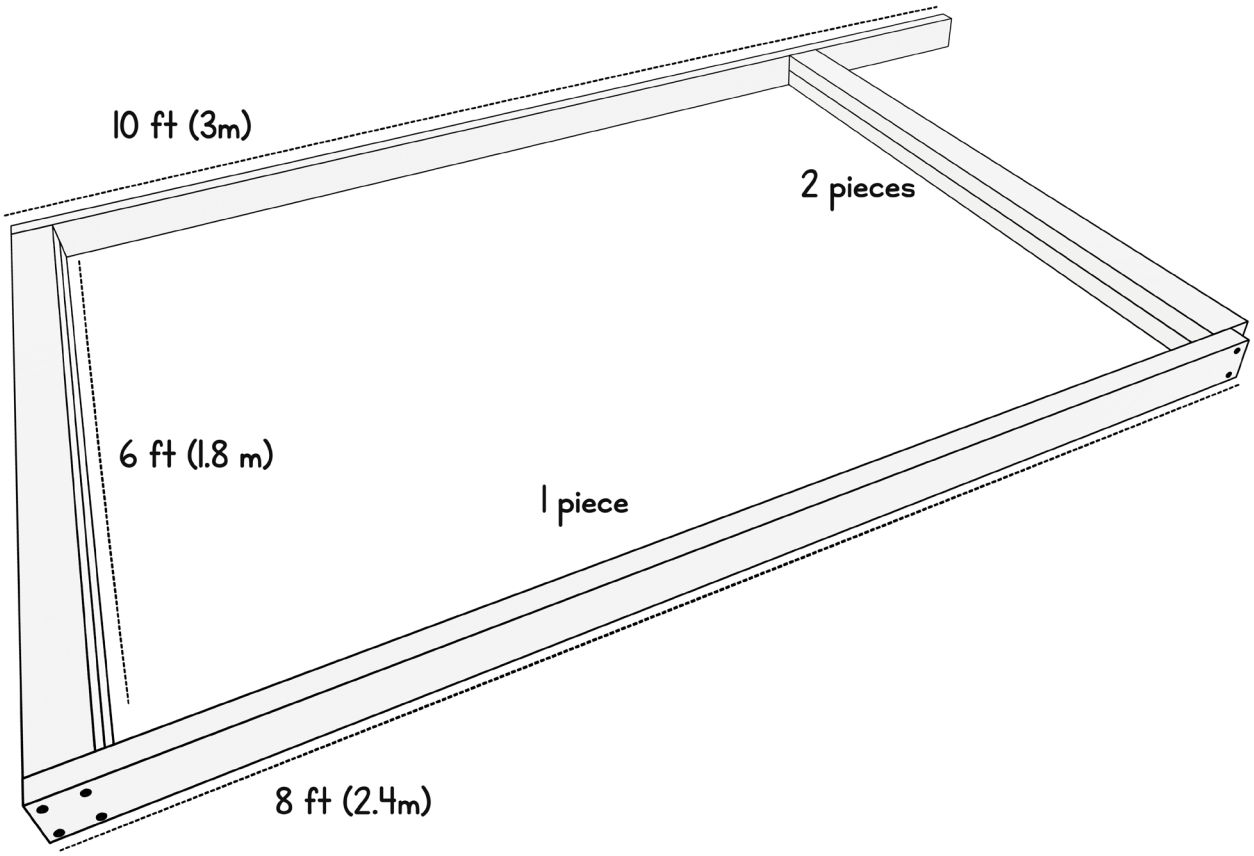
Slate roofing also works well for collecting rainwater. It's safe for drinking and irrigation, but it's also heavier.

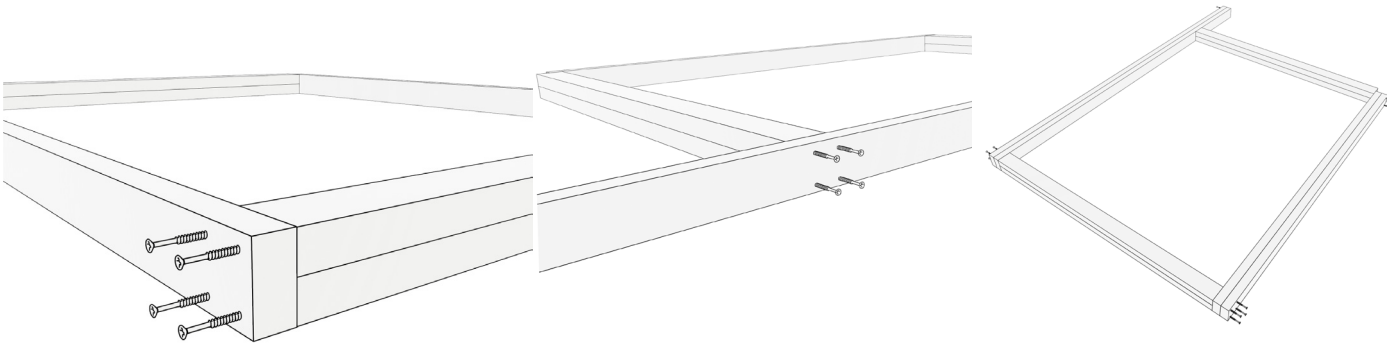
Asphalt shingles aren't the best collection surface, especially new roofs. They can leach harmful chemicals into the water.

Most people can't redo their roof just for the sake of installing a rain harvesting system, but you can still harvest rain. You just have to think a little outside the box. You can retrofit sheds or add a rain collecting surface in ways that don't cost a ton of money. You can just build surfaces to collect rain.

Building Out Your Frame

You're going to make three big frame pieces like this one. Make these flat on the ground. Screw (or nail) one 2x4x8 ft beam to four 2x4x6 ft beams. The long side measures 10 ft long. (If you're already planning to use a shed, you can skip the next few pages.)

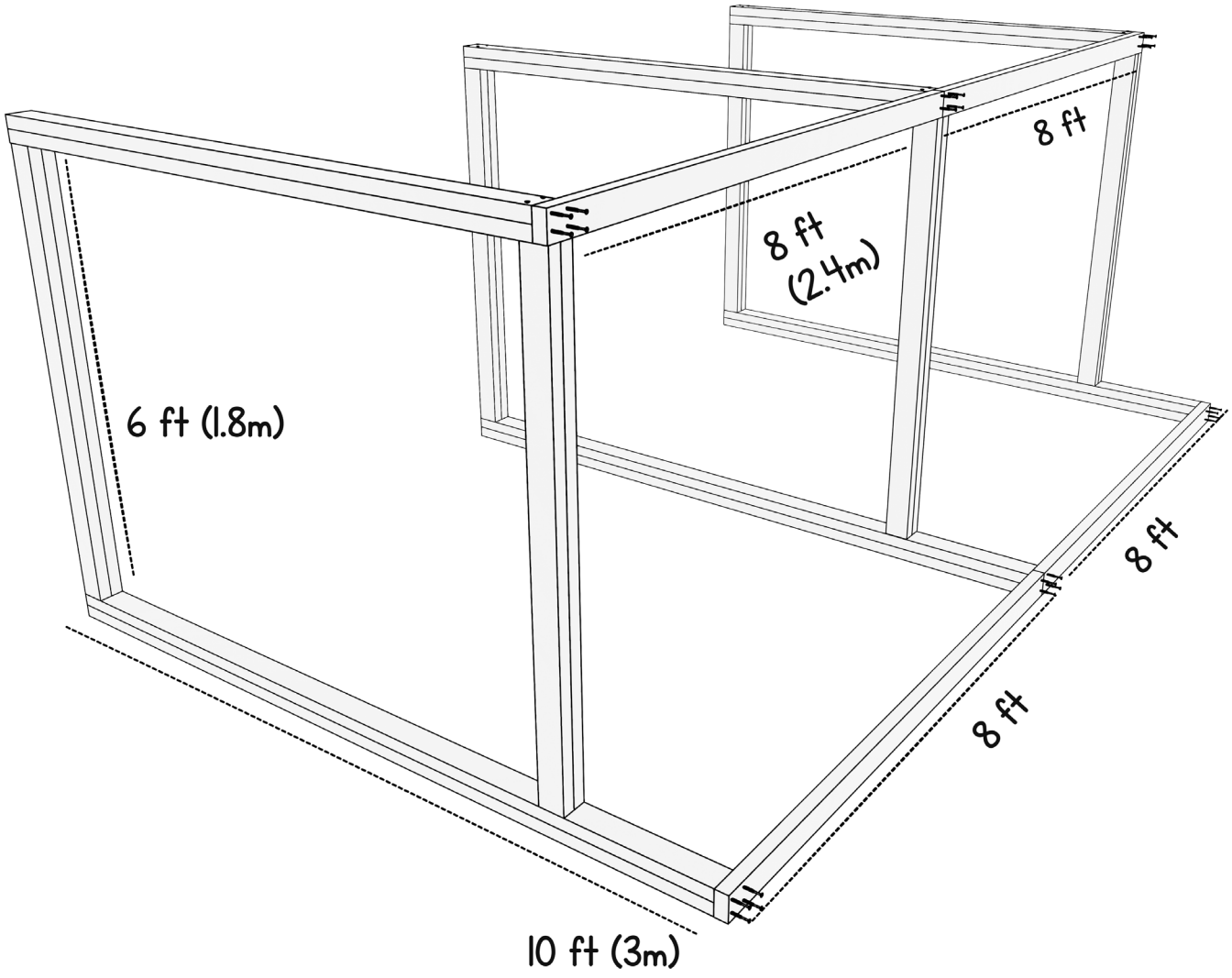


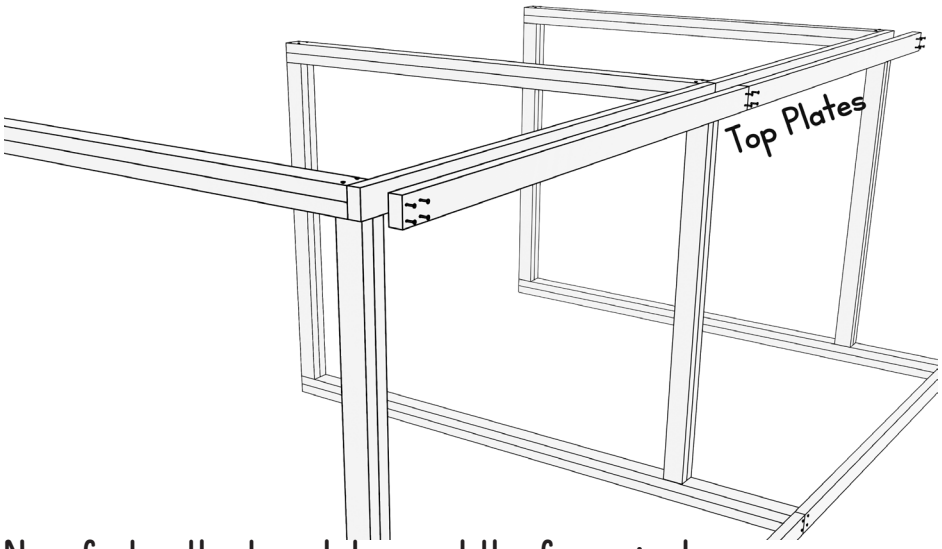


Add another 8 ft (2.4m) and another 10 ft (3m) piece to the front and back.

Finishing The Frame

Now you're going to connect the three big frames with 8 ft beams. You can put them on their sides to make the job easier.

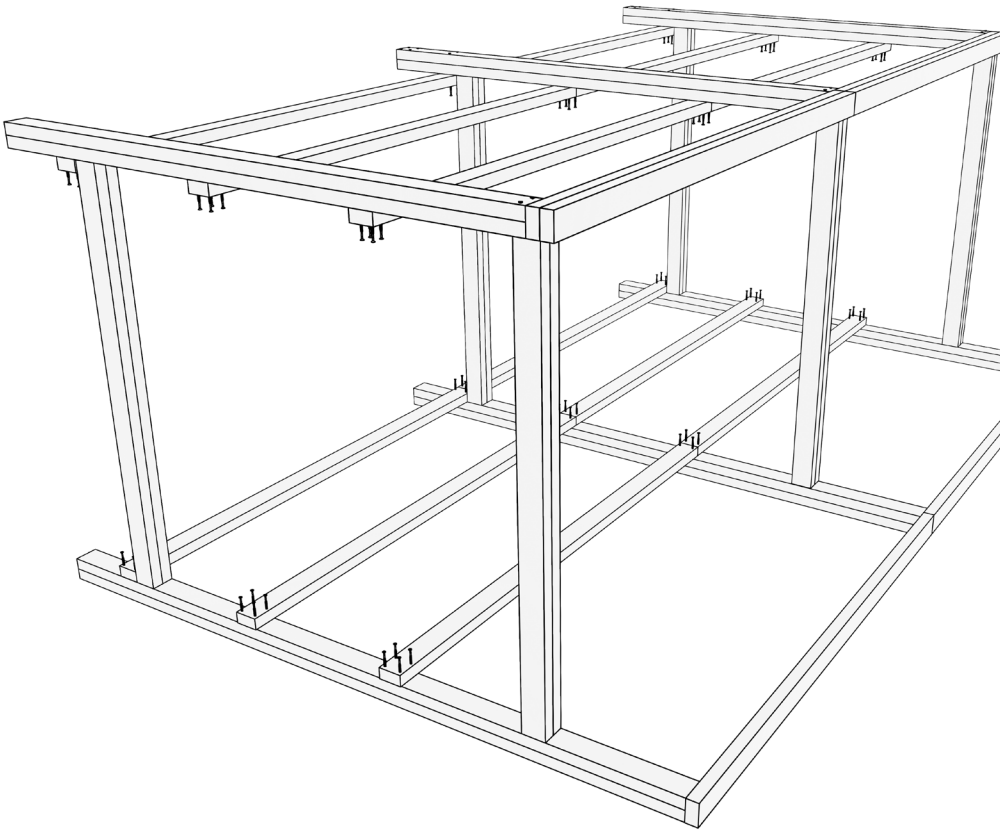


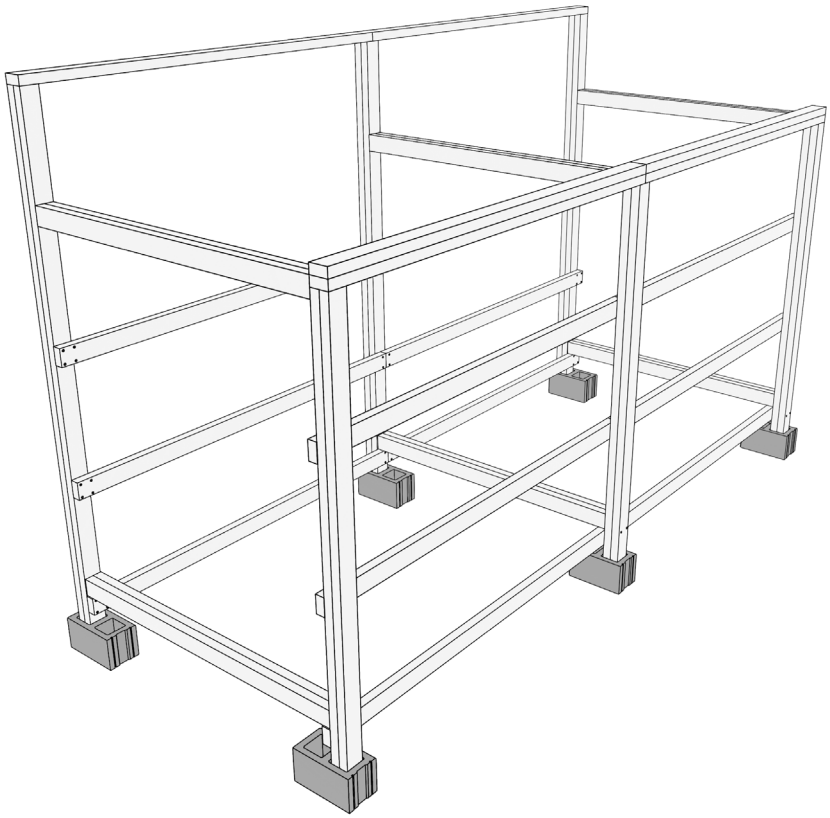


Now fasten the top plates, and the frame is done.

Adding Lateral Support

Finally, add 8 more 8 ft (2.4m) beams to give the frame some lateral support. This step especially matters in windy areas.





You can set the frame in cinder blocks to help guard it against high winds. Add quikrete or cement to give the base even more hold.

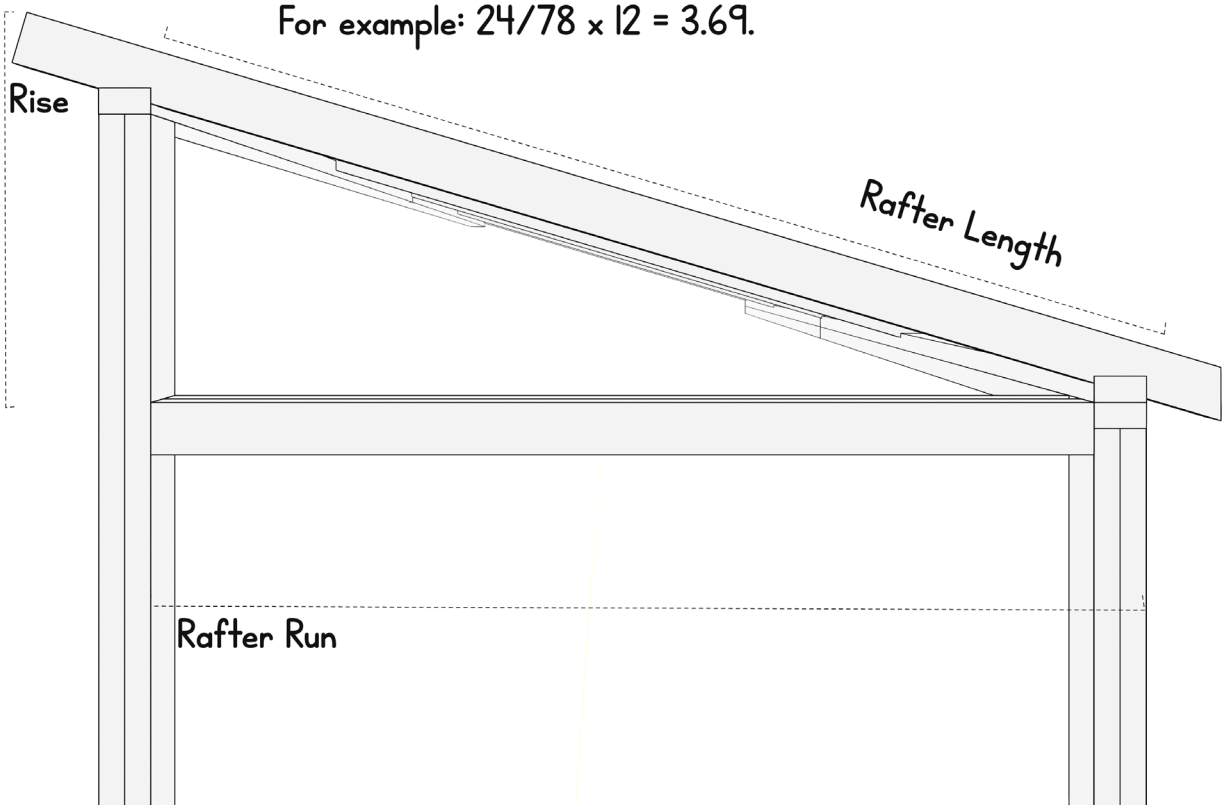
This might not look pretty, but it's easier than leveling ground and screwing post bases into concrete. (You can still do that.)

Cutting The Rafter Seats

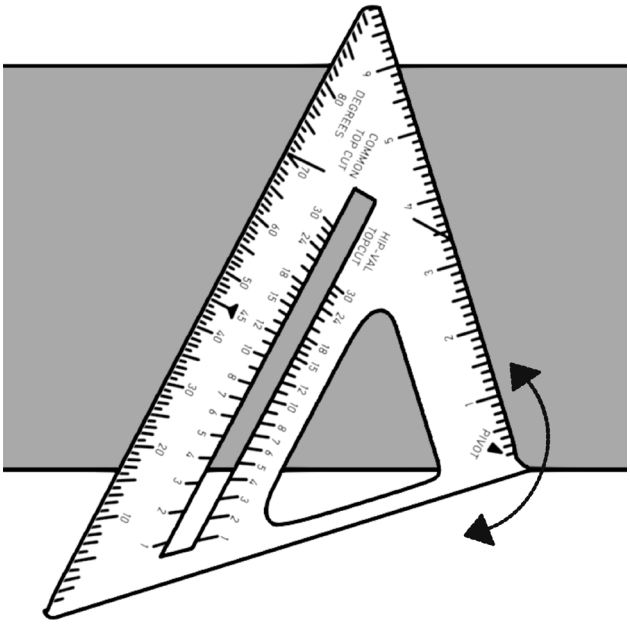
Once you've got the frame, you'll need to measure the birdsmouth cuts (seats) for your rafters. First, calculate the pitch. Use 2x6 or 2x8 beams for the rafters. 2x4s will eventually start to sag.

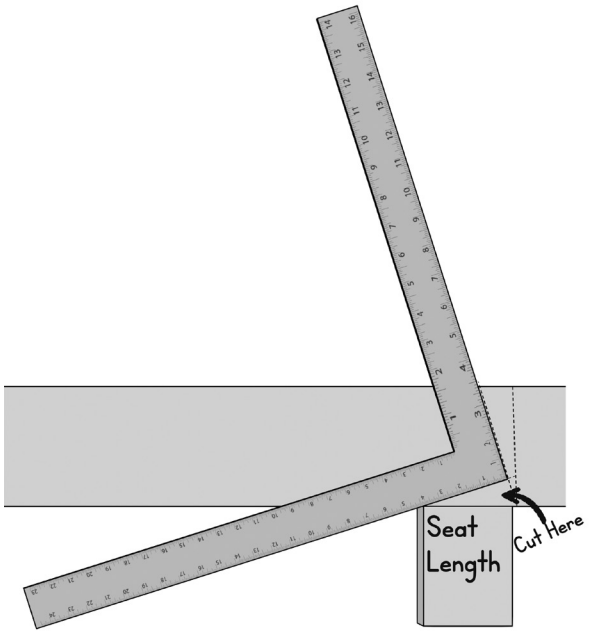
Divide rise by run, then multiply by 12.

For example: 24/78 x 12 = 3.69.



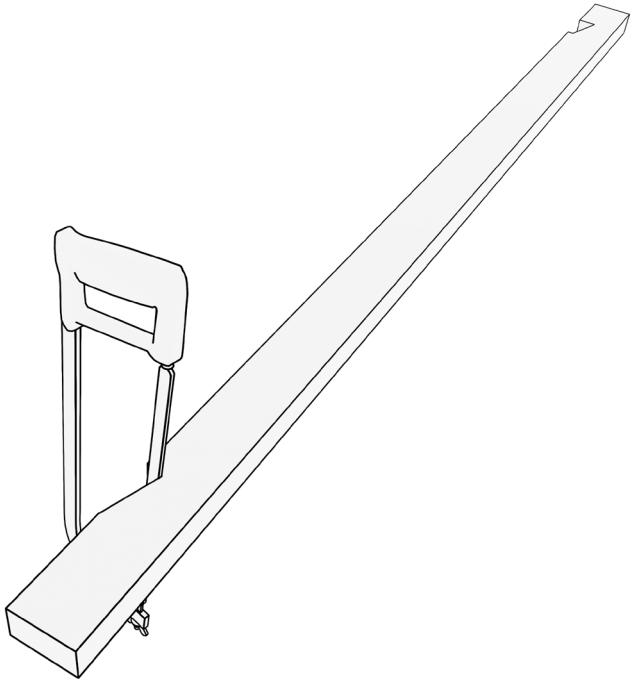
Once you calculate the pitch, use a carpenter's square and a framing square to mark the birdsmouth cuts.

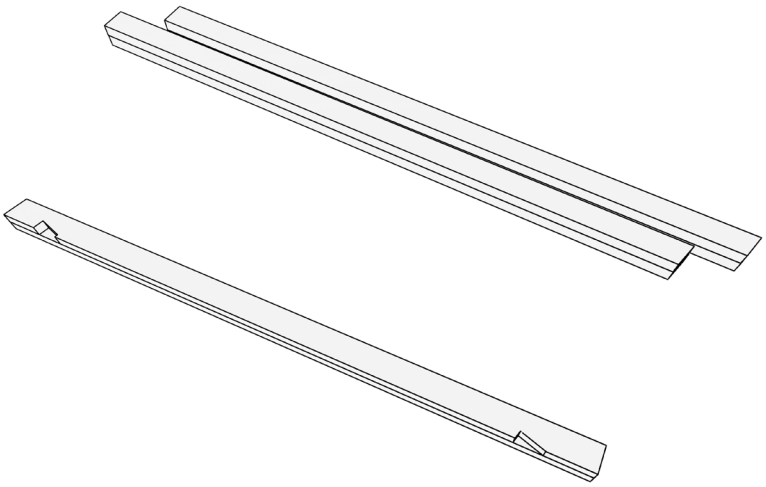


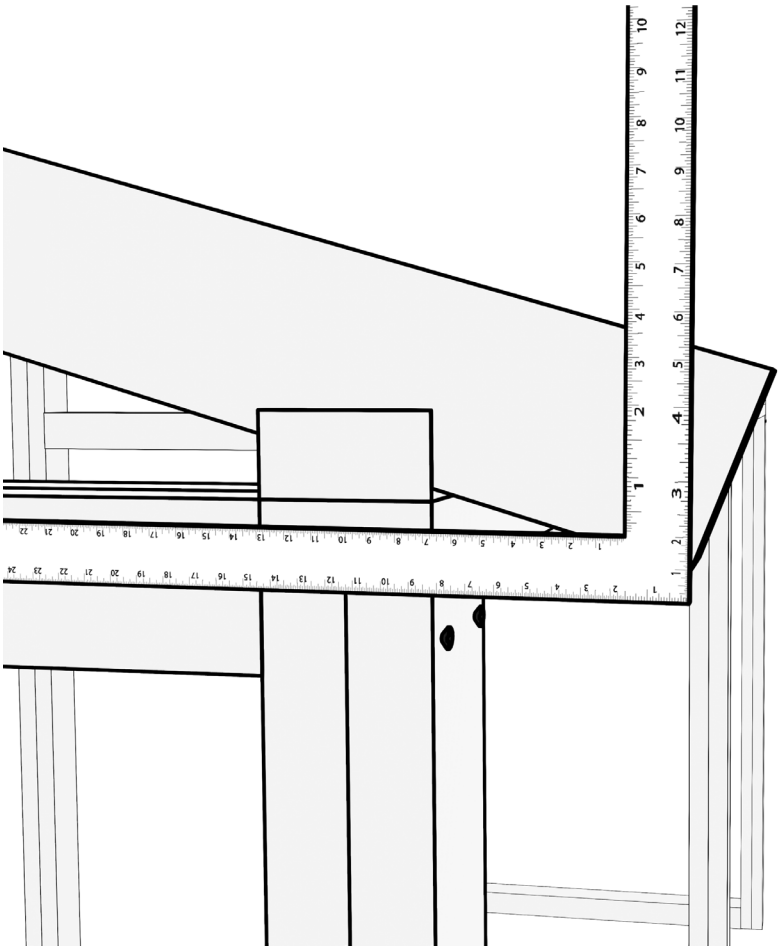


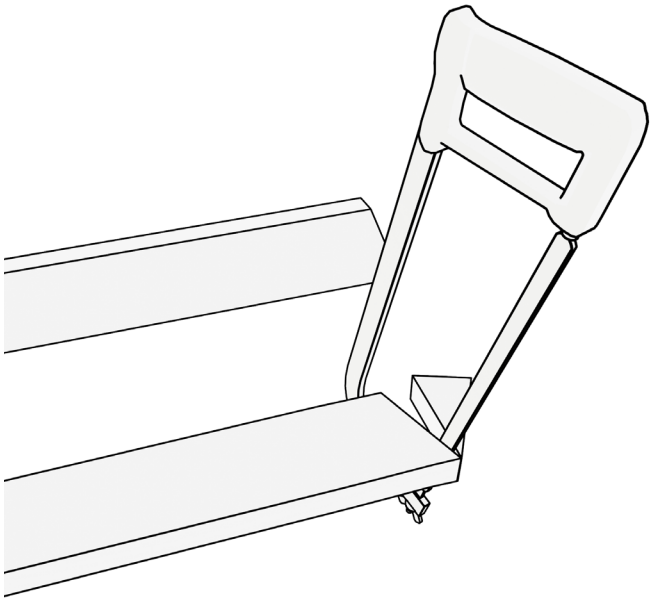
Trimming The Rafters

Cut the seats out where you marked them. Use the first rafter as a template to mark the other ones.







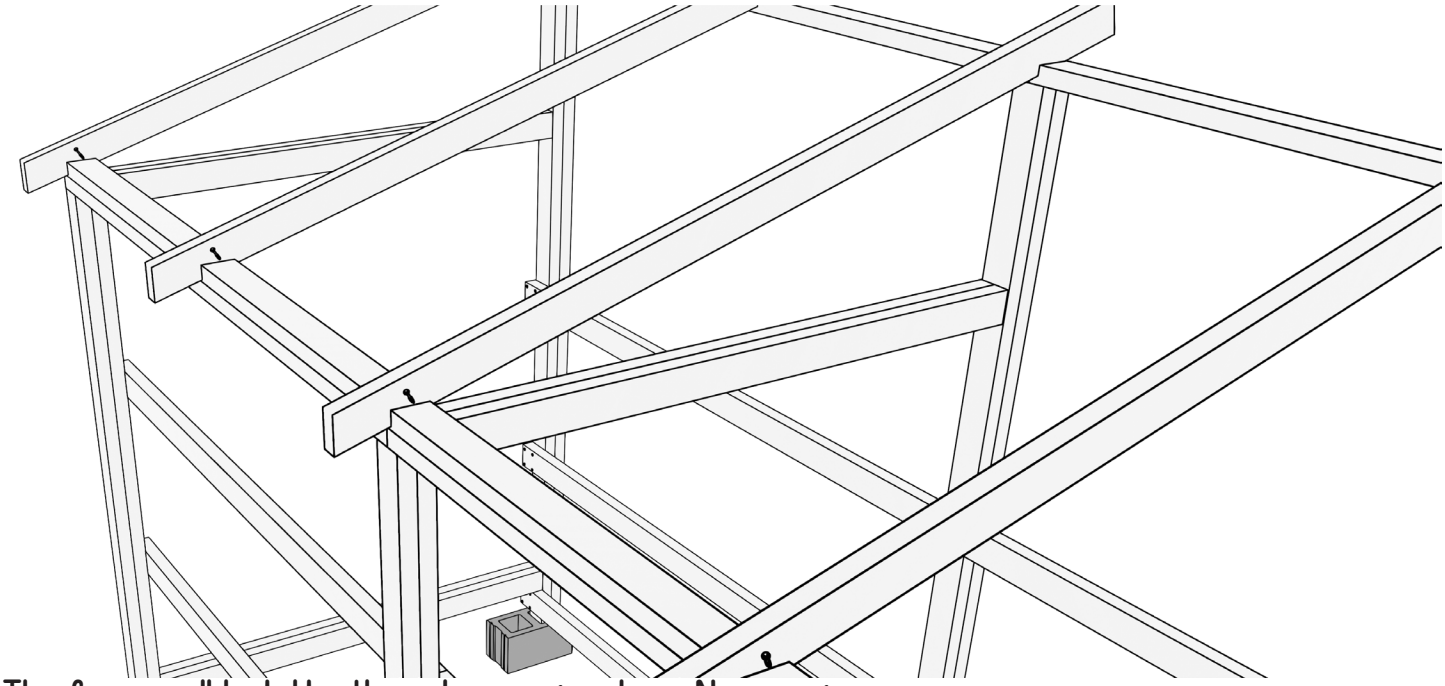


Cut a right angle on the bottom tail of the rafters. Mount the first rafter (without fastening it). Use a framing square and a level to mark a straight line.

You'll need this to mount the fascia board and hang the gutters later.

Putting on The Rafters

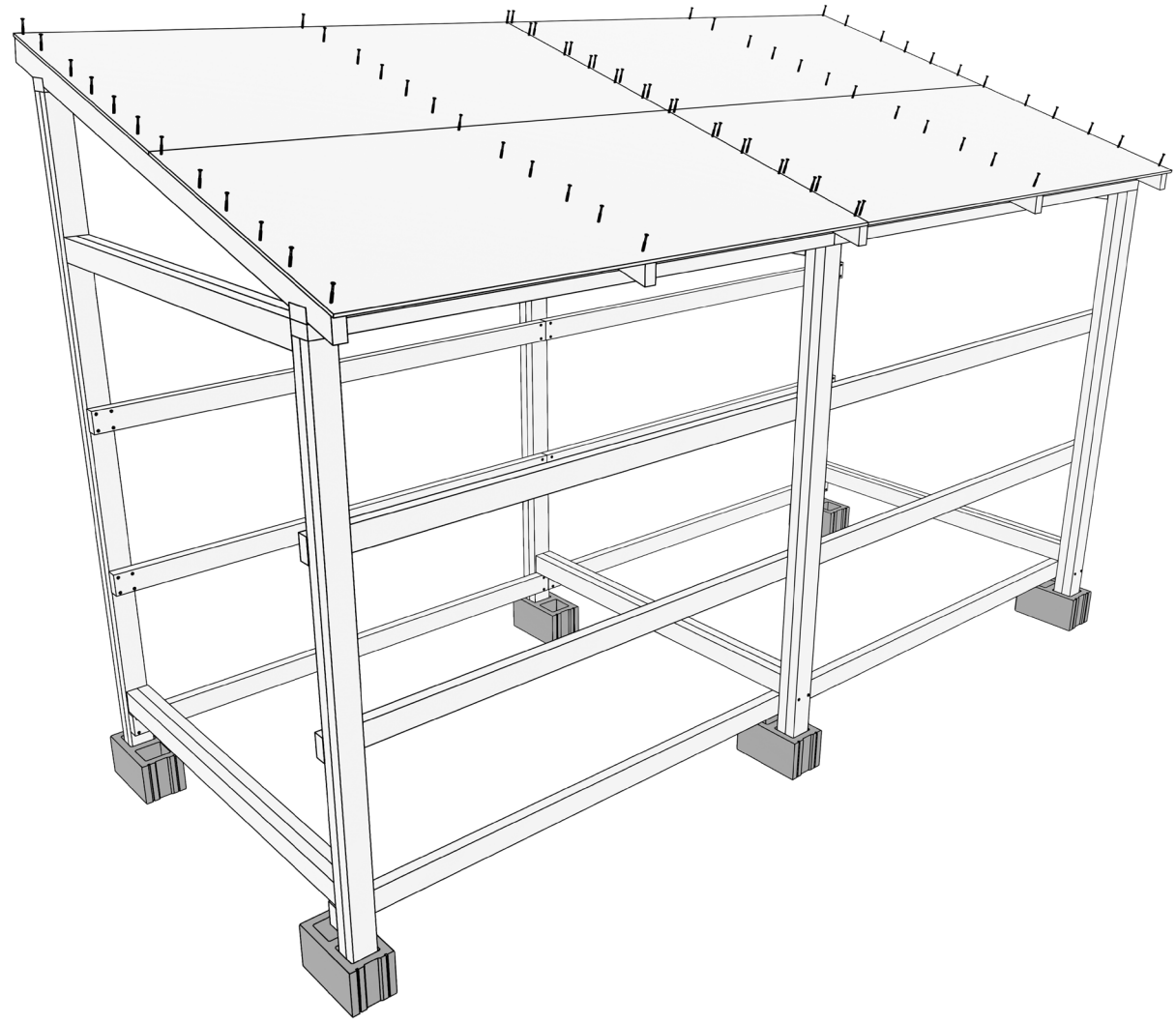
Now you're going to mount the rafters and screw (or nail) them by drilling or hammering them in at a diagonal angle. It's called toe-nailing.

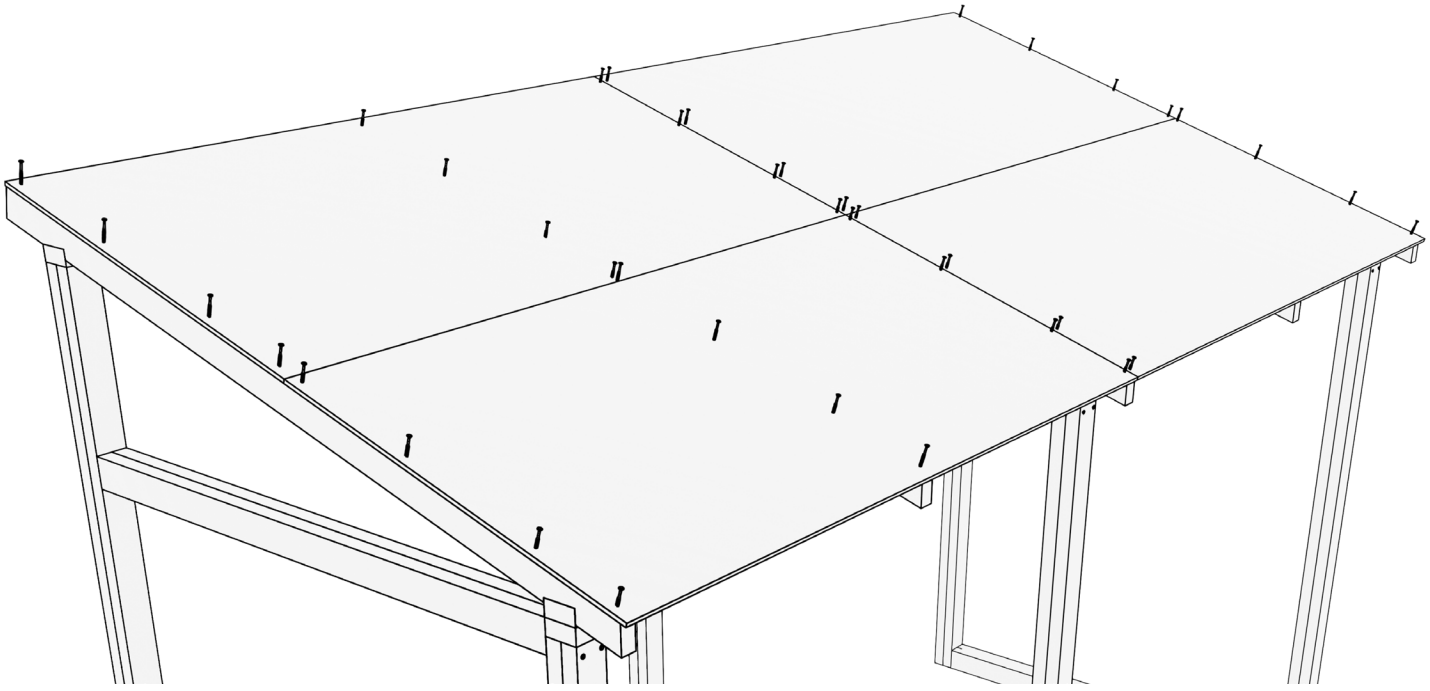


The frame will look like this when you're done. Now you're ready to attach the plywood sheathing.

Mounting The Sheathing

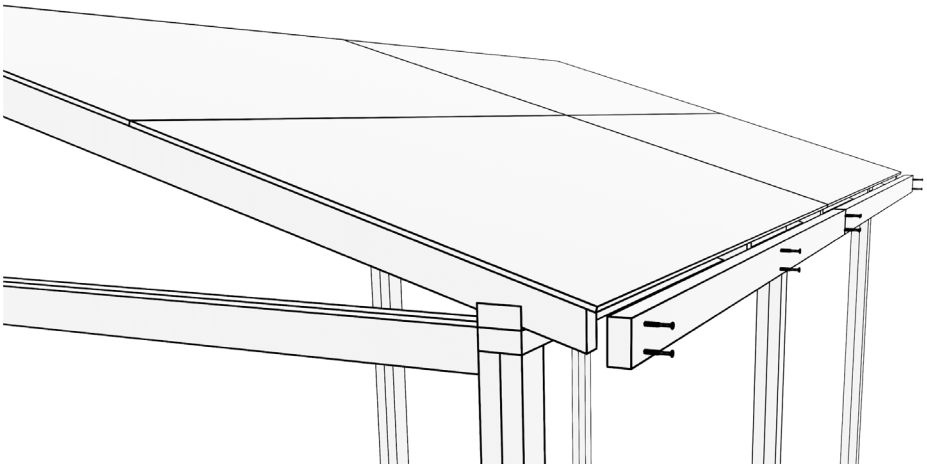
Use the studs as guides to mount the plywood.



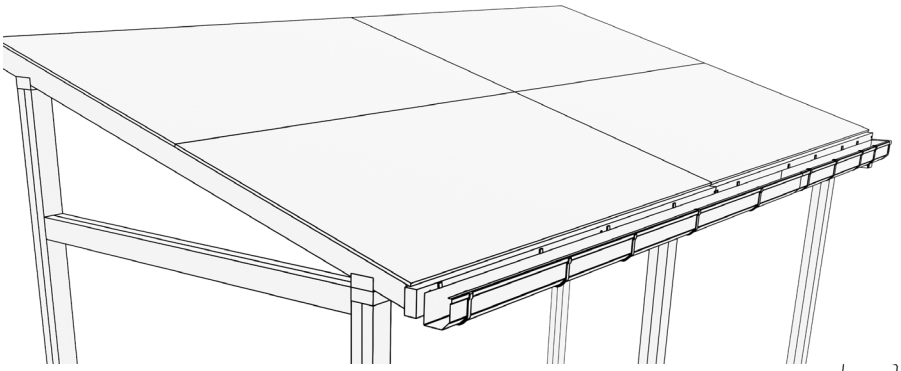


Putting on The Gutters

You need to attach the fascia and gutters before adding the final metal sheeting.

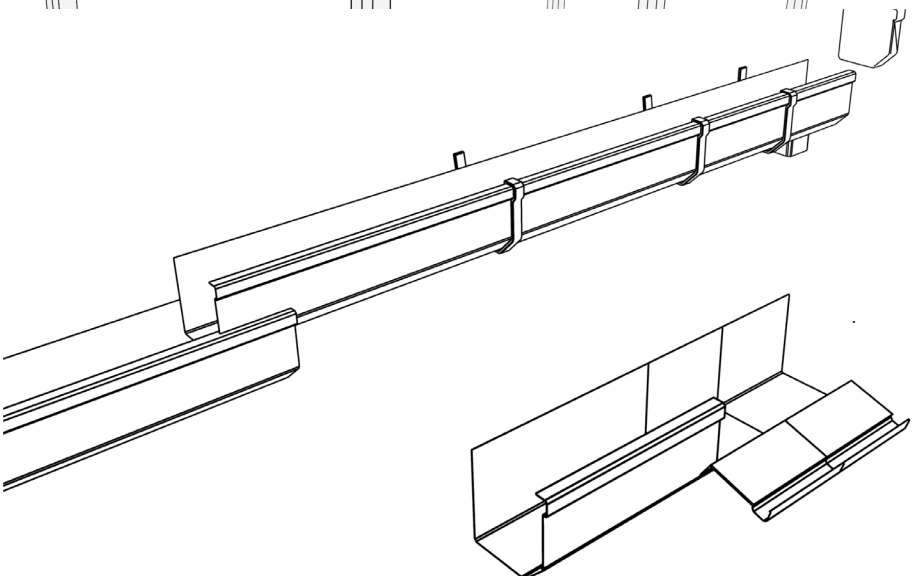


Fasten the fascia board into the rafters. Set it about an inch below the plywood sheathing to give the gutters room.

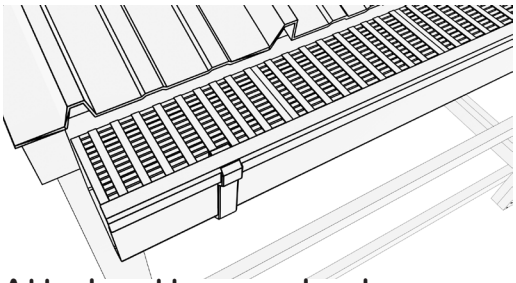


Hang the gutters at a slight slope toward the down outlet.

Gutter usually comes by 10 ft length, but you can trim it with tin snips. You can buy pieces with downspout outlets preinstalled, or you can measure and trim them with tin snips and toothsaws.



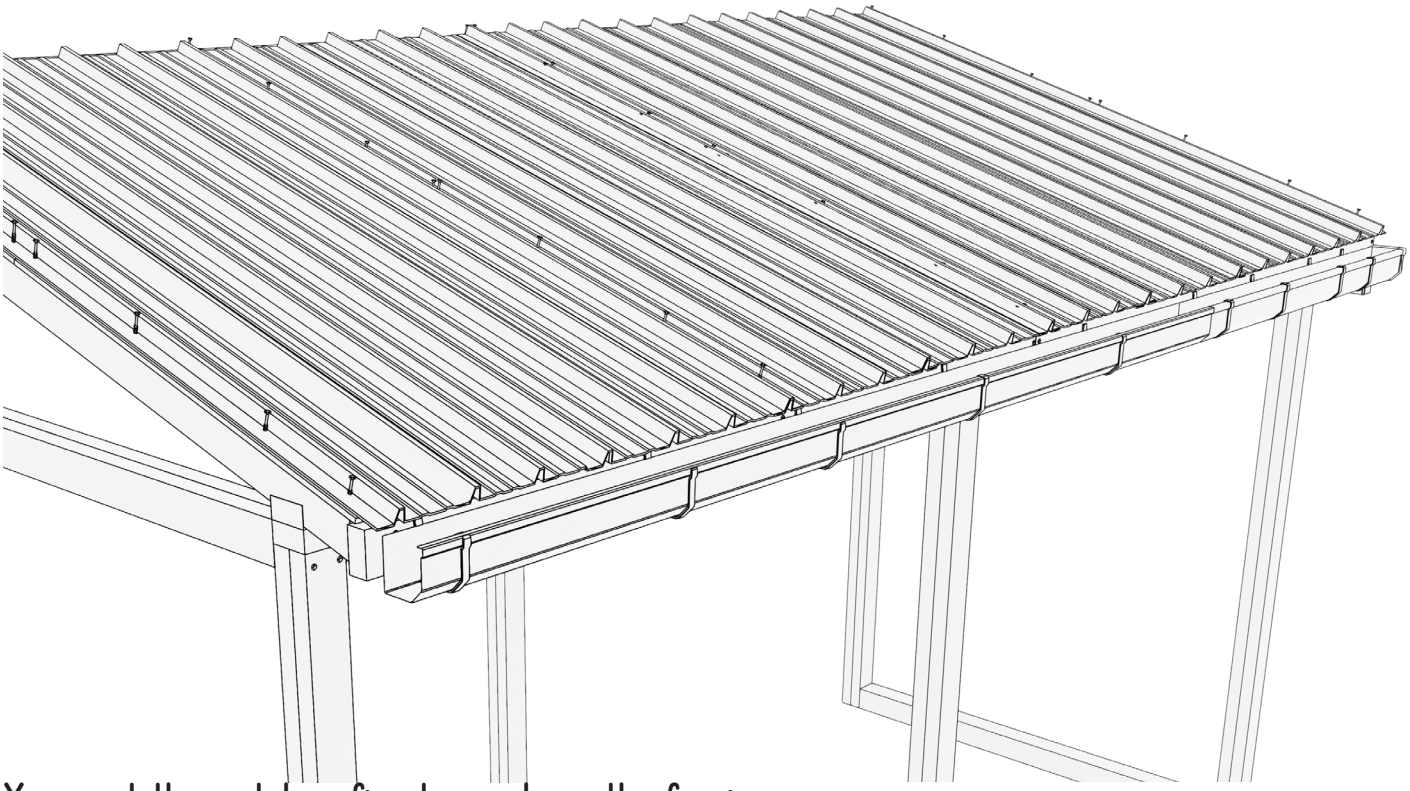
Attach gutter pieces with splice fittings, or you can just overlap the pieces by about 4 inches and seal them together. Do the same with end caps.



Attach gutter guards when you're done. They provide a first line of defense against leaves, critters, and other types of debris.

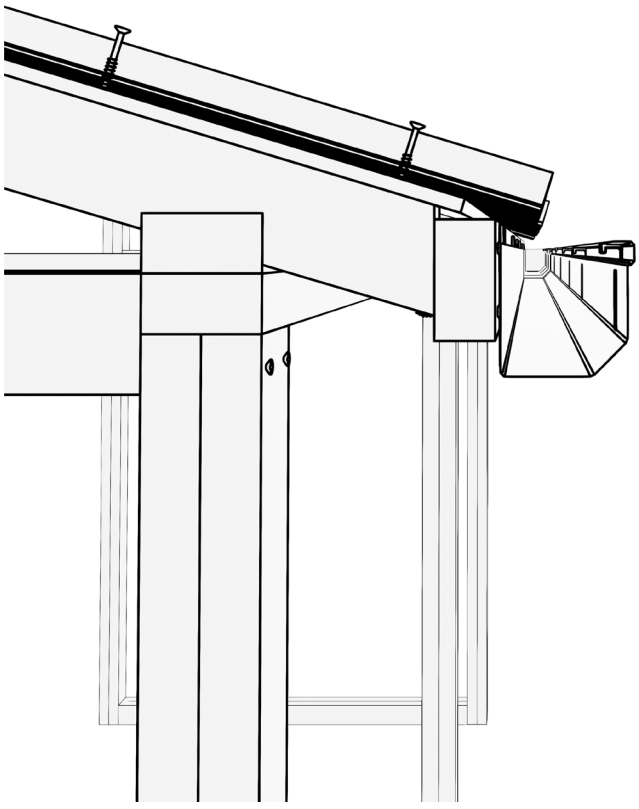
Putting on The Roof

Attach the roofing over the plywood sheathing. Follow the studs and overlap the metal sheets as you go. Metal roofing comes in various sizes, including 8x2 ft lengths, so it will go on easy.



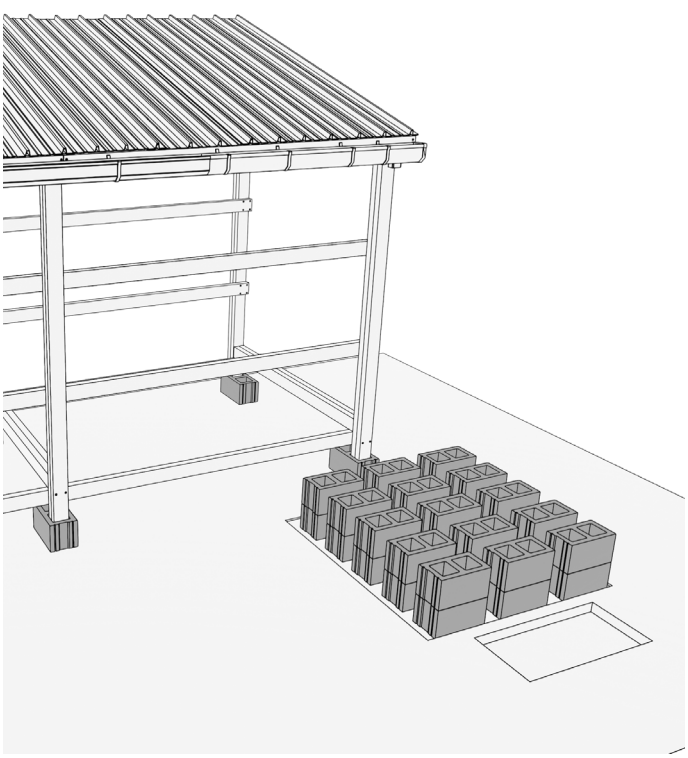
You want the metal roofing to overhang the fascia board by at least a couple of inches to ensure rain runs off the roof into the gutter.

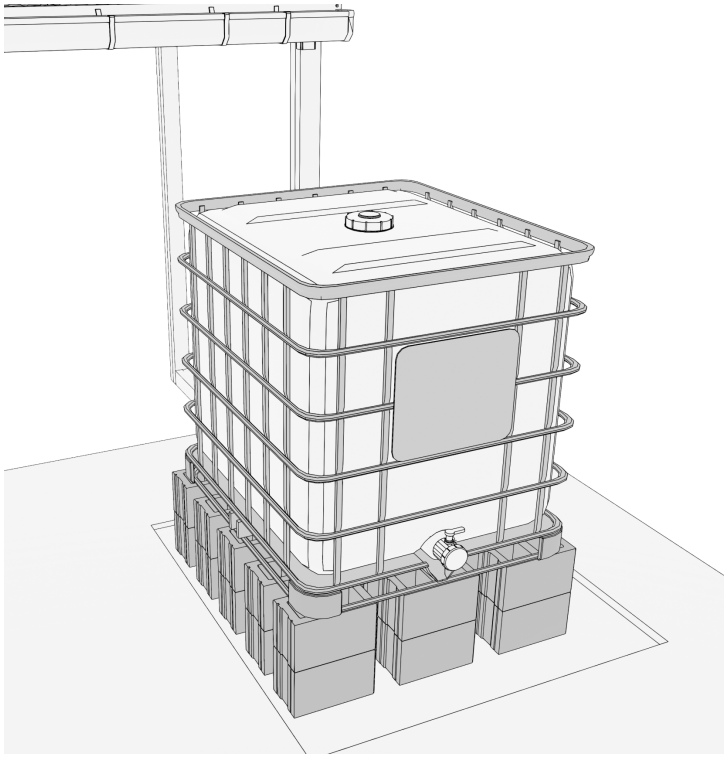
If you were installing a full roof onto a house or shed, you would put down waterproof underlayment and a slip sheet to protect against leaks. It's difficult to do, and you might not need it for this kind of structure.



Putting in The Tote

Most IBC Tote owners rest them on slab, paving stones, or cinderblocks. Dig a couple of inches out and pack the dirt before placing the blocks.

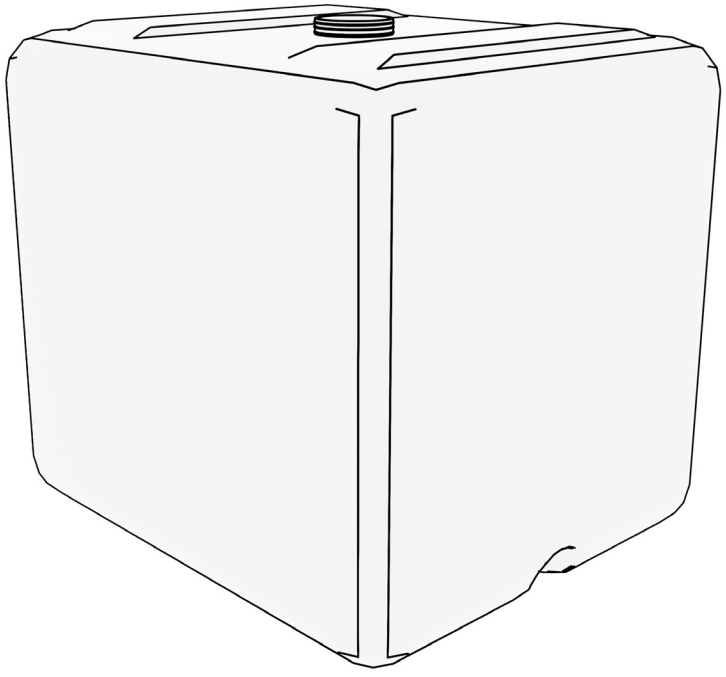




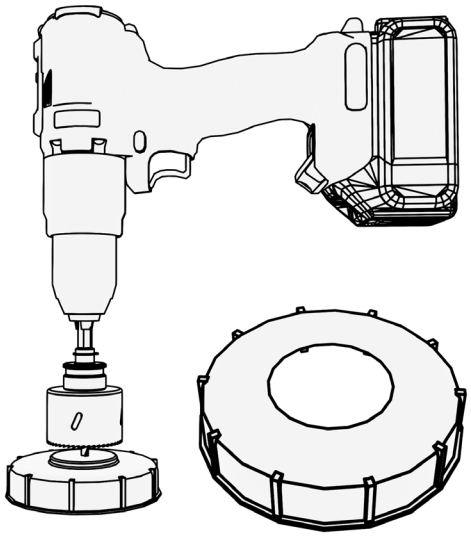
Totes get heavy when they're full. Packing the ground and resting it on cinderblocks ensures good clearance for the bottom valve, so you can fit containers under it.

IBC totes require a little modification for rainwater harvesting. First, cover them with IBC tote wrap or paint them with exterior latex or acrylic paint. Elastometric paint works very well. This step protects your tank from algae growth.

Next, you'll need to modify the cap if you want to install piping with a tight seal. While you could just direct a gutter into the tote, that can still let in contaminants, even if you add screens and filters.



Hooking Up The Tote

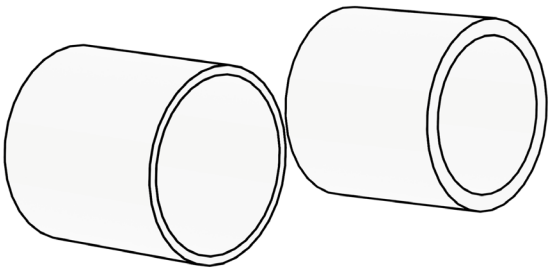


You can connect 3 inch or 4 inch PVC pipe to an IBC tote by modifying the cap. The outside diameter of Schedule 40 PVC measures 3/8 inch larger than the actual pipe size. So for a 3 inch pipe to fit, you need to make a 3 3/8 inch hole.

For the best and fastest results, use a hole saw, which attaches to a regular drill.

It's a good idea to cut a test hole into a bucket lid first, and keep a few spare IBC caps. You'll want them.

Now it's time to review some basic information about pipes.

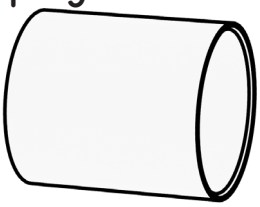


PVC comes in different types of thickness. Plumbers use Schedule 40 for most indoor plumbing. Schedule 80 handles even more pressure. Drain, Waste, and Vent (DWV) pipe works for systems with no pressure, like gravity-fed rain harvesting systems. Sewer and drainage (SD) pipe is even thinner.

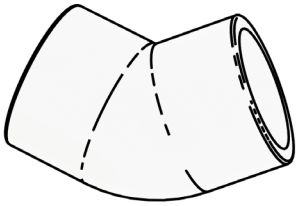
DWV and Schedule 40 can be compatible, but it's always best to stick with the same thickness of pipe. When you're buying pipe, size refers to the interior dimension.

You fit pipe together with different types of fittings or couplings.

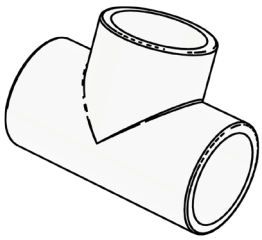
Coupling



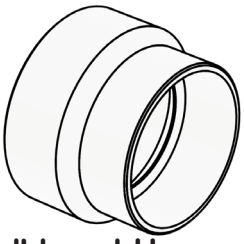
Elbow



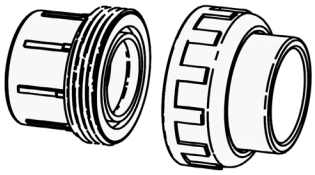
Tee



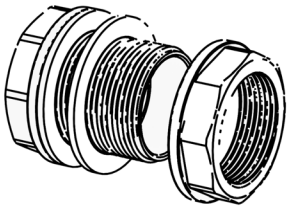
Reducer



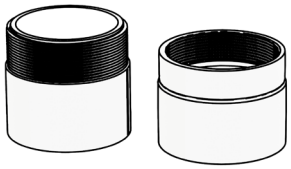
Union



Bulkhead Union

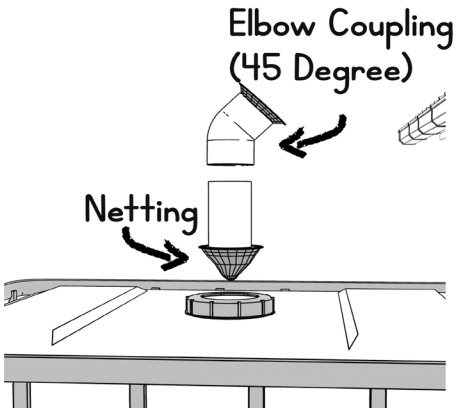


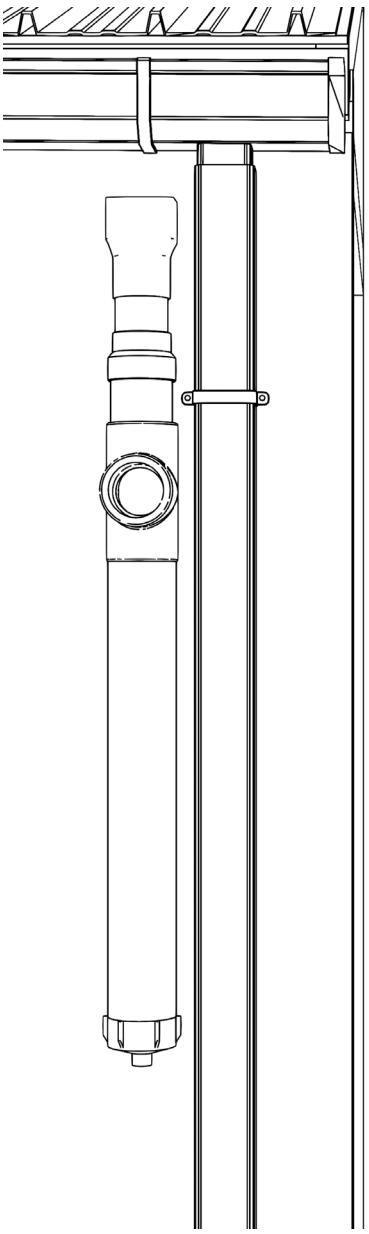
Male & Female Adapters

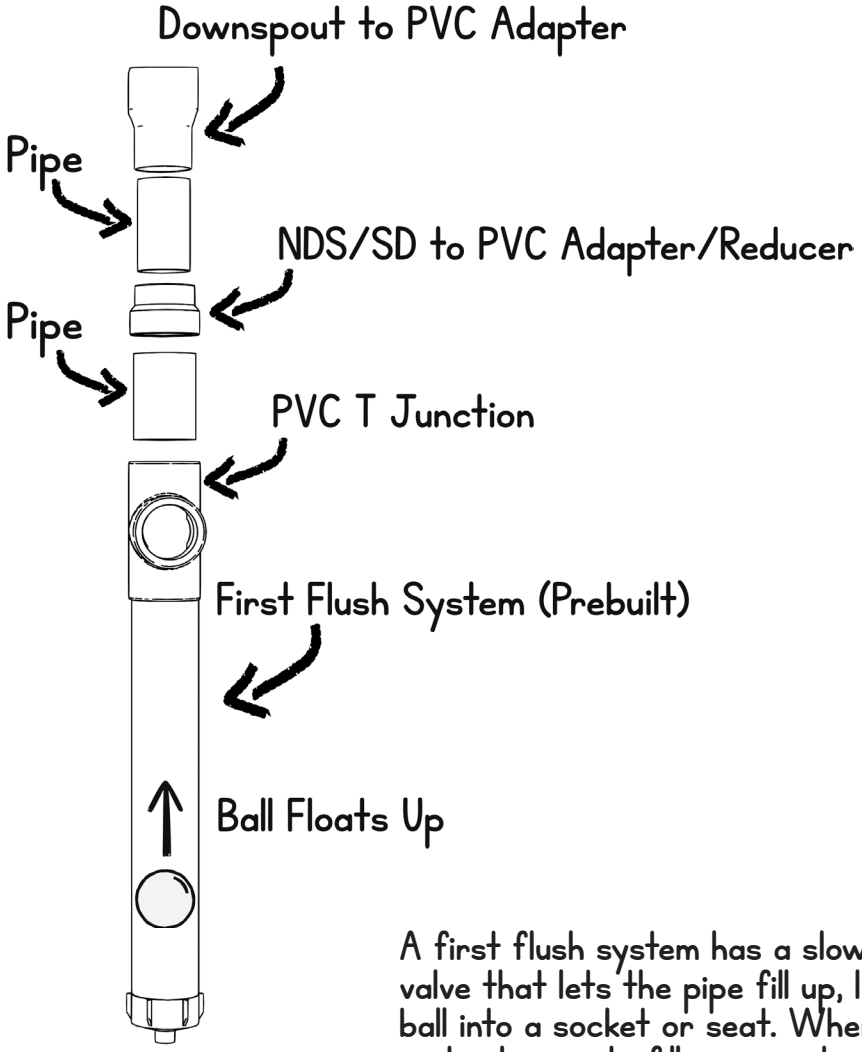


Filters and First Flush

Now you're going to assemble your first flush system and filters. You can use screen or mosquito head netting. Some homesteaders even use pantyhose. Not every homesteader uses a first flush system, but some insist. A first flush system helps eliminate debris and other contaminants before they reach your filters.





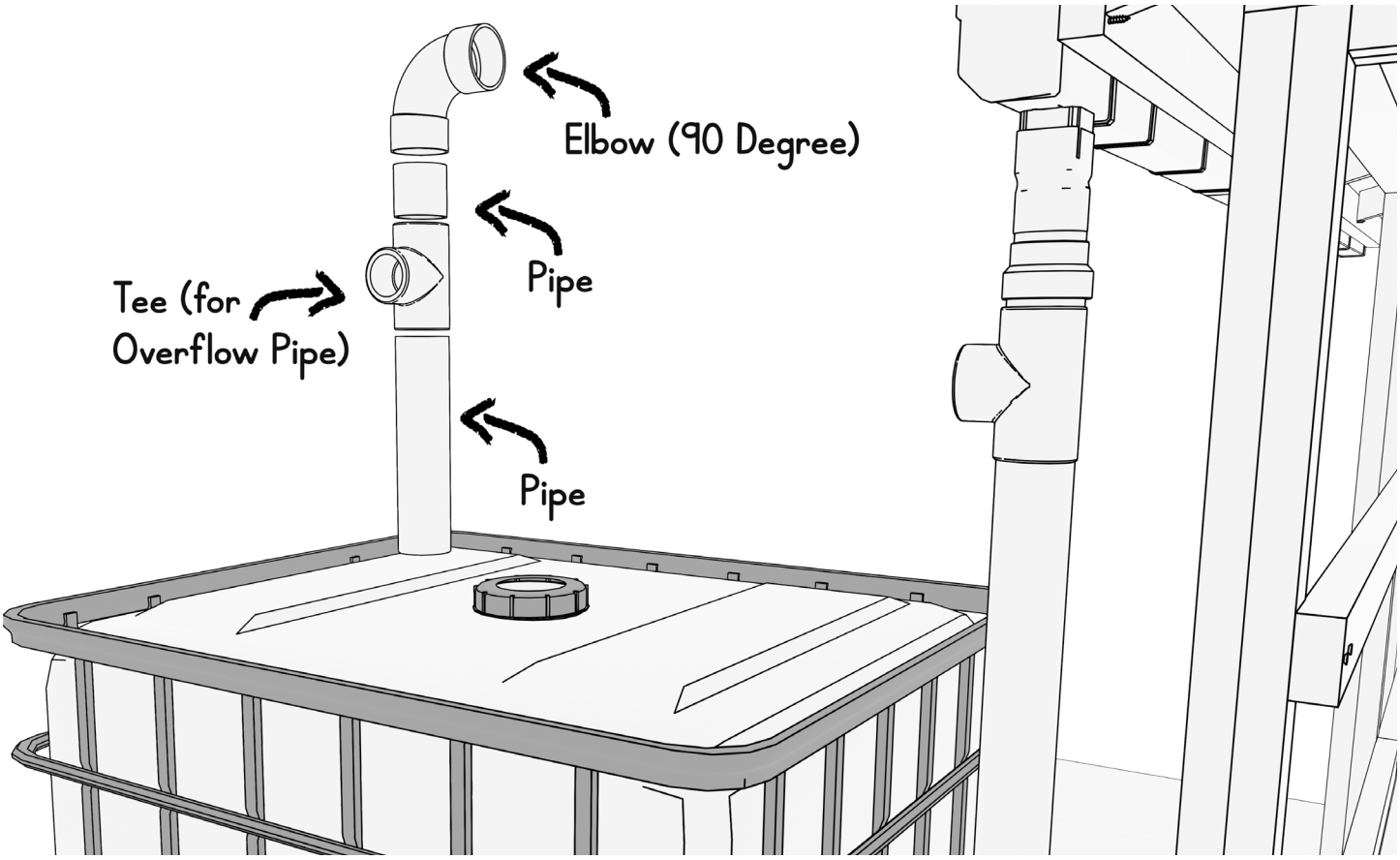


A first flush system has a slow release valve that lets the pipe fill up, lifting a ball into a socket or seat. When it's full, water begins to fill up your tank.

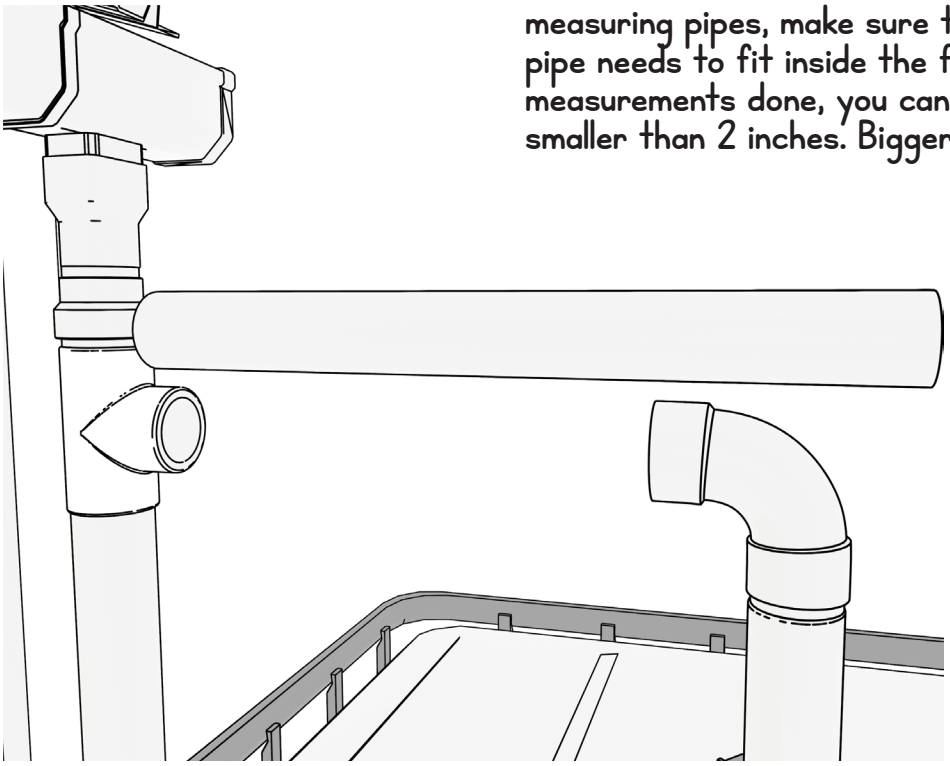
You'll be installing a downspout gutter and connecting it to PVC pipe. It's great if you can find a Schedule 40 adapter. If you can't, you can get an NDS/SD to Schedule 40 adapter. Before the final install with cement, measure and dry fit the pipes. When you're measuring, make sure you account for the inch or two pipes need to fit securely inside couplings on both ends.

Hooking Up The Rest

Now you're going to assemble the main connection to your tote. Leave the pipe that goes into your cap long for now, so you can adjust the length and make it even with your first flush system. Dry fit the pipes (without cement) so you can measure them.

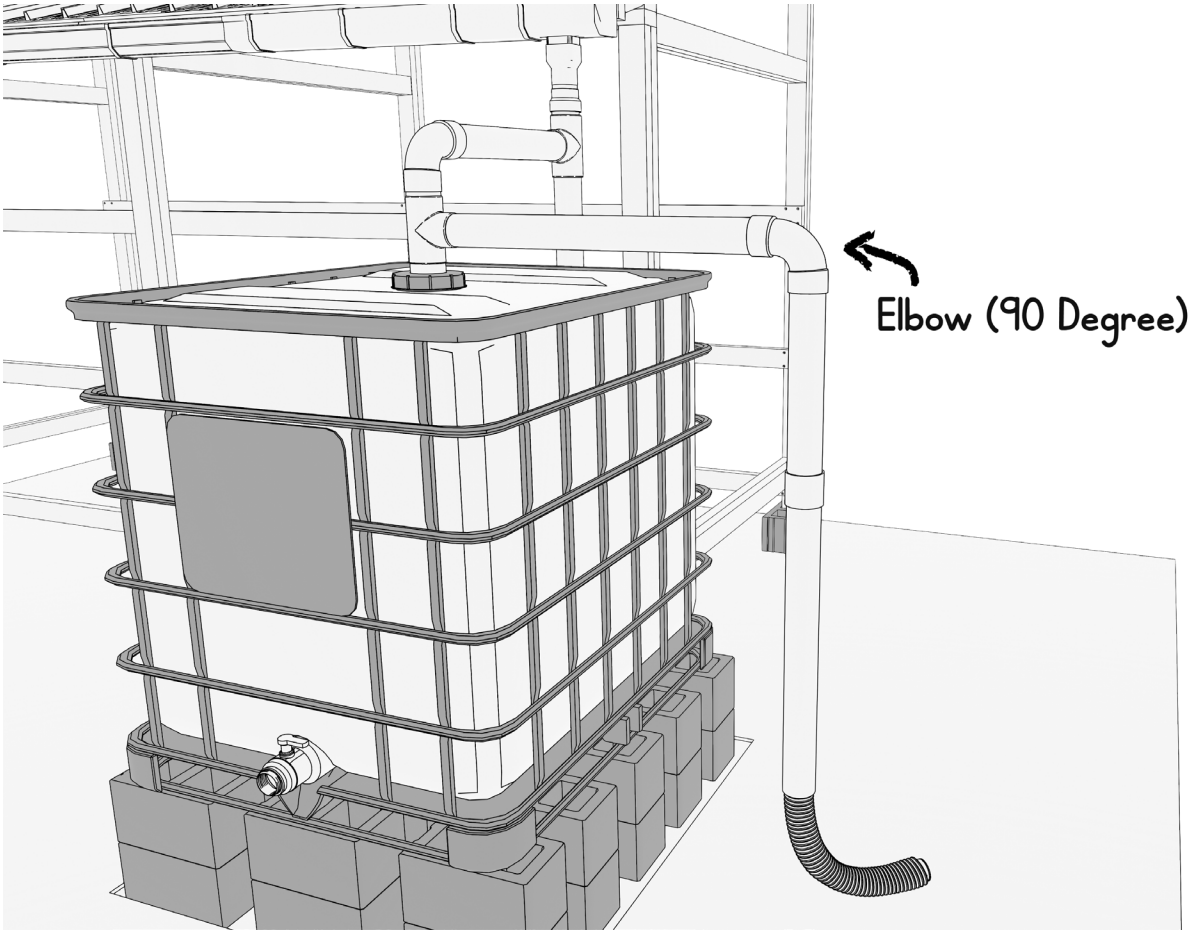


You'll measure the horizontal pipe last. Again: When you're measuring pipes, make sure to account for a few inches the pipe needs to fit inside the fittings. When you've got the measurements done, you can use a pipe cutter on most pipe smaller than 2 inches. Bigger pipe needs a hack saw.

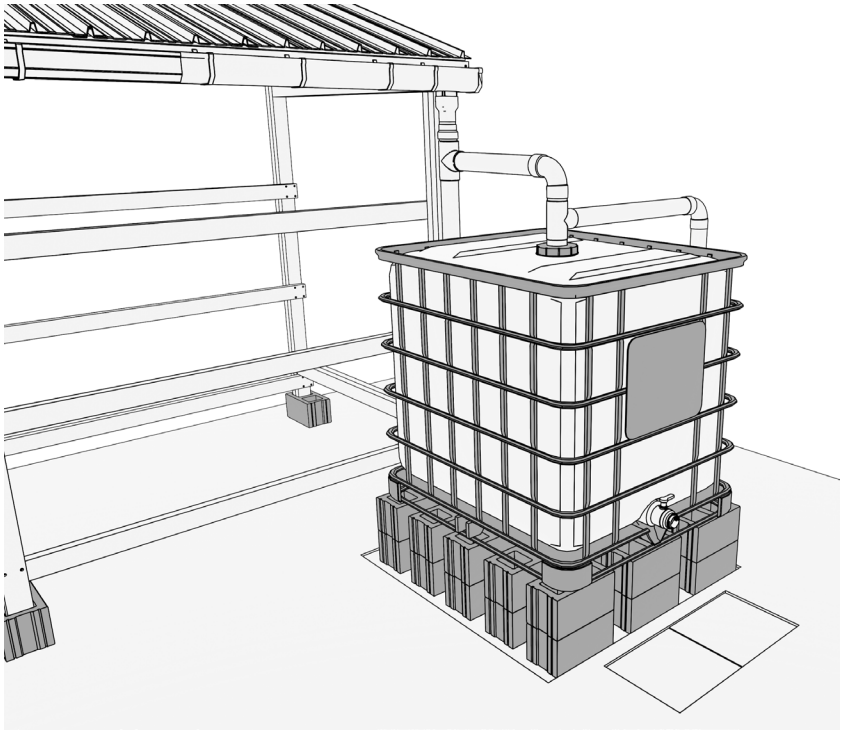


The Overflow Pipe

Once you've connected the first flush to your tote, you'll measure and connect the overflow pipe. When your IBC tote starts to overflow, water will travel out and toward the ground.



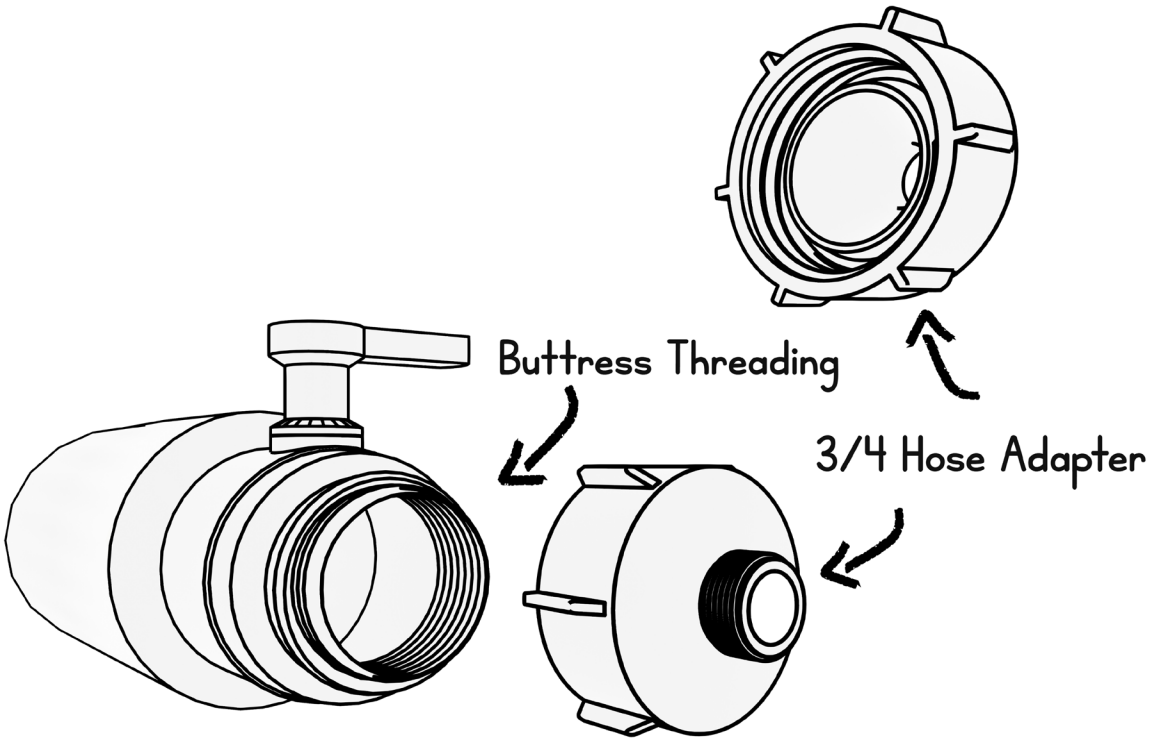
This is how your setup will look when it's done. If you need more space under the valve to fill buckets or other containers, you can dig out a filling area and add some paving stones.

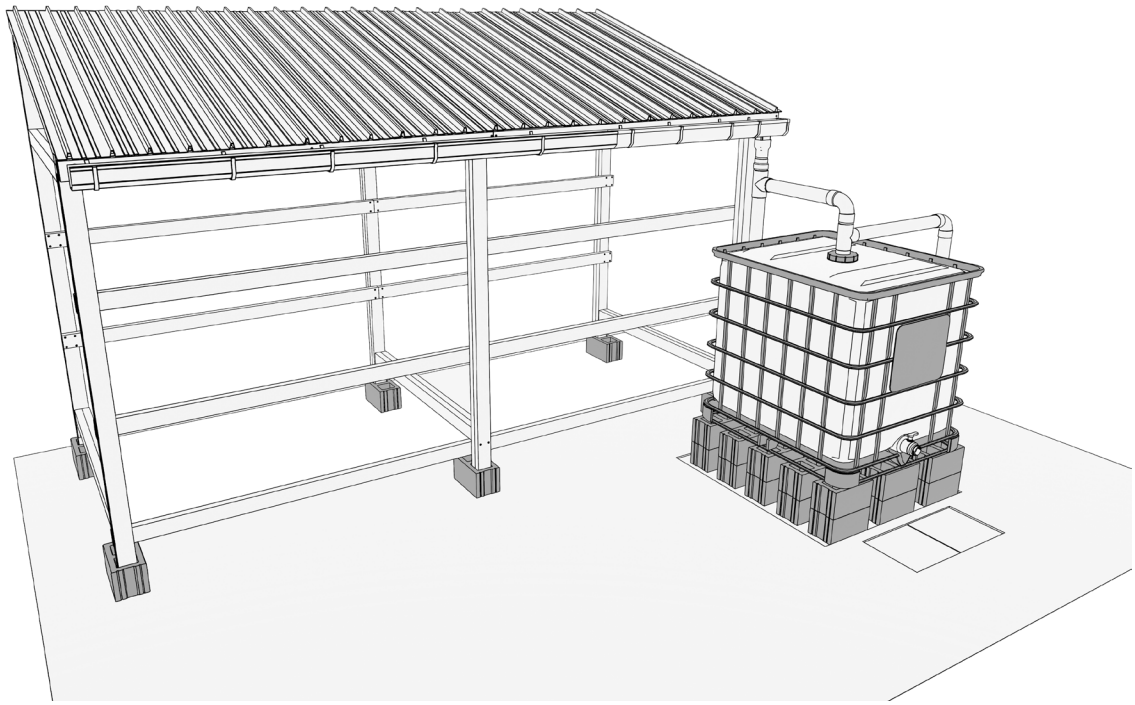


Using The Valve

The final hurdle to actually using your IBC tote: The valve. IBC Totes come with different types of threaded valves. Some come with NPT, the standard national pipe thread in the U.S. Others come with a coarser buttress thread, and a third kind comes with Camlock threading.

It can be hard to find adapters for the top cap, but it's not hard to find valve adapters. You can even find them on 3D print shops. You can connect valves to PVC, garden hose, and pretty much anything else.





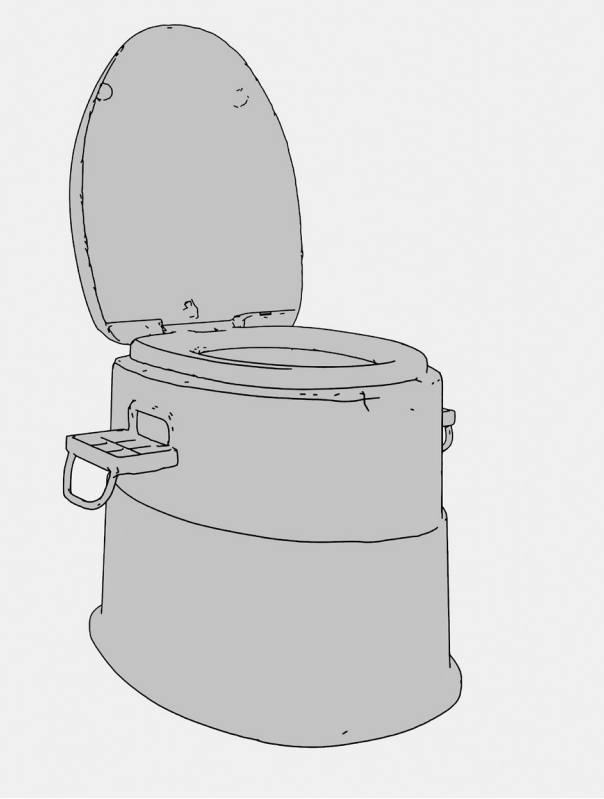
How to Make an Emergency Toilet

Indoor plumbing can fail for a number of reasons: disasters, droughts, or burst pipes. Many preppers and sustainability gurus have already installed composting toilets in their homes, at least in one bathroom. It makes sense. Disease from poor sanitation poses a big risk during short as well as prolonged emergencies. You need a way to deal with your waste.

Compost toilets offer the best longterm solution, but they're a commitment. Not everyone can install them in their homes. You can make something similar for a lot less money by converting emergency toilet buckets or even portable camping toilets.

Any emergency indoor toilet needs two things: A urine diverter, and cover material. These help with sanitation and decomposition.

Common cover materials include: sawdust, coconut coir, wood shavings, dry leaves, shredded cardboard, coffee grounds, pine straw, newspaper, and other "carbon" materials.

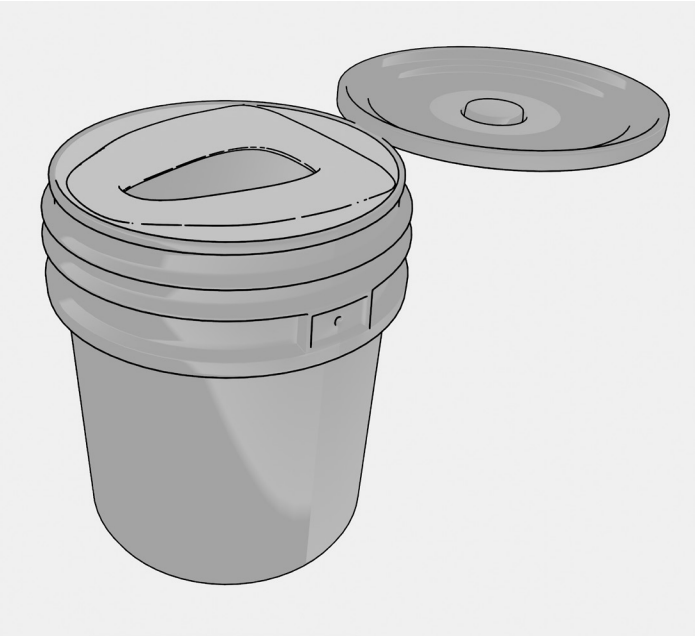


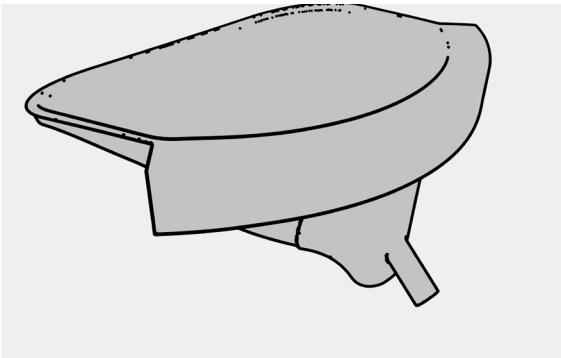
Several companies sell emergency toilets, including Reliance, who also sells Aquatainers. You can get larger portable toilets with higher seats from hardware stores for much less than it costs to install a full composting toilet. These portable toilets also fold up for easy storage.

We're going to talk about converting a bucket, but you can apply the same idea to almost anything, with a little adaptation.

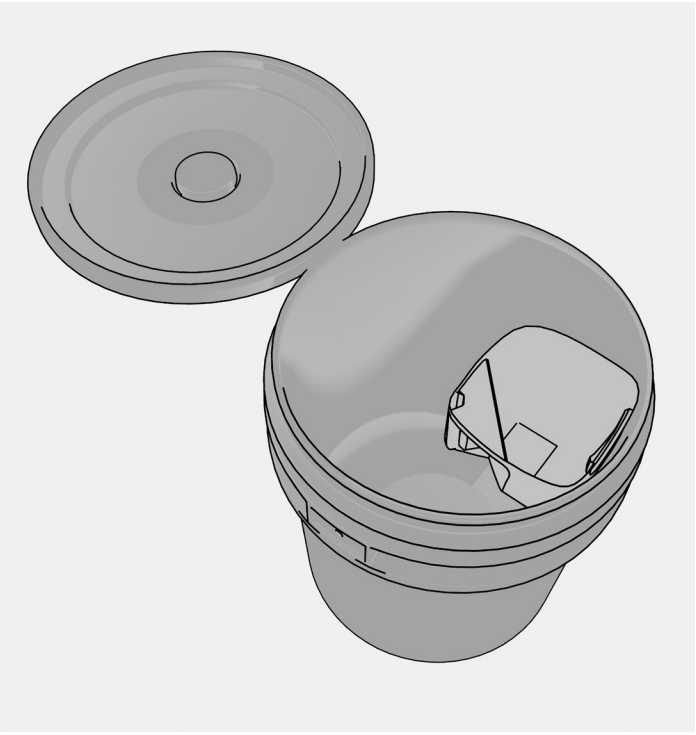
Making a Urine Diverter

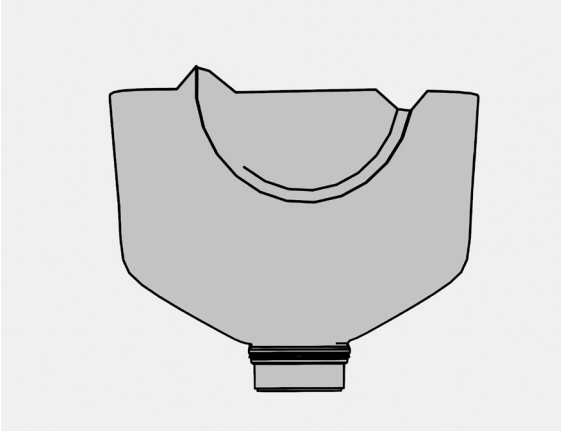
You can buy urine diverters specifically made to fit on toilet buckets, but you can also make one with almost any kind of container. Urine diverters make it possible for solid waste to dry up and start decomposing faster, and with less smell. Otherwise, you wind up with a wet mess that stinks and takes forever to dry out.





Standard urine diverters are relatively easy to get online.

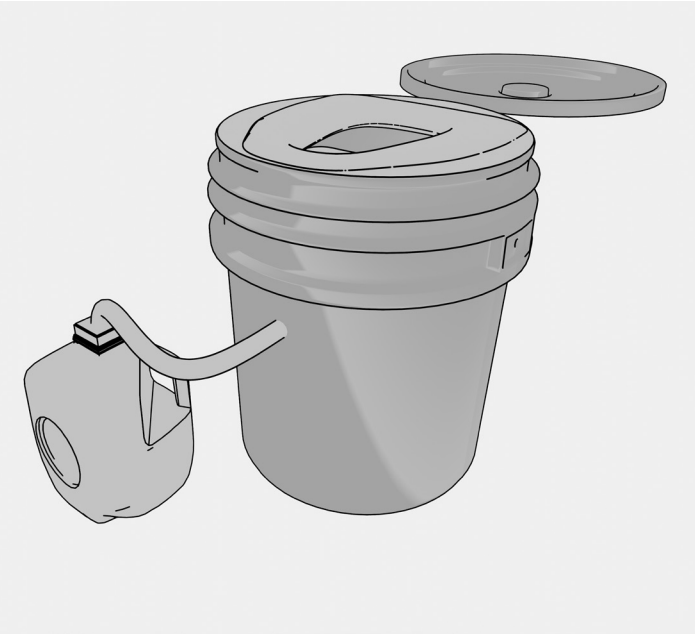




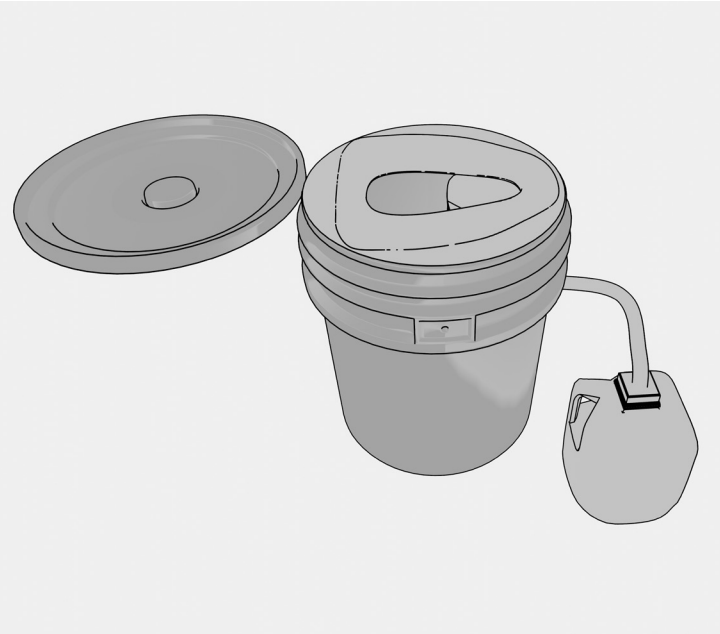
You can also simply cut a gallon jug in half. Caps run about 1-2 inches in diameter, so you can find vinyl tubing that fits the outside.

Fasten the gallon container to the top inside of the bucket with a screw.

Finishing The Urine Diverter



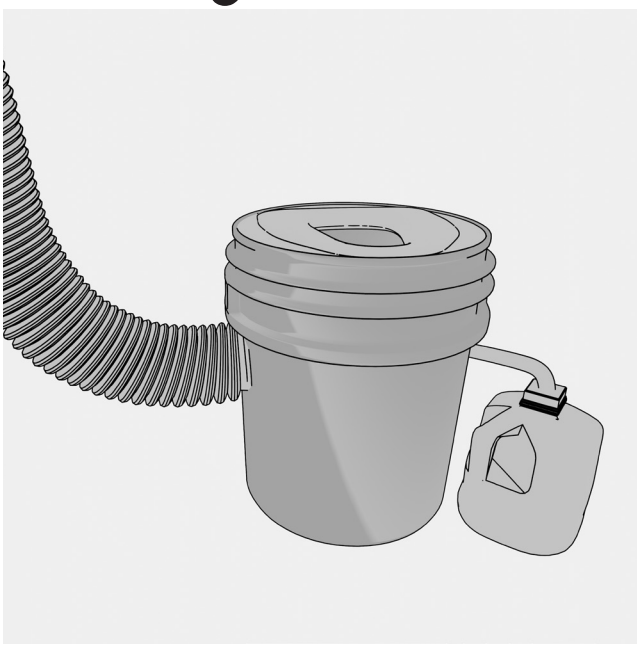
Drill a small hole in one side of the bucket to run the vinyl tubing through, then connect it inside another gallon container.

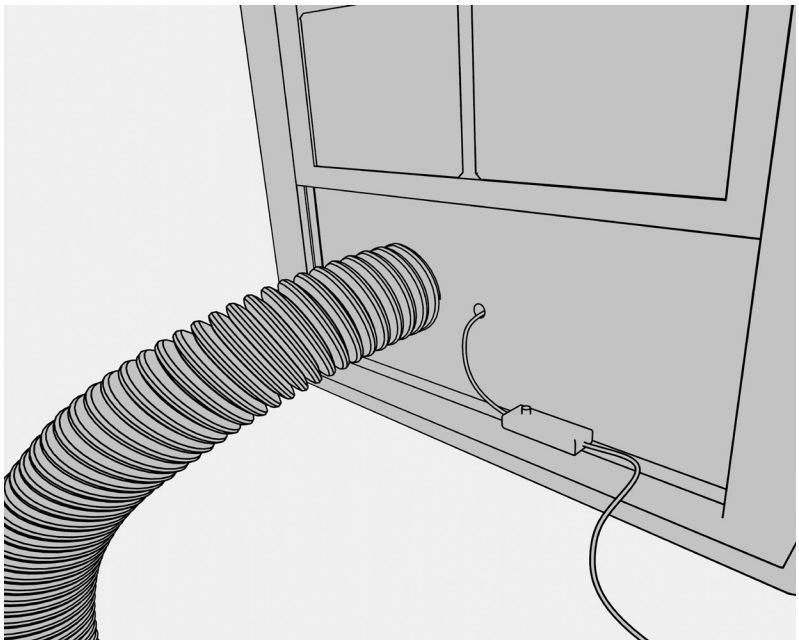


The diverter empties into the gallon, keeping liquid waste separate from solid. You're not supposed to pour any kind of waste into storm drains because they feed into rivers and streams. It's also technically illegal to bury it on your property. But during an emergency, separating them gives you more options and makes everything less hazardous.

Next, you can make a vent by drilling a 3-4 inch hole in the other side of your bucket (as close to the top as possible). You could also drill a hole into the lid. Keep a spare lid just in case. Use a hole saw, and size the cut to the outer diameter of any flexible duct you can find.

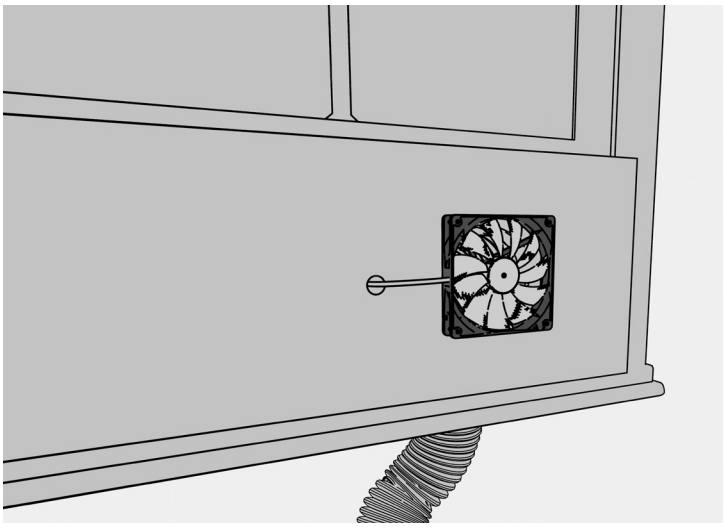
Making a Vent Port





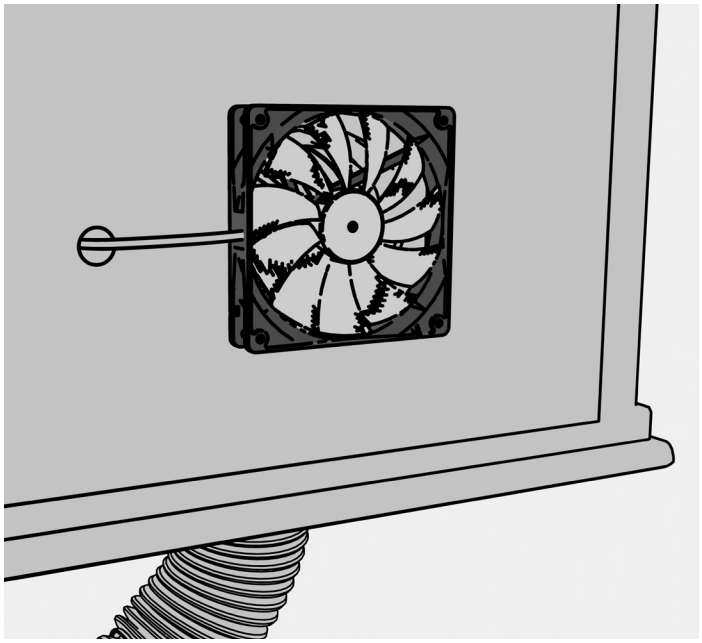
Feed the duct into the port you drilled. Feed the other end through a passthrough panel. The section on solar panels explains how to make one of these with rigid foam insulation boards. (Drill another hole with a hole saw.)

Next, you're going to mount a DC fan on the other side. It's easy to find them with AC adapters and control knobs.



You'll want to run the fan for several hours a day, even 24/7 in order to dry out the solid waste. The drier, the less smell.

Run the DC fan cable back through the panel, so you can turn it off and on from the inside. You can also usually adjust the speed.



Cold Weather Gear: Quick Guide

Layers

Base Layer: Thermal underwear made of polyester, polypropylene, or Polartec.

Mid Layer: A jacket or sweater made of wool, fleece, down, etc.

Shell: Hard shells provide the best protection, but they're bulky and not comfortable. Soft shells also offer good protection and comfort.

Wind Rating

Any good outer shell should provide a wind rating, measured in cubic feet per minute (CFM). It describes how much of a 30 mph gust can pass through one square foot of material. The lower the CFM, the better. Here's a breakdown:

CFM 60 or above: Poor wind protection

CFM 20: Some wind protection

CFM 5-10: Good protection

Waterproof Rating

Outdoor gearists measure waterproofing in mm with the hydrostatic head (HH) test. It describes how many millimeters of water can sit on the material before it penetrates. A 5,000 mm rating offers the minimum. It holds up against light rain and snow.

5,000 mm: Minimal water protection

10,000 mm: Some water protection

15-20,000 mm: Good protection

Staying Warm without Power

* Keep a tent handy or make one with blankets to conserve heat
* Keep sleeping bags on hand rated for cold temperatures
* Use candles, tea candles, and tea candle stoves for cooking and heat
* Solar power for heaters is an option, but they use a lot of energy
* Sharing body heat with other people or pets can save your life
* Be careful with candles and heaters, especially when sleeping. You might even want to turn them off and rely on sleeping bags, body heat, hand warmers, etc.
* Keep foods on hand that don't require much preparation
* Wool or polyester base layers, gloves, socks, hats, beanies, and neck gaiters