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Fall 2016

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Self-Reliance

On the cover

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In the kitchen

In the self-reliant home

On our cover

Miranda Rommel hoists an armful of freshly harvested Russian Red garlic at her home on Birdsong Farm in Oregon. Miranda writes about growing great garlic beginning on page 22. *Photo by Andy Rommel.*

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Features

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Subscriptions:
Yearly subscription of four issues is $26.
Send payment to:
Self-Reliance
P.O. Box 746
Gold Beach, OR 97444
A subscription form is on page 98.
For information call (541) 247-0300.
E-mail: customer-service@self-reliance.com
Website: www.self-reliance.com

Advertising:
Classified ad rates are $1.50 per word. Minimum $30. Classified ad pages will debut next issue. For current display ad rates, visit www.self-reliance.com/advertise or call 1-541-247-0300

Identification statement:
Self-Reliance (ISSN No. 2471-9382) is published quarterly (four times a year) for $26 per year by *Self-Reliance Publications, LLC.*, 29545 Ellensburg Ave., Gold Beach, OR 97444. Periodicals Postage Rate is paid at Gold Beach, OR and additional mailing offices. POSTMASTER: Send address changes to *Self-Reliance*, PO Box 746, Gold Beach, OR 97444.

Published in Gold Beach, Oregon, U.S.A.

Editor's Note

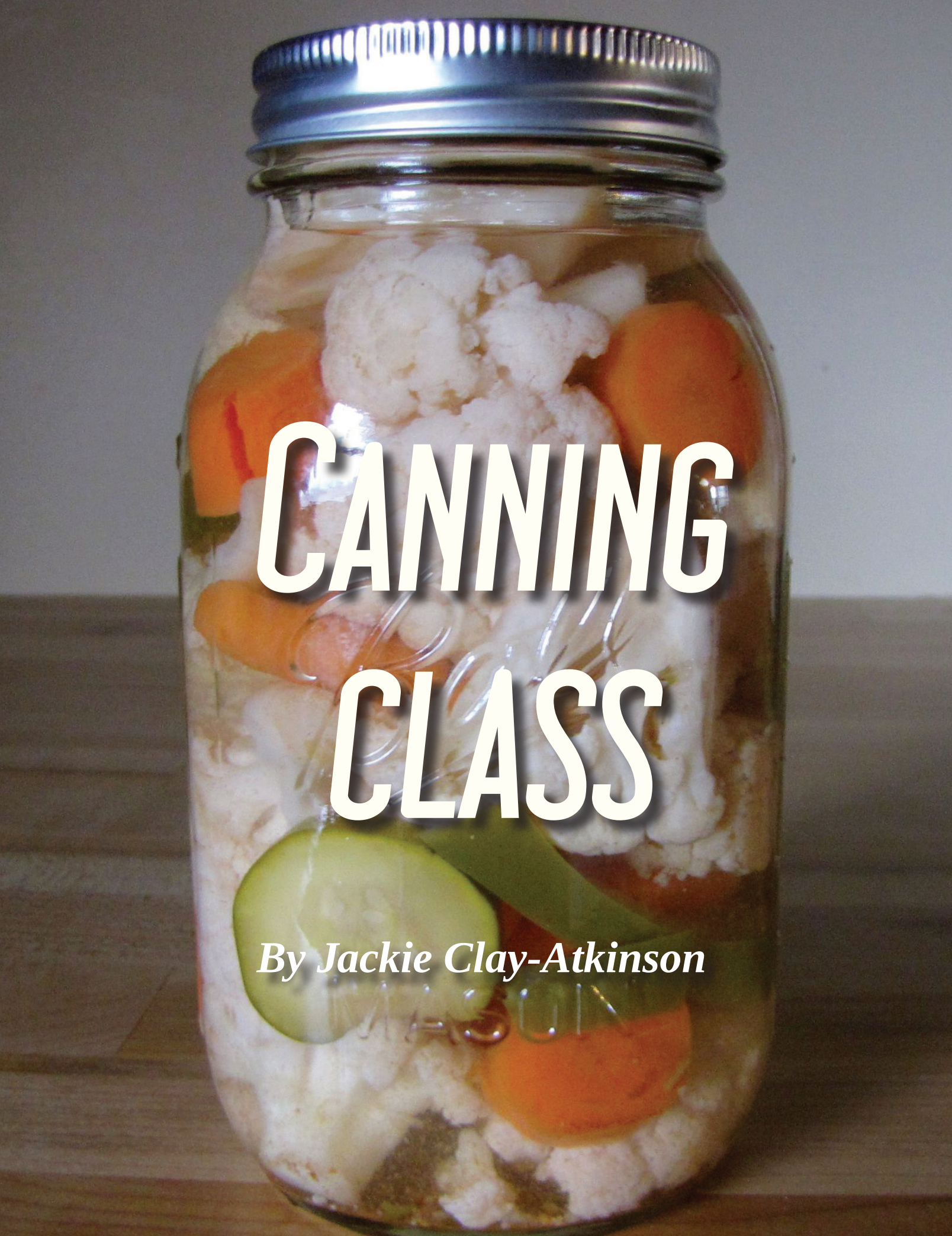
This issue marks the launch of *Self-Reliance* onto newsstands across America, as well as the launch of Jackie Clay-Atkinson's new "Canning class" series. With the explosive resurgense of home food preservation interest has come an equally abundant proliferation of canning recipes and methods — but are they safe? Jackie draws from more than 50 years of experience to help you learn the basic methods and the up-to-date critical safety rules you must follow to fill your larder with delicious, nutritious, and most of all, safe food.

The topic of self-reliance has become so popular in America that in the next few months alone there will be eight major self-reliance and preparedness expos across the country. We're excited to be able to attend events in Oregon (see page 30), Florida and Colorado (see page 31), Missouri and Ohio (see page 36), and Utah (see page 84). In addition, Mother Earth News is holding two more huge self-reliance Fairs this fall in Pennsylvania and Kansas (see page 51). For the past two years I have really enjoyed attending their June fair held in Albany, Oregon, not far from my farm. If you are interested in learning more about becoming self-reliant, I encourage you to attend an event near you.

Meanwhile, I hope this issue will help you get in the swing of fall with articles on growing garlic, butchering chickens, installing a rainwater diverter, saving seeds from your garden, and even tanning sheepskins. Fall is a busy time on our farm as we fill the freezer and pantry and also prepare for a long, rainy winter. We'll be putting many of these ideas into practice at our home, right alongside you.

Annie Tuttle
Editor

Publisher Sam Duffy and Editor Annie Tuttle along with her daughters Olga and Clara and newborn goat kids



Canning Class

By Jackie Clay-Atkinson

Canning has been a big part of my life for more than 50 years now. I still remember standing in our cool Detroit basement, watching as my mother and grandmother canned sweet peaches from our backyard tree. I'm sure that's what got me started down this path, as I was so impressed we could pick, can, and eat those wonderfully succulent peaches from summer all the way through winter. It seemed like a miracle then, and it still does today.

Every time I go down to the huge pantry in our cool basement, I gaze in wonder at the hundreds of multi-colored jars of home-grown foods. Even after all these years, it never ceases to amaze me how much healthy, delicious food I can put up all year long.

Here are the simple tools needed for canning. From left, canning funnel, jar lifter, lid lifters, new canning lids and ring, pressure canner, and a canning book.

Some folks have never learned this skill and others have canned in the past but somehow gotten out of the habit. Luckily, there's a terrific interest in canning today. Some of it is because people are becoming more health-conscious, wanting to put chemical-free, locally-grown food on their family's table. Other reasons are to prepare for a natural disaster or financial crises.

So if you've never canned or want to brush up on your canning skills, we've put together this canning class so you can join in.

Why you should can

It's healthier. The food you can has no preservatives or other additives. If you wish to avoid pesticides, herbicides, or GMOs, you can. You control exactly what goes into each jar. Freshly picked and processed foods haven't sat around for days in a truck or factory picking up bacteria. And by doing it yourself, you know you've used clean produce and sanitary processing methods.

It tastes better. Home-canned food just plain tastes better than store-bought canned foods. Part of the reason this is true is that you, alone, control when the vegetables are harvested and even what varieties are canned. Commercial foods are harvested in bulk, often when much of the crop is still slightly underripe, not when it is at its best flavor.

By using your own spices, you can adjust the taste of many canned goods. Maybe your family doesn't like garlic — don't put it in! Or perhaps you like your salsa really hot. Add more hot pepper to the recipe. You have control over the flavor.

Home-canned foods stay good for decades. Some folks think you must eat up all the food you canned during

the fall by the next harvest season. When stored properly, home-canned foods remain tasty and healthy for years and years. This makes stocking up your pantry a snap. And no matter what happens during an emergency, you can be assured of having plenty of wonderful food available at all times.

You have a huge selection of foods available. Just about anything you can buy in a can from the store, you can home can yourself. And more, too! How about your favorite family recipes for stews, soups, and mixed dishes? Most can easily be canned to line your pantry shelves. For instance, I put up about five different flavors of spaghetti sauce, four different barbecue sauces, six different salsas, and my own pizza sauce, none of which you can buy in the store. I also can up a huge variety of meat, poultry, and fish. The commercially canned versions are very expensive.

Canning is easy and very safe. If you can read and follow directions, you can put up your own food, starting today! Yes, I'm sure you've been warned about how dangerous a pressure canner is. "Grandma's blew up, burning her and spewing food all over the kitchen!" Truthfully, I don't see how a modern canner could blow up. There are safety features in all canners manufactured within the last 50 years. These consist of weights, which let off excessive pressure, and rubber "blow plugs," which pop out if the canner builds up too much pressure. Some even have safety petcocks which release excessive pressure. With no excessive pressure, there is no "blowing up."

Many people worry about food poisoning or botulism turning up in their home-canned foods. Again, a needless worry when proper methods are used. When home-canned foods are put up properly, using a modern canning book as a guide, there will be no food poisoning. Still, as an additional safety, home pressure canned and store-bought pressure canned goods alike should be heated to boiling temperature by either heating on the stove top, baking in the oven, or being otherwise held to boiling temperature for 10-15 minutes, which kills any possible bacteria or toxins.

Most food poisoning in the United States today comes from commercially grown foods, not home canned ones.

Canning is convenient. I don't know what I would do without my jars of home-canned food in the pantry. When company shows up unexpectedly, I can go down in the pantry, bring up a basket full of jars and in 20 minutes or less, serve a full meal such as roast beef, carrots, onions, and potatoes with a dish of wild blueberries for dessert. If I'm too tired to "cook" a meal, I can grab a jar of salsa and taco meat from the pantry, heat up the meat, fill taco shells, and in 15 minutes we're scarfing down homemade tacos with plenty of salsa. Or I can simply heat up a quart of soup or chili. Ta da! A homemade meal in minutes.

You get more meals out of a large piece of meat. When I cook a turkey or ham, instead of getting a couple big meals then a few "pickin's," I'll get dozens of meal ingredients instead. I can up big chunks of meat in pint jars, and small diced pieces of meat in half pint jars to use in various casseroles and mixed dishes. Then I boil up the bones with a little meat still on them to yield soup stock. I use ham broth and bits of meat to can split pea soup, bean soup, and even baked beans.

Canning saves big money. Especially when you grow your own food to put up, canning is a wonderful budget saver. We very seldom ever buy food from the store. In fact, I can't remember the last time I bought a vegetable from the market. Even when you don't have a big garden, canning saves plenty if you can buy food from a local source such as a Farmer's Market or neighboring gardener. Once word gets out that you can, you'd be surprised how many folks will call up and say "I've got extra carrots, if you'd like some to can." Or beans … or spinach …

Although you must use a new lid each time you put up a jar, they only cost about a dime each, and only a little energy is spent for fuel to can a batch of jars.

Let's take a look at the basics so you can join me with confidence.

Tools used in canning

There are a few basic tools needed in canning. These include a **canning funnel** which makes filling the jars much easier and faster, a **jar lifter** which clamps over the jars, making lifting them in and out of a canner much safer, a **lid lifter,** which is a magnetized wand used to retrieve hot lids from simmering water, and **canning jars** in quart, pint, and half-pint sizes, depending on the amount of food you plan on canning. When I had eight children at home, I used quarts for nearly everything. But now that it's just me and my husband, Will, I find pint and half-pint jars to be more convenient.

I have hundreds of jars (probably thousands), but I didn't buy them all new. Most were picked up at auctions, yard sales, and given to me by friends. Of course, most big box stores have a good selection of canning jars as well.

Canning lids are sold in boxes of a dozen and come in regular and wide mouth sizes. The wide mouth lids fit wide mouth jars which are handy to use for larger pieces of firm foods which may be damaged while trying to pry into or out of a regular mouth canning jar. Their only drawback is that they're slightly more expensive than regular mouth lids.

Lastly, you will need a canner. There are both **boiling water bath canners** and **pressure canners,** and the type you need depends on the types of food you will be canning. Most big-box stores carry both types of canners. I've also bought both at yard and estate sales for a very reasonable price. Make sure the canners are complete, in good shape, and have an instruction manual available. Pressure canner

Pickled foods are easy to put up using a boiling water bath canner.

instructions can usually be downloaded from the internet. Just search for your canner's brand name and model number (usually stamped somewhere on the canner or lid).

The two methods and their *critical* differences

Boiling water bath canning is very simple and extremely safe. People most often use the "big blue" canner which is a very large blue enameled pot with a lid and a rack inside. This method is especially great for beginning canners. It can be used for a wide variety of foods, like fruits and fruit juices, pickles, relishes, jams, jellies, conserves, and preserves. You'll notice the foods I mentioned are all high-acid foods, having sour bases, often with sugar added to the fruit or vinegar to lessen the tartness. High acid foods resist bacteria which cause food poisoning, most often botulism. If high acid foods "go bad," they will either ferment or mold … neither which will usually harm a person. For instance, if jelly molds, you just spoon off the mold and the jelly is fine, below it.

No matter what Grandma used to do, low acid foods ***absolutely must*** be canned in a pressure canner for safety. Low acid foods include *all* vegetables, meats, poultry, and fish and any recipes containing them. No matter how long you process low acid foods in a boiling water bath canner — and granny processed for hours — the food is never brought to a temperature high enough to kill the botulism bacteria. Only by **pressure canning** can the temperature be raised to 240° F, which is sufficient to kill botulism bacteria when the food is processed for the correct length of time. As with canning in a boiling water bath canner, you must know your altitude. With pressure canning, you must adjust your canner's pressure, not the length of time processing, to suit your altitude.

Using a boiling water bath canner

Putting up food using a boiling water bath canner is quite simple. You will first check all the jars for cracks or nicks in the rim before placing them in hot water to hold until you fill them. Fill your water bath canner with very hot water and leave it sit on

With a simple boiling water bath canner you can easily turn fruit into preserves, canned fruit, jam, and jelly.

Altitude adjustment charts

For boiling water bath canning

Altitude	Increase processing time
1,001 to 3,000 ft	5 minutes
3,001 to 6,000 ft	10 minutes
6,001 to 8,000 ft	15 minutes
8,001 to 10,000 ft	20 minutes

For pressure canning

Altitude	Weighted Gauge	Dial Gauge
0-1,000 ft	10 pounds	11 pounds
1,001-2,000 ft	15 pounds	11 pounds
2,001-4,000 ft	15 pounds	12 pounds
4,001-6,000 ft	15 pounds	13 pounds
6,001-8,000 ft	15 pounds	14 pounds
8,001-10,000 ft	15 pounds	15 pounds

the stove with the lid on until you begin to put jars in it. Be sure there will be enough room in the pot for the jars and the water — at least an inch of water much cover the tops of the jars — and be sure you use a rack under the jars to hold them off the bottom of the canner. If you don't, the jar bottoms will very often crack and break, dumping food out into the water.

In a small saucepan, bring the lids to simmering temperature, then hold in the hot water until you use them. New lids have been made with a reformulated sealing compound that no longer requires boiling. Check your lid directions carefully.

Fill the warm jars with the food you will be canning to the specified head room or head space according to your canning recipe. This just means you'll be leaving some room above the food in the jars. With food canned in a boiling water bath canner, it is usually one quarter to one half of an inch, as this food does not usually swell during processing. Wipe the rim of the jar clean with a clean, dampened cloth. Then place a new, hot, previously-simmered lid on the jar and screw down the ring firmly tight. Don't use excessive force. Use a jar lifter to lower the filled jar onto the rack in the hot water bath canner. It's best if the jars do not touch. If they do touch, sometimes they will clunk together and break during processing. Put the lid on the canner and turn on the heat.

Begin counting your processing time when the water in the canner comes to a full rolling boil. Time your food's processing time, using your canning book as a guide. Notice that there is a caution in every reputable canning book, advising you to check a chart for processing times if your altitude is above 1,000 feet. The higher your elevation is above 1,000 feet, the longer you will process your jars. See the boiling water bath altitude adjustment chart.

When the time is up, turn off the heat and immediately remove the jars to rest on a folded towel in a draft-free area. If you just set them on a cool counter, the bottoms of the jars may break. The same will happen if you set them in front of a window with a cool breeze blowing in on them. Do not touch the jars until they are cool.

Once your jars are cool, usually over night, remove the rings and gently wash the jars in warm soapy water to remove any food residue. The rings play no role in keeping jars sealed, and actually reduce the life expectancy of the seals. Rust can collect beneath the rings, eventually rusting out the jar lid. As you pick up each jar to wash, check the seal. The lids should be indented in the center and when you gently press down in the center with one finger, it should not flex, but remain firmly indented. Any that flex are not sealed and should be refrigerated and eaten soon or re-processed with a new lid for the identical time you used before.

Safety with the pressure canner

To avoid any trouble with your pressure canner, first, read the canner's manual and follow its instructions. Then always read the directions in your canning book for every food you intend to can. Even after more than 50 years of canning, I always open my canning book to the section on the food I'm about to can. You can forget, you know!

Before beginning to can, ensure the openings in the vent and petcocks are clear and not clogged with bits of food from prior uses. If your canner uses a dial gauge, it's best to have the gauge tested every year or two to ensure it reads correctly. The University Extension office in your county probably offers this service.

If your canner has a gasket, make sure it is flexible and free of cracks. If it is brittle, stiff, cracked, showing signs of aging, replace it. A bad gasket can let steam escape, making it hard to maintain proper pressure. A replacement gasket is inexpensive and can be found online or at most hardware, farm, or kitchen stores carrying canning supplies.

Some pressure canner lids attach by twisting on, but others have screw down knobs. If yours is the latter, be sure to tighten opposite knobs, keeping the lid square on the canner and working your way around. If it is tightened unevenly, it may let steam escape, making it hard or impossible to bring up to pressure.

After processing and letting the pressure return to zero, remove the lid carefully, holding it away from your face. There will still be plenty of steam in the canner which can burn you.

As with the boiling water bath canner, you must have a rack on the bottom of the canner to support the jars or

they may break. You may stack canning jars in more than one layer, but you need a wire rack between layers. This may be a rack which came with your canner or you can improvise by using a circular wire barbecue grate. I got mine from the Dollar Tree. It has worked great for 15 years now.

Using your pressure canner

Get your canning supplies together and inspect your jars for cracks or nicks. Discard damaged jars, as they will crack or break during processing.

Open and read your canning instructions on the food you will be putting up. Place clean jars in hot water to hold until you fill them. Have your new lids in a pan of very hot water to hold before use.

Add two to three inches of water to the bottom of your canner and place the rack on the bottom. Pre-heat the canner until the water is hot. Putting hot jars into cold water will often cause the bottoms to crack out.

Fill jars with prepared food according to instructions, leaving the correct amount of head space in each jar. Wipe the rim of the jar with a clean, damp cloth. Remove any air bubbles with a wooden spoon handle, chopstick, or thin spatula. Place a hot lid on the jar and screw down the ring firmly tight, without using force.

Put each jar into the canner, using the jar lifter. Place the lid on the canner and either twist to lock in place or tighten the knobs, depending on the brand.

Turn on the heat. Exhaust steam until a steady, forceful stream escapes from the vent for 10 minutes, or as instructed in your canner's manual. Put on the weight or close petcock(s). Continue on high heat. Watch canner carefully as pressure builds. With a **weighted gauge,** the weight will begin to rock when the correct pressure is reached. It should rock several times per minute, spurting out small bits of steam. If it rocks too often or spurts steam constantly, the heat is too high. Turn down the heat a bit until it reaches a comfortable pressure. With a **dial gauge,** when the pressure is correct, simply turn down the heat to maintain the right pressure. Try to hold the pressure quite even for the entire processing time. If it is allowed to dip and rise, it often allows some liquid to boil out of the jars at the top, leaving some of the food uncovered at the top of the jar. This does not mean the food is not good, but the appearance may be affected.

Before, carrots being prepared to pressure can. After, an hour later, bright jars of carrots with nothing added but water, a bit of salt, and love, wait to cool after canning.

If your canner has a gauge and a weight, as mine does, add the weight then adjust the stove heat to maintain the pressure on the dial. For instance, I live at an altitude of 1,500 feet, so I should use 11 pounds of pressure when I can. I set the weight on the 15 pound hole, then bring the pressure up to 11 pounds and hold it there.

When the correct time has passed, turn off the heat and let the canner cool so the pressure gauge returns to zero. If your canner only has a weight, cool for a while, then gen-

After processing, jars should be lifted onto a folded towel in a draft-free location to cool completely.

tly nudge the weight with a spoon handle. If it releases steam, let it cool longer. If no steam appears, carefully remove the weight.

Never hasten cooling by bumping the weight to release steam, immersing the canner in cold water, or opening a petcock prematurely to release steam. Your jars may not seal properly.

Remove the lid, holding it away from your face so the steam doesn't burn you. With a jar lifter, carefully remove the jars to a dry, folded towel in a draft-free spot to cool. Do not touch the jars until they are cool. Pressure canned jars may still be hotter than boiling temperature even once they are removed from the canner. Use caution.

A pantry full of home canned foods brings satisfaction and security to a family.

Once your jars are cool, usually over night, remove the rings and wash the jars in warm soapy water to remove food residue, just as you would when water bath canning. As you pick up each jar to wash, check the seal. The lids should be indented in the center. They should not flex or pop up when pressed down in the center. Any which flex are not sealed and should be refrigerated, re-processed with a new lid for the identical time and pressure you used before, or eaten soon.

Once you've given home canning a try, I promise you'll become addicted. It's so much fun and fulfilling, too! I can't tell you how many times I've heard people say they would have started canning years ago if they had known just how easy and fun it actually is.

Avoiding botulism when canning food

By Joe Alton, MD and Amy Alton, ARNP

Home canning is a great way to have good things to eat, even in the coldest of winters, and more and more people are learning this useful skill. Indeed, Jarden Home Brands, which makes Ball canning jars, saw a 30 percent increase in sales last year.

Home canning techniques are much advanced from its beginnings about 180 years ago, with many scientific improvements that make it an excellent way to preserve food for later use.

Canned food can have a shelf life ranging from one to five years, although it can be longer under certain circumstances. In 1974, samples of canned food from a ship that sank in 1865 in the Missouri river were tested by the National Food Processors Association. There was no trace of microbial growth and, though not in its original state, was determined to still be safe to eat.

But home canners, and even food conglomerates, sometimes make mistakes; when they do, pathogens (disease-causing organisms) can invade the very stuff that we depend upon for nourishment. One of these pathogens is *Clostridia Botulinum*.

Clostridia Botulinum

Clostridia Botulinum is a rod-shaped bacteria found in soil worldwide. The organism is anaerobic, which means that it grows best in conditions where oxygen is absent. In addition, it forms "spores" that survive in a dormant state until conditions favor their development. You might be surprised to know that botulinum spores exist on most fresh food surfaces. Here, they are harmless because the spores activate only in the absence of air.

Clostridium botulinum's spores are hardy, heat-resistant, and exist just about everywhere. Once in a favorable, oxygen-poor environment, they activate. This leads to the production of certain noxious substances called "toxins," some of which are so dangerous they have been considered as biological weapons.

There are a number of different botulinum toxins, some of which cause illness in humans, others in animals. This illness, which primarily affects the nervous system, is called "botulism."

First described as a disease in the 18th century in people who got sick after eating contaminated meats (the word "botulism" is derived from the Latin word for sausage), the bacteria itself wasn't isolated until near the beginning of the 20th century.

With advancements in home and commercial processing of food, botulism is much less common than it once was. Despite this, over 100 cases are reported in the United States every year.

Types of botulism

Although there are various ways that botulism may be transmitted, three types are most common:

Infant botulism: Infant botulism occurs after consuming spores of the bacteria, which activate and multiply in the intestinal tract. The source of infant botulism may be ingestion of honey, which the FDA warns against in the first year of life. Despite this, it's much more likely to be caused by exposure to soil that contains the bacteria.

Wound botulism: When a wound, even a scratch, is contaminated with *Clostridia Botulinum*, toxins produced by spores can cause major damage. In recent decades, wound botulism has occurred not so much in accidental trauma as in self-inflicted injury, such as the injection of heroin.

Food-borne botulism: Food-borne botulism in home canning is the focus of this article, and can be seen in foods that are low in acid, with a pH of 4.6 or lower. They include, according to the USDA, red meats, seafood, poultry, milk, and all fresh vegetables except for most tomatoes. *Clostridia Botulinum* doesn't seem to find high-acid and refrigerated foods as agreeable.

It should be noted that botulism doesn't appear to be spread from human to human. When a cluster of cases are identified, it's usually because the group ate the same contaminated food.

Sign and symptoms

When you eat food containing botulism neurotoxins, a chemical known as acetylcholine is inhibited. This chemical is required for nerve cells to "communicate" with each other and control movement and other vital functions. The end result is paralysis if untreated, but other symptoms are seen earlier, usually within a day or so of exposure. They include:

- Blurred or double vision
- Weakness of facial muscles
- Difficulty speaking and swallowing
- Drooping eyelids
- Dizziness and fatigue
- Nausea and vomiting
- Dry mouth
- Abdominal cramps
- Difficulty breathing

Some victims experience only a few of the above symptoms. Untreated botulism carries a death rate of close to 10 per cent, usually due to respiratory failure in areas without access to advanced methods of mechanical ventilation. Paralysis of extremities can occur and be very slow to recover in survivors.

Diagnosing and treatment

A physician can usually suspect a diagnosis of botulism from the history, physical signs, and symptoms of the patient. However, a number of other nerve conditions, such as Guillain-Barre syndrome (recently tied to Zika Virus infection), and even strokes, can produce similar symptoms. Certain lab tests of blood, stool, or vomit are required to provide definitive proof.

Waiting for lab results may not be appropriate, however, and supportive care should be initiated, especially respiratory support. If botulism was likely to come from recently ingested food, many physicians will induce vomiting or even administer enemas to remove as much of the offending substance as possible.

The definitive treatment for food-borne botulism is an "anti-toxin" derived from horse serum. Although it eliminates the ill effects of botulism toxins, nerve damage is not reversed. Luckily, humans can regenerate nervous tissue, although the process may take months of rehabilitation therapy. Full recovery can be expected in a majority of cases.

Although caused by bacteria, antibiotics are effective only in cases of wound botulism, which may also require surgery to remove infected tissue. Although a vaccine exists against botulism, it has been of limited effectiveness and has some unwanted side effects.

Home canning and botulism prevention

Home canners should follow the guidelines set in the U.S. Department of Agriculture's (USDA) "Complete Guide to Home Canning," easily accessible online. The guide has been recently updated, so make sure you find the most recent version. Jackie Clay-Atkinson's book "Growing and Canning Your Own Food," available through this magazine on page XX is also an excellent guide.

Low-acid and tomato foods not canned according to USDA recommendations present a risk of botulism. Although this article doesn't claim to be a guide on home canning practices, the USDA suggests that home canners:

- Carefully select and wash fresh food.
- Peel some fresh foods beforehand.
- Hot pack many foods.
- Add acids (lemon juice or vinegar) to some foods.
- Use appropriate jars with self-sealing lids.
- Process jars in a pressure canner for the correct period of time.

If the USDA guidelines are strictly followed, you will prevent the growth of pathogens and, importantly, help form a high vacuum in jars. Good vacuum forms a tight seal which keeps liquid in and germs out.

Why not just boiling?

Botulinum spores are heat-resistant and may survive basic boiling-water temperatures. All low-acid foods should be sterilized at temperatures of 240° to 250°F with pressure canners operated at 10 to 15 PSI. The USDA specifically states that pressure canning is the only recom-

The beneficial side of botulinum toxin

You might be surprised to learn that botulinum toxin may have medical uses. In addition to the anti-wrinkling injection, "Botox," the toxin can:

- Eliminate chronic migraine headaches
- Decrease neuralgia. Neuralgia is a intense, shooting pain that comes as a result of nerve damage or dysfunction, such after outbreaks of shingles.
- Reduce spasticity. Spasticity is the involuntary tightening of the muscles caused by traumatic brain injury, cerebral palsy, multiple sclerosis, stroke, or spinal cord injury.
- Reduce excessive sweating by injections in the underarm or other areas.
- Reduce the sudden urge to urinate caused by an overactive bladder.
- Eliminate twitching or "tics" in eyelids and other facial muscles.
- Decrease tooth grinding and the dental damage it causes.

mended method for home-canning meat, poultry, seafood, and vegetables. Boiling-water canners are associated with a greatly increased risk of botulism.

Using proper technique, the time needed to destroy bacteria in low-acid canned food ranges from 20-100 minutes. The exact time will vary based on the type of food, the way it is packed into jars, and the size of the jars.

Even if there is no evidence of spoilage, the USDA recommends that low-acid and tomato foods should be boiled in a saucepan before consuming. At sea level or altitudes below 1,000 feet, boil food for 10 minutes. As water boils at a lower temperature at higher altitudes, add an additional minute of boiling time for each 1,000 foot rise in elevation at your location. Spinach and corn should be boiled for 20 minutes or longer.

Having said this: If you have, indeed, followed the USDA guidelines to the letter, low-acid canned foods may be eaten without boiling *if* you are certain that:

- Food was processed in a pressure canner.
- The gauge of the pressure canner was accurate.
- Appropriate process times and pressures were used for the size of jar, style of pack, and kind of food being canned.
- The process time and pressure recommended for sterilizing the food at your altitude was followed.
- Jar lids are firmly sealed and concave.
- Nothing has leaked from jar.
- No liquid spurts out when jar is opened.
- No unnatural odors are detected.

The bottom line: If you're not certain that you followed USDA guidelines, you might consider discarding it.

In addition, Never eat canned foods if the container is bulging, leaks, or has mold. Food should not appear to have become "mushy." Toss any food that foams or emits a strange odor when boiled.

It should be noted that baked potatoes may also harbor botulism toxin if not eaten hot or stored in the refrigerator. Infused oils with garlic or herbs should also be refrigerated. Don't leave them out at room temperature.

With some attention to detail, you can safely can your fresh food and avoid the threat of food-borne botulism.

Joe and Amy Alton are the authors of the #1 Amazon Bestseller "The Survival Medicine Handbook." For more than 600 articles on medical preparedness in wilderness, disaster, or other austere settings, go to their website at www.doomandbloom.net.

Solar-powered water pumping

By Jeffrey Yago, P.E., CEM

In the last issue of *Self-Reliance* (Summer 2016) I briefly mentioned how solar power can provide well water for the farm or homestead. In this issue we will go into much more detail about the different types of solar-powered water pumps you can actually install yourself.

There are multiple ways to use these systems, including pumping water from a pond to an animal drinking trough, supplying water for fenced-in animals to prevent creek contamination, and pumping water from remote field wells to provide animal drinking water that would otherwise have to be trucked in.

Anyone who can use a screwdriver and pipe wrench should be able to assemble a working solar-powered pumping system using one of the many available kits. These systems are very simple since they do not require any batteries, and rarely require maintenance. Most systems will consist of five basic parts:

- 12 or 24 volt DC submersible pump
- Pump controller
- One or more solar modules with pipe mount
- Water source, such as a drilled well, pond, or creek
- Roll of ½-inch PVC water pipe

The following system sizing information is intended to provide only general guidelines for the actual selection of solar hardware. Obviously there are multiple variables that can impact a specific installation which cannot be known without field verification. Each solar-powered water pumping system will have its own unique sizing requirements and some trial and error may be required to find the right combination of pump, pipe size, and solar module wattage to provide the flow rate required.

Drilled wells

Some DC solar pumps are designed to fit down a 4-inch drilled well casing, but most require a 6-inch casing. These pumps can easily supply three to four gallons per minute from a 100-foot depth. Normally this same pump will work up to a 200-foot depth, but the flow rate may drop to only one or two gallons per minute unless the solar array wattage is increased. While this is not enough flow to wash your car, two gallons per minute is still more than 800 gallons per day for a typical five-hour solar window. At three

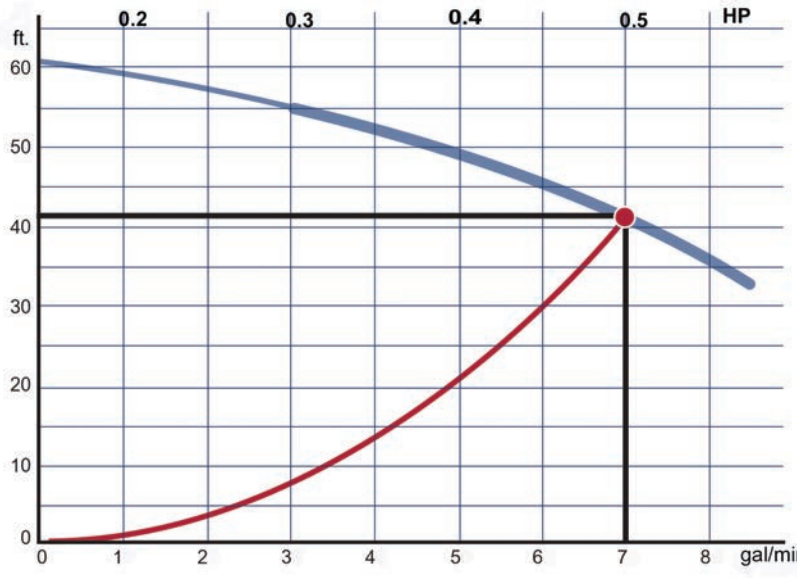
Pole-mounted solar module and pump controller next to drilled well

Average* daily water requirements for most farm animals

Animal	Gallons/Day
Goat	2 to 3
Sheep	1 to 4
Horse	8 to 10
Beef Cattle	8 to 10
Milk Cow	14 to 20

* Water requirements will vary depending on size of animal and seasonal temperatures.

SunPump 12/24 volt DC submersible well pump



Typical pump curve showing gallon flow verses head pressure (blue) and horsepower load (red). This example shows 7 gallons/min flow at 42 foot head with ½ HP pump loading.

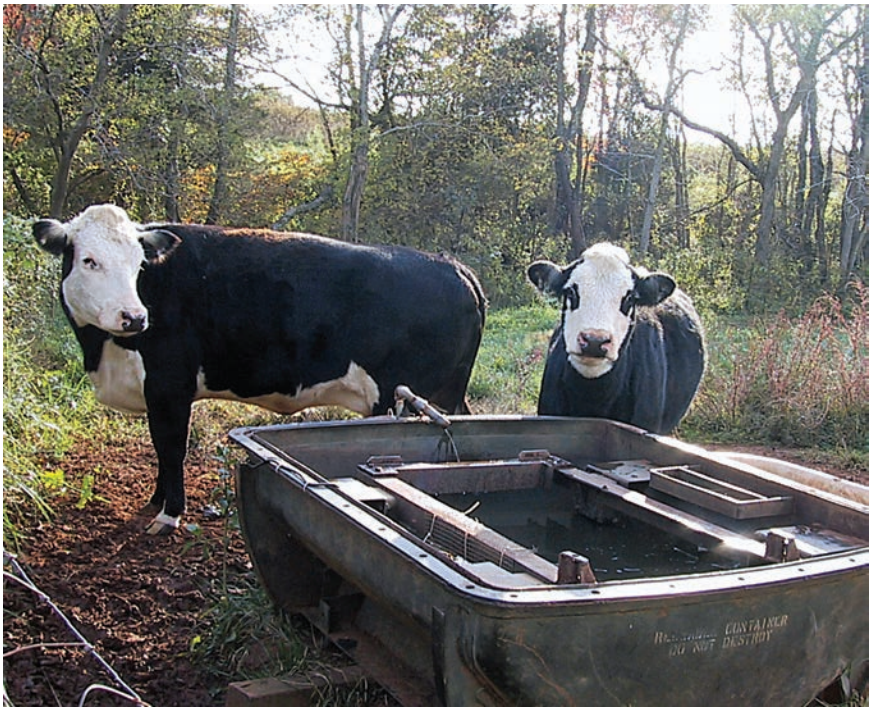
gallons per minute, this higher flow will produce 1,100 gallons per day.

A small solar-powered pumping system that produces two to three gallons per minute could easily support more than 50 head of beef cattle. Assuming a solar-pumping system in this size range meets your needs, the next task is determining the solar wattage required.

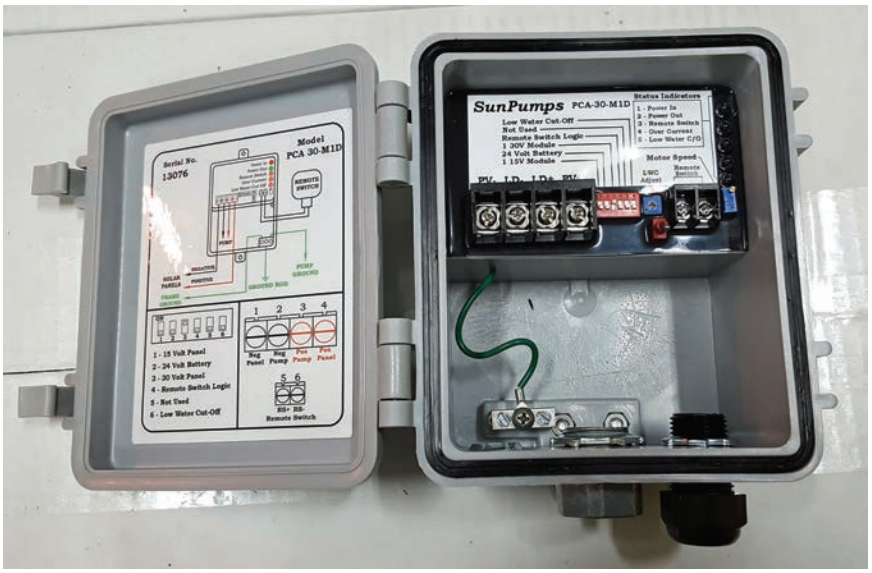
For lower flow rates and a well depth of only 30 to 50 feet, most solar pumps will only require a single 12-volt solar module in the 80 to 100-watt range. However, for wells with pumps having to lift over 100 feet, the pump will most likely need to operate at 24 volts, which requires two solar modules to maintain this same two to three-gallon per minute flow rate.

Unlike a 240-volt AC pump which may stop pumping altogether if the supply voltage is reduced below its voltage rating, almost all DC pumps will operate on a range of voltages with their pumping flow proportional to the input voltage. In addition, solar modules for pumping applications with a nominal 12-volt rating (17 to 21 volts actual) are available in a variety of wattages up to 125 watts.

For a deeper well or higher flow rate, select a larger-wattage solar module or modules. Every pump sold will include a design curve data sheet that compares gallons of flow verses feet of head pressure. Multiple curves are



Water trough kept full by solar pump in lower pond.



Solar pump controllers provide an easy way to connect each electrical component

used to indicate these flow rates with different supply voltages and currents.

Controls

A typical ½- to ¾-horsepower residential 240-volt AC well pump will have a flow rate of five to six gallons per minute using a 1-inch supply pipe with a line-pressure of 50 to 60 psi. When combined with an expansion tank, the AC pump will cycle on and off for a few minutes each time enough water is discharged at any faucet to cause a drop of system pressure.

However, most solar pumping systems are for applications needing as much water pumped as possible since they only pump when there is adequate daytime sunlight. In this case, a control strategy that cycles the pump on and off based on pressure is not normally used. Instead, the solar pump is allowed to pump continuously from sun-up to sun-down. By pumping to an elevated storage tank, any water not needed immediately is available for use later when the solar pump is not operating.

In addition to separate positive (+) and negative (-) terminals to connect the pump and solar module, some solar pump controllers will also include wiring terminals for optional float switches. These can be used to stop the pump when the tank is full or the well water level is too low. While theoretically you could wire the DC solar pump directly to the DC solar array (assuming they are the same voltage), the solar pump controller offers many special features to increase system performance and provide overload protection for the pump motor. I strongly recommend any solar-powered pumping system include a pump controller.

For example, during the early morning and late afternoon hours, there may not be enough current (amp) flow available from the solar array to cause the pump motor to start. However, instead of just staying in this stalled condition and allowing the motor windings to heat up, some pump controllers can convert excess array voltage into a higher current which will force the pump to start pumping during these low sun conditions. While the reduced voltage during these periods will not allow the pump to run at full speed, additional water flow will be available when the system would normally not pump anything. Most solar pump controllers also offer a convenient place to manually turn the pump on and off for service, and LED lamps to indicate system status.

Pipe size

Since a solar-pumping system operates at a much lower pressure and flow rate than most grid-connected residential AC pumping systems, it's advisable not to oversize the pipe from the pump to the tank. For a fixed flow rate, the larger the pipe, the lower the velocity of the water flowing through the pipe. However at low-flow rates, any sand, gravel, or

Float switch used to shut off pump when the tank is full to prevent overflow which can muddy ground and waste water

dirt picked up by the pump may not have enough velocity to reach the surface and be discharged.

For a design example, by referring to the simplified pipe head-loss table, we see that a flow rate of four gallons per minute through ½-inch PVC pipe will have 17.1 feet of "head loss" for each 100 feet of pipe, which is fairly high. However, if we change to a ¾-inch pipe, the head loss will drop to 4.21 feet of head, or almost one quarter the load on the pump. If we need only 50 feet of ½-inch pipe, the head loss will be 8.5 or (50/100) x 17.1.

Head Loss (ft) Per 100 Feet of PVC Piping

Gal/Min	½" Pipe	¾" Pipe	1" Pipe
1	1.38	0.036	.011
2	4.38	1.21	0.38
3	9.96	2.51	0.77
4	17.1	4.21	1.30
5	25.8	6.33	1.92
6	36.3	8.83	2.69

For pump sizing applications, most pump design data is given in "feet-of-head." For example, a given pump is listed at 4 GPM at a 100-foot head. This means if the pump is located 50 feet down a well, and is pumping to a tank located 10 foot above ground and right next the well, the actual head loss for this system using ½-inch PVC pipe would be:

50 ft.	lift to surface
8.5 ft.	pipe friction head loss
10 ft.	tank elevation
68.5 ft.	total head pressure on pump

Since our example pump is specified to provide 4 GPM at a 100-foot head, this proposed system should be within the capacity of this pump. However, if the tank was located higher up the hill, we would expect the pump to have a significant drop in flow.

If you would prefer to calculate pump sizing and flow rates using pressure drop in "psi" instead of "feet of head," just remember for every 2.31 feet you elevate any water level, the pump pressure will increase 1 psi.

Well cap keeps dirt out while sealing around supply pipe and electrical cable.

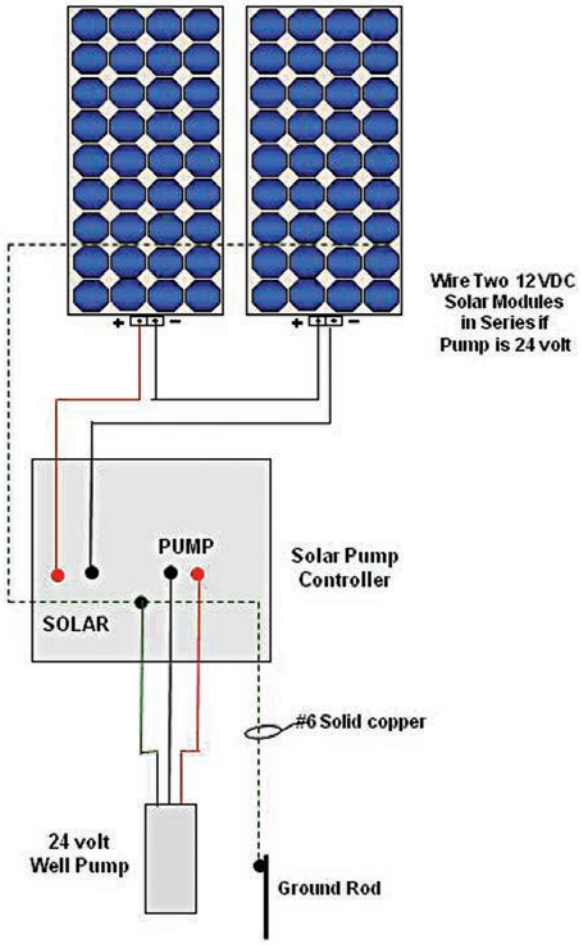
The above example assumes the water level in the well is 50 feet down. From a design standpoint, the actual head pressure on any well pump is the lift required to reach the surface from the normal level of the water in the well, and not how far down the well the pump is positioned. However, if you have a slow recovery well and a high flow pump, it's possible for the static level of water in the well to lower as soon as pumping starts, and could quickly reach the level of the well pump. Most pumps will be located near the bottom of the well, but still maintain enough elevation to allow for a gradual buildup of sand and clay at the bottom.

Unless you have already tested the recovery rate of your well to make sure it exceeds the flow rate of the pump, it

Solar pump suppliers

The following suppliers provide solar pumping kits that include all the hard-to-find parts. Sales staff at these firms are very familiar with sizing solar pumping systems and will be glad to assist you in selecting the components you will need.

Backwoods Solar	**www.backwoodssolar.com**
Wind & Sun Inc.	**www.solar-electric.com**
Sun Pumps	**www.sunpumps.com**



may be wiser to use the distance from the ground elevation down to the pump to determine maximum feet of lift, since there may be times the water level will reach this lower depth.

Well cap

All drilled wells will have a protective cap on the top of the casing where it exits the ground. A deep well pump should never be supported by the water pipe or electrical cable. All well pumps will include either a stainless-steel "eye" bolt or a threaded hole in the pump cap to screw in an eye bolt. This is to allow suspending the pump using a nylon rope which will eliminate the danger of the pump pulling loose from the pipe and falling to the bottom. This safety rope will also prevent any strain on the power cable.

Most solar-pumping kits will include a replacement cap which will include a pass-through pipe fitting, a gland to allow the power cable to exit, and a matching "eye" bolt on the bottom side to tie off the safety rope. However, if there is risk of freezing, a side-wall fitting is available for the supply pipe that exits below-grade on the side of the well casing below the frost depth.

Pond pumping

Some solar pumping applications pump water from a pond or creek to a storage tank located uphill from the water source. In this case, to determine the head pressure on the pump, just estimate the total difference in elevation between the water surface and the elevated tank measured in feet, then add the friction loss for the length of pipe required, which is provided by the piping head loss table and also given in feet. Remember these table values are per 100 feet of pipe. For example, if your application requires 300 feet of pipe from the pond up to a tank on a hill, multiple the table values by three.

For most pond pumping applications, the pump is usually supported by chains from a flotation device to keep the pump off the bottom of the pond where it's intake screen could get stopped up by mud or silt. You need to make sure the pump will not rest on the bottom if the water level of the source drops during the dry season.

Since PVC water pipe is fairly flexible, it can rest on the bottom of the lake from the pump over to the water's edge, and from there it can be buried until it reaches the storage tank or animal drinking trough, where freezing temperatures are expected.

Wiring diagram

The wiring diagram shows the very simple connections required to wire a 24-volt pump to two (2) solar modules having a 12-volt nominal output. If you will be using a 12-volt pump, or a lower flow is acceptable using a dual-voltage 12/24-volt pump, the connections will be the same except only one 12-volt solar module is used.

Summary

Please remember, any pumping system can fail, the level of water in a well can drop, or a pond can dry up. When using any mechanical pumping system to provide drinking water for farm animals, especially if grazing in a remote field, you must check on a regular basis to verify that there is an adequate supply of fresh drinking water. Believe me, a fenced cow or horse will easily break through almost any fence to access a source of drinking water if their normal water supply is suddenly dry.

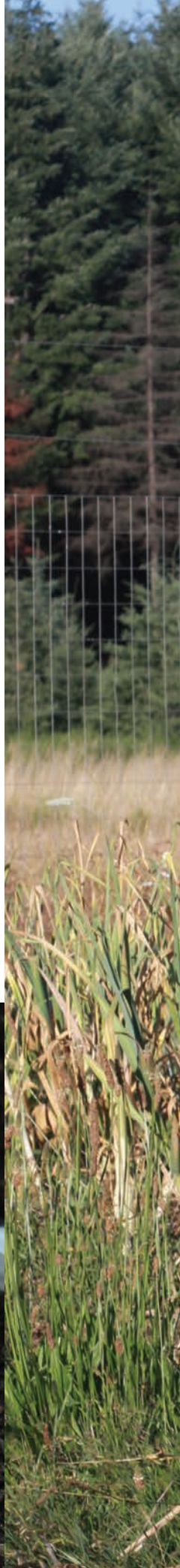
Please note that larger solar-powered pumping systems are available that can pump thousands of gallons of water each day from wells hundreds of feet deep. However, sizing and installing a system this size is beyond the scope of this article and will require the assistance of a solar professional.

Jeff Yago is a licensed professional engineer and certified energy manager with over 35 years of experience in the energy conservation field. He has extensive solar photovoltaic and emergency preparedness experience, and has authored numerous articles and texts. His website is www.offgridprepper.com.

Grow garlic!

By Miranda Rommel

Garlic is delicious, nutritious, useful for repelling garden pests (and vampires, of course) and is part of my secret to a strong immune system. Garlic is a lovely allium that deserves a place in every gardener's fall schedule. Whether you tuck a few in with your roses, plant a dozen in an available raised bed, or plant a whole field of it to keep your family in homegrown garlic all year: Allium sativum is easy to grow but does benefit from some planning and care. This is my guide for growing the best garlic you can on a home gardener's scale.



Above: Miranda and Pocket smooth out the garlic bed in preparation for planting. This bed was first worked over with a broadfork to loosen the compacted soil. At left you can see our seed garlic laid out, ready to be separated into cloves and planted. Right: Miranda plants individual cloves of garlic in shallow trenches, about two-four inches deep. Each trench is about one foot apart, and cloves are placed every 6-8 inches. We use stakes and string to mark rows to make them straight. About eight 30-foot rows gives us more than enough garlic to last all year, plus some to sell at our farmers market booth. We usually have enough to help neighboring gardeners start their own garlic beds, too. Previous page: Miranda holds a small portion of her 2016 Russian Red garlic harvest.

Above: I like to add bone meal to the garlic bed at the time of planting in each trench. Below: Pocket helps heavily mulch the garlic bed as soon as all the cloves are planted. The garlic will grow up through the mulch with relative ease, but weeds will not. We've used straw in the past, but ended up with a little field of oats that required constant pulling. The main function of mulch is to help retain moisture.

Choosing the variety

There are two main types of garlic: hardneck and softneck. Hardneck produces smaller bulbs with larger cloves. I love hardneck garlic for the tender scapes it sends up about a month before harvest. Scapes are the flower stalks; snip them off while immature and add to recipes. I don't love hardneck garlic because it doesn't store as well. Plant some to enjoy the scapes and use up first but invest mainly in softneck varieties. Softneck garlic is traditionally braided and can be stored up to a year in the right (cool, dark, not too humid or dry) conditions and is usually milder in flavor than hardneck. Once you've decided what type of garlic to grow, there are many, many varieties to choose from. Try to choose an organic seed company that grows their garlic as close to you as possible: their garlic will be best suited to your climate. Keep in mind that garlic isn't available until the fall, but companies will often take orders ahead of the harvest and sell out quickly. Here in Oregon I love buying my seed garlic from Adaptive Seed and Big John's Garden. My personal favorite varieties (so far) are Russian Red (soft neck), Nootka Rose (soft neck), and Kilarney Red (hard neck).

Choosing the location to plant

Garlic is an excellent companion plant to many vegetables. You can certainly tuck it in between other vegetable beds or with your roses. I like to plant a 10x30 foot "mini

field" which keeps my household in garlic all year plus some to sell at market and mix into seasoning blends. Wherever you plant it, the soil should be somewhat fertile, loosened, weed free and in full sun. I love working my garlic bed over with some chickens a few months prior to planting: they do the weeding for me and add their unique fertilizer to the soil. I also amend with rabbit manure and compost.

Planting and care

Plant your garlic in the fall. In western Oregon I try to plant between September and November, shooting for October 15th. You don't want to plant your garlic on a rainy day, but a recent rain will help the soil to be just damp and more easily worked. Some folks soak their garlic in advance but I have never done this. I bring all my heads of garlic to the field in tact, choosing the largest seed garlic I have first. When ready to plant, I 'break' the bulbs open to reveal the cloves inside: again, only plant the largest ones and save the 'runts' for cooking with. When preparing your bed mark your rows clearly, or plow all your trenches first. Garlic should be planted 2-6 inches deep with cloves placed blunt side down or on their sides. In warm climates like mine they'll do fine in two inches of soil; in colder climates they should be planted more deeply. Space your rows about a foot apart and plant a clove every 6 to 8 inches. I like to sprinkle some bone meal in with my garlic.

I mulch my garlic immediately after planting. This deep mulch protects the new green shoots from an early frost. Don't worry: the first garlic leaf has a tough 'egg tooth' to help it break through the soil and mulch. Previously I have used oat/wheat straw as a mulch, but hate fighting the baby oats that come up in spring. Garlic doesn't like to compete with weeds! This year I plan to mulch with leaves and mint compost. One other note: if planting several varieties, mark them well! I like to leave a gap between one variety and another, or lay down a 2x4. When you're harvesting, keep the varieties separated.

To harvest your garlic, loosen the soil with a digging fork and gently lift each bulb by hand. The ideal bulb is large with defined cloves, but the cloves have not separated. Keep the fork well away from the bulbs so you don't pierce them. Handle the bulbs gently. They bruise easily, and bruised garlic will not store well.

In a few weeks you should see some baby sprouts come up. Peek under the mulch to check. Garlic will grow a bit in the fall, then remain dormant through the winter beginning to grow in earnest around February (early spring.) To encourage your garlic to be the best it can be, you will want to fertilize it several times — but not yet! I like to mark my calendar (or set up reminders in my Google calendar) to remind me to think of the garlic months later. My general fertilizing tip: On that first warm 'spring' feeling day in late February or early March, give your garlic a good foliar drench with liquid seaweed and liquid fish. This fertilizer isn't too hot but will give your garlic a nice snack to set its spring growth off right. Water the leaves early in the morning when it is still dewy, or late in the evening — never in the afternoon. Repeat this foliar feeding again in a few weeks. Once spring is closer to arriving in earnest (early April) you'll want to foliar feed again and continue to do so every 2-3 weeks. Because I hate to waste, I also water my garlic with blood harvested from the animals I butcher. A little too primal for you? You can side dress with blood meal found at the garden store. Side dress your garlic with a complete vegetable fertilizer in late May and be sure it's getting plenty of water through mid June. In Oregon, the rain takes care of the watering chore all winter and spring and cuts off just in time to harvest. If you are irrigating, cut the water the last week of June.

Harvest, curing, and storage

Knowing when to harvest garlic can be a tricky task. Not all varieties will be ready at once, and not all BULBS of one variety will be ready at once. Watch your garlic carefully and expect a bit of a learning experience the first few years. Unlike onions, you do not want to let the tops totally dry and fall over. This will result in your garlic bulbs opening, losing many of their protective wrapper skins, and will decrease storage time. The key is for the bulbs to fully develop and for 25 to 50% of the outer green leaves to begin to dry. When you think it's time, carefully dig up one or two and proceed if they're looking good. I like to use a pitchfork to loosen the soil beside the row (don't hit the bulb by accident) and lift out the bulb by hand. Don't pull too hard on the leaves or they can rip off.

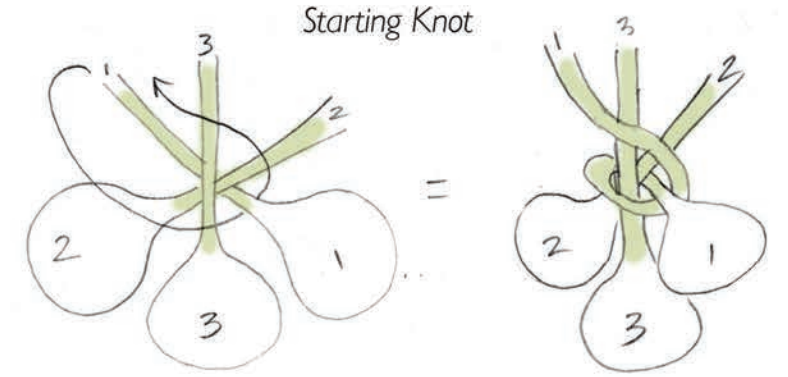
Garlic can be eaten fresh, but in order to store it you need to properly cure it. While harvesting, handle

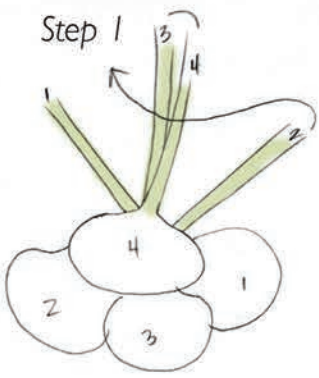
Hang garlic to cure in a shaded spot in small bundles to allow plenty of airflow. These are hanging from the rafters of our rabbit barn. I'll let these cure for about a month before I worry about cleaning up the root ends. By then the dirt will be dry and easy to brush off, the skins will have dried to form a more protective layer, and they won't be so prone to damage. Then I'll braid the withered greens and hang them for long-term storage in my cool pantry.

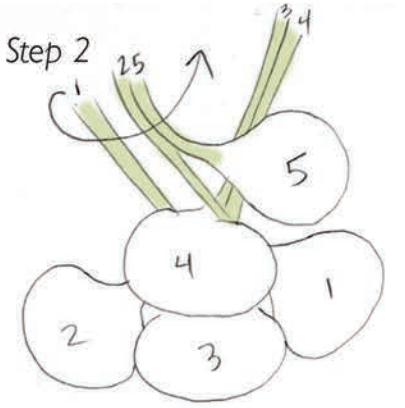
your garlic gently, as it bruises easily and any damage will decrease storage time. Don't leave your bulbs out in the sun too long as they can sunburn. Once your garlic is dug up, carefully store it in a place out of the sun with plenty of air flow. You can lay the bulbs out on screens or hang it to dry. I bundle mine by tying tightly with baling twine and hang in my barn. Important: do not trim roots/greens or clean dirt off your garlic until after it has been cured!

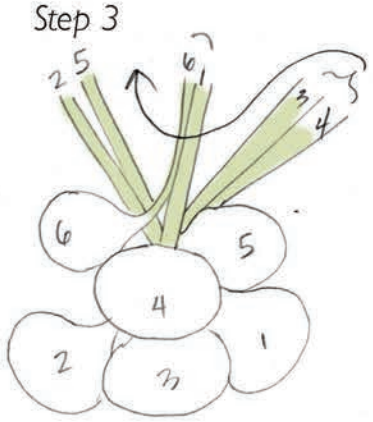
Once the garlic has cured for about a month, you can clean it up. Trim the roots close to the bulb, knock off any dirt, and trim the greens of hardneck varieties or braid softneck varieties. Eat your hardneck garlic first: it's excellent roasted and can be dehydrated to make your own garlic powder. Store your softneck braids in a cool pantry out of direct sunlight. Most garlic should store well into midwinter, and if you're careful with the variety you choose and by curing properly you can have garlic clear through until next year's harvest.

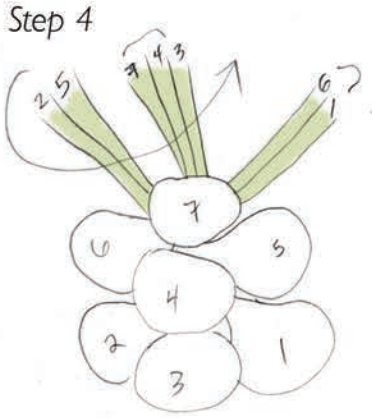
I have been growing my own garlic for around three years and haven't had to buy any from the store since then.

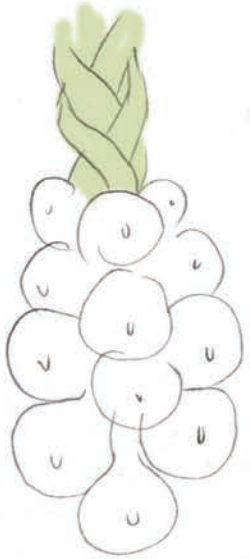










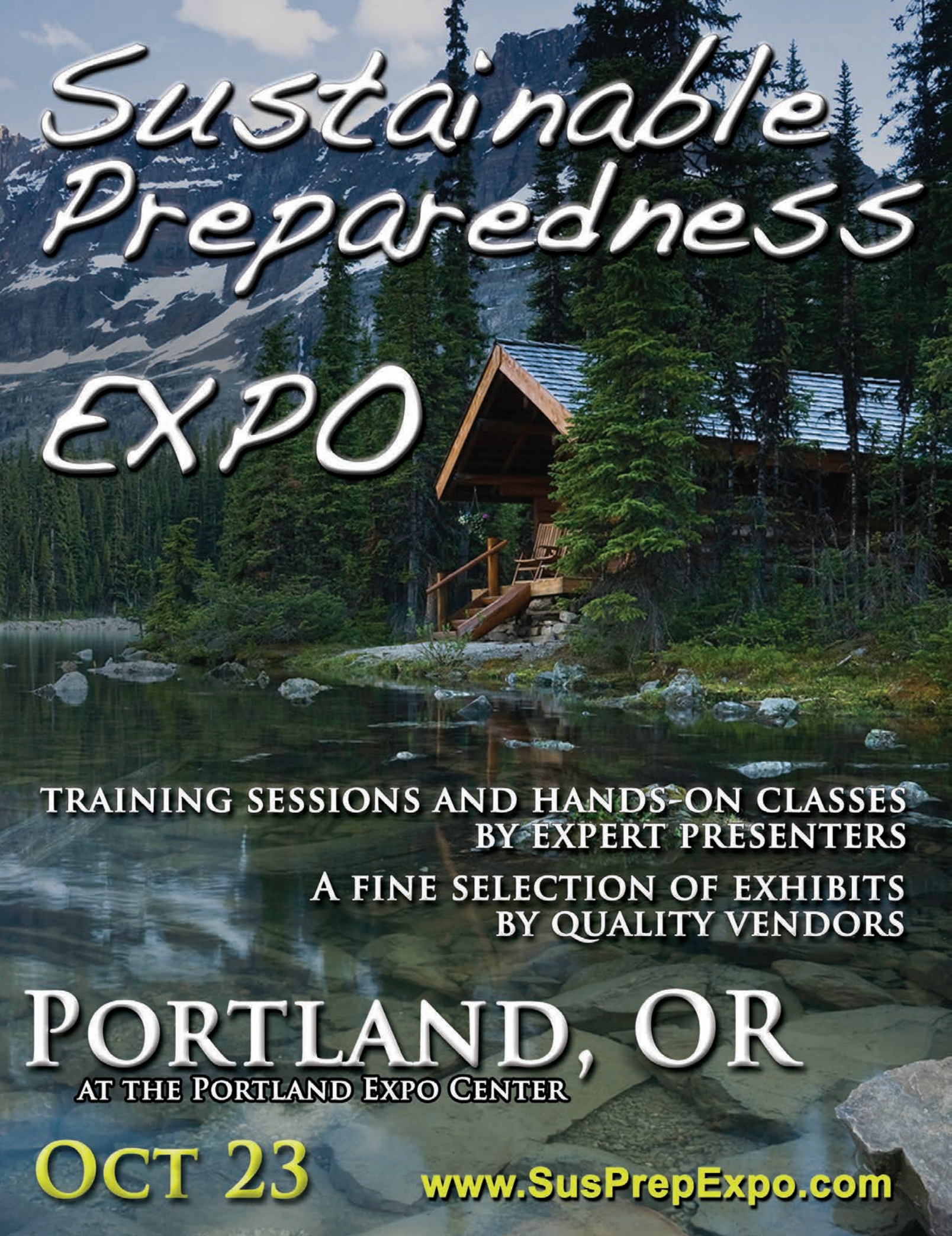


Repeat the pattern "right, left, center" then finish your braid by braiding the greens tightly and tying off with a durable twine loop.

These braids of garlic from my 2015 harvest are still good and hanging in my pantry as my 2016 harvest cures in the barn.

I have learned by trial, error, and lots of reading. A couple of my favorite online resources: **http://www.seedambassadors.org/adaptive-guide-to-growing-garlic/** and **https://groworganic.com/media/pdfs/garlic-l.pdf**

Miranda Rommel is a professional artist living on "Birdsong Farm" in western Oregon. New to homesteading, Miranda and her husband, Andy, (along with their corgi, Pocket) do their best to eat seasonally, grow much of their food, raise happy livestock, and slowly improve the 17 acres they are lucky to call home. Miranda is an avid cook and advocate for sustainable living. Read more about their adventures at www.PocketPause.com.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Add spice to your life with fire cider

By Katelynn Bond

Fire cider is a traditional folk elixir that has been lovingly brewed and used by generations of people across the world as a preventative medicine. Although the special ingredients differ from region to region, person to person, and even harvest to harvest, the core recipe remains fairly standard: raw apple cider vinegar, raw honey, onions, garlic, horseradish, hot peppers, and ginger, all combined then fermented for a minimum of two weeks and sometimes for over a month. Some people even bury it for a month or so instead of sticking it in a cool dark place.

Everyone approaches their fire cider making differently. I first learned about it through my friend Lauren who hosted our herbalism group. We all learned the basics together, but when we compared notes after we had each made our own batches, they were all as unique as the creators.

Fire cider is chock full of probiotics, is anti-inflammatory, anti-fungal, anti-microbial, anti-viral, and anti-parasitic, and if all that isn't enough for you, it also tastes amazing! It's spicy, tangy, and just a bit sweet. When combined with olive oil, fire cider makes a healthy and delicious salad dressing. If you're a honey mustard fan, you'll never go back to store bought after trying a homemade fire cider honey mustard.

Alright then, no more stalling, here is how to make it.

The recipe

Half-gallon glass jar and lid
Plastic wrap (to keep the vinegar from corroding the metal lid)
1 quart of raw apple cider vinegar (yes it really does have to be raw)
1 hot pepper (jalapeño, habañero, or similar)
1 white onion
10 or so cloves of garlic
¼ cup grated fresh horseradish
¼ to ½ cup grated fresh ginger root (no need to peel)
Raw honey to taste

Chop the pepper, onion, and garlic, and add them to your large glass jar along with the horseradish and ginger. Add any extra ingredients you'd like, if any. Here are a few ideas to get you started:

A lemon, orange or one of each, chopped with the peel on
Fresh rosemary
Turmeric and black pepper (best added together). Turmeric is an anti-inflammatory and one of the best herbs for lung issues. Black pepper enhances turmeric's natural properties. You can use turmeric fresh or dried (if you use fresh, just grate it along with the ginger and horseradish) and whole black pepper crushed a bit with either a mortar and pestle or rolling pin is best as more of the natural oil found in black pepper will be available that way.
Berries (cranberries, raspberries, etc.)
Rose hips (high in vitamin C)
Hibiscus (high in vitamin C and will turn your brew bright red)

Once you have prepared your core ingredients and added whatever extras you want, go ahead and pour the apple cider vinegar into the jar, making certain that all the ingredients are as submerged as possible. Some may have a tendency to float at first — that's fine as long as the level of the liquid is high enough that all ingredients could be submerged once they stop floating. Place your plastic wrap over the top of the jar, screw the lid on nice and tight, and place in a cool, dark place for two to six weeks (or you could be really "earthy" and bury your jar in a protected spot outdoors if that's your thing). After it has fermented, strain the fire cider into a clean glass container and add the honey. Start with a couple of tablespoons and taste as you go.

Using fire cider

The tasty part has now arrived! You can use fire cider as an herbal medicinal elixir by taking a teaspoon every morning as a preventative pick-me-up. It's also a good way

This traditional, medicinal elixir tastes delicious and packs a punch.

to warm yourself up during the cold winter months. Take up to three teaspoons when you feel a cold or flu coming on. But my favorite way to use it is as a major flavor in my cooking.

Fire cider honey mustard

8 Tbsp. whole mustard seeds (yellow or brown)
⅓ cup water
⅔ cup fire cider
Honey to taste
A pinch of salt

Combine ingredients in a glass jar, stir well to ensure seeds are completely submerged, and seal with a lid. Remember to place plastic over the top if the lid is metal. Allow the seeds to soak at room temperature for three to five days, until the seeds have expanded to the same level as the liquid. You may need to shake the jar occasionally during the soaking process. When the seeds have absorbed the liquid, pour them into a blender with honey and salt, then blend until smooth. Store in a sealed jar in the refrigerator.

As amazing as fire cider is, it may not be for everyone, because although it's "just" a folk remedy, it is extremely strong. People with ulcers or acid reflux may have a difficult time with fire cider, especially if they take it straight. If you decide to take fire cider medicinally, be sure to eat first, since fire cider has too much spice to inflict upon an empty stomach, and follow it with a bit of water to protect your tooth enamel. Use wisdom and enjoy both the product and the process.

LET'S TALK MRES!

By Christopher J. Ranallo

Meals Ready to Eat. Just hearing those four words conjure thoughts of mass produced, tasteless, bland and unimaginative food in a generic cardboard box or mylar packet. When adding in the fact that MREs are one of the most expensive field rations per unit, we've all thought, "There has to be a better way!"

The components that make up one of my home-assembled MREs

The next usual options for a quick and portable survival meal-on-the-go are the freeze dried foods offered by companies such as Wise foods, or Mountain House. These provide a greater variety and better taste than government-issued food, but still require added water and a heat source to prepare. They also are limited in the fact that they only provide one part of a whole meal, usually the entrée.

Both of these choices are almost always far more expensive than normal long-term food prep and also lack the ability to be personalized to taste and dietary restrictions. How can a conscientious prepper have the best of both worlds when choosing an MRE type field ration for your Bug Out Bag or vehicle? The answer is make your own!

My wife and I have decided to make our own version of an MRE and it's honestly easy, cost effective, and tasty. These can be tailored to suit your tastes, preferences, and nutritional needs. We use our vacuum sealer to create homemade MREs that I feel are far superior to stock meals, although the shelf life likely is shorter.

Here is our list of contents:

Sealed pouch of any protein (tuna, chicken, or salmon)
Raisins/Craisins
(2) sections Datrex 3600 bar
Peanut butter crackers
Cashews
Jerky, protein, or energy bars
Mini pouches of Gatorade, Ensure, and instant coffee
Matches
Powdered creamer, sweetener, salt, or seasonings
Plastic utensil(s)
Dental pick/floss
Moist wipe for cleanup and a small resealable bag for leftovers

When assembling your meals, remember to make a small pinhole in any packages of raisins, jerky, etc. to allow all the air to be removed during sealing and eliminate bulges. The vacuum sealer can also be used to make the smaller sealed pouches required for any loose contents such as the Gatorade, Ensure, or cashews. Once each homemade MRE is completed, be sure to place a small cut along an edge for easy opening and always mark the date of manufacture on the pouch.

I know this sounds like a lot of items, but it all fits into one small, manageable package. We keep ours in our B.O.B.s and also in our daily drive truck. My wife is a flight attendant and also carries a few in her luggage during work trips. Last winter she was stranded in a Newark,

The assembled MRE, with components distributed for the most compact fit once vacuum sealed.

New Jersey hotel room for four days during a blizzard. No power, hotel restaurant was closed, and a driving ban was in effect for the entire city. Her homemade MREs and some canned fruit really saved her from hardship.

Please be sure to rotate with fresh meals at least every six months, sooner if you store them in a vehicle during hot weather. Also, don't make every MRE exactly the same. I made that mistake the first time, and soon became very sick of tuna and craisins. Variety will make your rations seem much more palatable. Allow yourself to include some comfort food when picking your MRE menu. Food is very important during stressful times and some chocolate or familiar tastes can be a tremendous boost to your mood and outlook.

Of course, you can substitute and change any or all the contents. Have fun making your own versions of MREs.

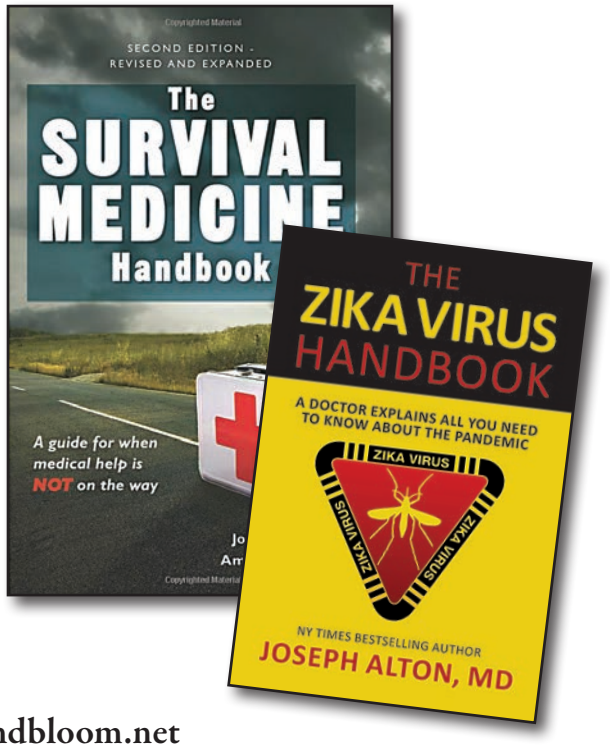
Book Review:

The Survival Medicine Handbook and *The Zika Virus Handbook*

In this modern era of technology, many of us rely on the Internet to diagnose and treat our minor illnesses and injuries. For larger problems, we rely on doctors, hospitals, and advanced technology to heal us. But what if there is no Internet or easy access to a hospital?

This is where *The Survival Medicine Handbook* by Joe and Amy Alton comes into play. This doctor and nurse team have gathered precise, accurate information to help you survive medical catastrophes on your own when there are no other options. The third edition has been revised to include chapters on surviving blizzards, avalanches, mudslides, and even volcanic eruptions. This book belongs on every homesteader's bookshelf (and in every go-bag).

Joe Alton has also recently authored *The Zika Virus Handbook*. He has taken his passion and expertise from his career in obstetrics and applied it to spreading the knowledge of how to prevent Zika virus (which causes life-threatening microcephaly in fetuses). This book covers prevention methods, information on how the virus spreads, available tests, and symptoms of infection. The types of mosquitoes that carry Zika are found in some areas of the United States, although they are not currently spreading the virus. Even when we hope for the best, it's always wise to prepare for the worst. *—Jessie Denning*



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Putting chicken in the freezer

By Melissa Souza

Chicken is highly regarded as a healthy part of the American diet. It is a good source of protein with low saturated fat. It also contains 8 essential amino acids, and is a good source of vitamins B3, B6, and B7. It is rich in zinc and iron, and also low in sodium.

We decided to raise our own meat chickens, and see to it that they were raised as cleanly as possible, fed as naturally as possible, and slaughtered with high standards. We started with Red Rangers chicks, although there are faster growing chickens that can be purchased for meat purposes. The Cornish Cross are also a great meat bird. We kept the chicks under the heat light in our garage until they were fully feathered, and then they were moved outside to a lawn tractor.

The tractor was wonderful because we were able to move it around several times a day, ensuring that they had clean ground, and plenty of fresh bugs, worms, and grass to eat. The beauty of the tractor is it allows a free range experience while keeping the chickens dry and safe from predators. They were also fed garden scraps, flock raiser pellets, and given fresh water daily. We raised the chickens for 14 weeks, and when they were around 7 pounds it was time for the freezer. About 24 hours prior to

Above, we brooded our meat chicks in the garage under a red heat lamp until they had grown their feathers in. The red light helps prevent the chicks from becoming aggressive with each other, which can lead to feather picking and bullying. Left and above right, juvenile Red Ranger meat chickens live in a chicken tractor which is easy to move. The birds enjoy fresh grass every day, along with bugs, garden scraps, and pelleted chicken feed. We raised the chickens until they were 14 weeks old. Our children helped care for the chickens, and we reminded them that these were livestock, not pets. At butchering time they were very proud of the role they played in helping to fill our family's freezer.

Below left, once the birds reached about seven pounds, we placed each bird into the killing cone and dispatched it with an axe. The orange cone immobilizes the birds, making the task safer, easier, and faster. Of course you don't have to use an axe, especially if you're worried about damaging a tree. A pair of large pruning shears or a knife will also make quick work of the task. Another benefit of using the cone is that it holds the bird in position after the head is removed so the blood can drain completely, which takes about two minutes. Meat that is thoroughly bled will appear cleaner and more appetizing. Collect the blood in a bucket to use in your garden, as if you were using blood meal.

dispatching the chickens we pulled their pellets to eliminated feed in their digestive tracts, and crops.

Dispatching can be done in a number of ways, but we choose the good old fashion chop to the neck. Instead of having headless hens running around the yard we mounted a traffic cone to a tree, and cut off the skinny end to fit a chicken's head. To use the traffic cone method, hold the bird upside down by the legs, pull the neck straight, insert into the traffic cone, and pull their neck out the bottom hole. When upside down the chickens become very calm due to the blood going to their heads. One whack with a sharp axe is all it took. We let them bleed out for about 2 minutes.

Once the chicken had bled out we submerged the entire body to the leg feathers in 170 to 180° F water for about 40-50 seconds. While counting, we swirled them around to get the hot water into all those feathers. After 40 seconds we tested the feathers to see if they would easily rub off. If we had to tug on them, then we dipped for another 15 seconds, and tested again. If the water is too hot or they are submerged too long it will damage the skin, liquefy the fat, and begin to cook the bird. Basically, you have to experiment a bit to determine the proper amount of time a bird needs to be submerged.

When the tail and wing feathers were softened up, we moved to the butcher table to remove all feathers. We started with the legs, moved to the belly, and then spun it around to get the back and wings. Once the bulk of the feathers were removed, we rubbed our hands all over the chicken to remove any left over feathers. We then dunked the birds in clean water to remove everything unattached, and to reveal any pin feathers that were missed. Once the bird was clean of all feathers and pins, it was time to eviscerate it.

We started with the neck by flipping the bird onto its back and making a straight line cut to the chest. Then the membrane was detached from the neck meat, and the neck skin was removed and discarded. The necks can be saved to make soup stock. We reached into the chest cavity, found the crop (little bag in their throat where they begin to digest their feed), and loosened that so it would pull out the other end easily. We removed the neck and esophagus, and trimmed the excess skin and fat from around the neck cavity. Each chicken was then flipped onto its belly, and

To scald the bird, heat a large pot of water to 170-180° F, then plunge the bird into the water, swishing constantly, for about 40 seconds. Remove from the water and test to see how easily you can pull the wing feathers out. If still too difficult, scald an additional 15 seconds at a time until the flight feathers can be removed. The shorter, smaller feathers will pull out or rub off readily.

Opposite page.
Top, Loosening the neck skin.
Middle, removing the oil gland.
Bottom, eviscerating the bird.

the oil gland was removed from the top of the tail. This is done by starting at the base of the tail, and scooping upwards to remove all the yellow. This gland is used by the chicken to oil its feathers, but if left on will go rancid. The entire tail can also be removed, which will take care of the gland as well.

We then spun the bird around, belly up, and removed the innards. The most important part of gutting a chicken is to take care not to puncture the gallbladder or intestinal tract. If these are punctured, then the meat is contaminated. That first cut must be made very carefully. We made the first cut by measuring about two fingers width down from the chest bone and cutting outwards so the knife didn't go too deep. The first cut was only the layer of skin. We could then see the membrane and were able to make a small 3-4 inch slit to reveal the inside bag of the chicken. Using our hands we tore the opening wider. We then cut carefully down along the vent of the chicken.

The next step is similar to cleaning a pumpkin, a very warm pumpkin. We inserted our hand along the top, palm down, and scraped all along the top cavity, sides, and front to release the membrane. In one giant scoop we pulled outwards, removing all the guts at once. We then carefully cut the bottom free from the vent and tail area. This step must be done with care so as not to rupture the intestines. Once all innards were removed, we had to reach back in to pull out the lungs. They are very soft, and hidden up inside the ribs of the chest cavity. The guts were then spread out so we could inspect the overall color and health of the organs. If there are any spots or discoloration on the liver, then your bird was sick. In our case all livers were a deep red, and so we kept them to batter and fry up. Livers are also excellent on the grill. The hearts are delicious, too.

Top: The gizzard is a fist-sized organ that does a lot of the work of breaking up what the chicken eats before it reaches the stomach. Slice it open to see what your chicken has been eating. In our case, we mostly found grass and sand. (Chickens swallow sand and gravel to help break down their meals.) Middle: Lastly, cut off the feet and neck. A sharp slice through the connective tissue on each side of the claws, then use the necks and feet to make delicious, meaty, collagen-rich chicken stock. Bottom: When finished, thoroughly rinse the bird inside and out, check for any additional feathers, and submerge in a salted ice bath for 24 hours. The salt keeps the ice from melting longer, and won't compromise the quality of the bird at all. Be sure to use regular or non-iodized salt.

For each chicken we made sure to find the little bag that had a greenish color to it. This is the gallbladder, and it contains the bile that we did not want on our meat. If this is ruptured, then the bird is no longer edible. They were all intact so we discarded them with the rest of the innards. The gizzard is a large, hard, almost fist sized bag. It looks like a big muscle. That is where the chicken breaks down its food by grinding it with sand and small pebbles. If you cut this open it will reveal what the bird has been eating. In our case it was filled with sand and grass. The kids found this very interesting. Some people clean out and fry the gizzards as well.

Once the cavity was cleaned out we rinsed each bird off well, including the inner cavity, and placed them in a salted ice bath for 24 hours. This allows the meat to rest, and the salt also draws out any blood left in the meat. After the 24-hour bath we rinsed, patted dry, and bagged each bird. We used heat-activated shrink wrap bags that can be purchased at a number of online shops. You save a lot by buying these in bulk, and they will preserve your chickens much better than a ziplock bag that allows air inside.

Finally, it is time to package the birds into shrink bags for the freezer. Remove each bird from the ice bath and rinse, then pat dry. Place each bird "head" down into the bag. Insert a long plastic straw down into the cavity, and use a zip tie to gather the bag around the straw. Following the bag manufacturer's instructions (some use hot water, others use a hair dryer or heat gun), heat the bags. As the bag shrinks, air will escape through the straw. Finally, remove the straw, pull the zip tie tight, label, and freeze your birds.

To seal the birds we placed them feet up, inserted a plastic straw into the chicken cavity, and tightened a zip tie around the portion the bag and straw. Dip each bird completely covering all but their feet into 160° F water for five seconds. Each bird was then removed for 10-15 seconds while the air escaped through the straw. The straw was then removed while the zip tie was pulled tight. All excess bag and zip ties were trimmed, and our chickens were ready for the freezer. Each chicken weighed 4-5 pounds fully dressed.

The entire process of chick to freezer is incredibly rewarding and ensures good clean meat for our family. My children helped with caring for the chickens, and we made sure to remind them that these birds were livestock, not pets. When cull day arrived they had no problem with the process and felt proud of filling the freezer with meat that they helped raise.

Raising children

By Anna Twitto

While I was growing up, I thought I had the whole trajectory of my life mapped out: college, job, family, mortgage. This was the way people were doing things, so it had to be right, right? However, as I left my teenage years behind, I started feeling nagging doubts. Could there be more to life? I longed for the simple, but somehow, everybody seemed signed up for the complicated.

I was in my early twenties when I met my husband. I now had a partner in my quest for a simple, self-reliant life, and our common vision began to take form. We wanted to be financially independent, we wanted to produce at least some of our own food, and we wanted to raise our children ourselves, without delegating this crucial task to others.

Our path towards financial independence took, and is still taking, various turns — from refusing to commit to a mortgage and seeking out affordable housing in less lucrative areas, to fishing furniture out of the dump and giving them a new life in our home. Home educating our children is a natural extension of our desire to take control over our life, rather than relinquish it to someone else.

Naturally, as we discovered that a simple life has the potential to be so much more satisfying than the usual earn-and-spend-as-much-as-you-can treadmill, our goal is to pass what we learned — and are still learning — down to our children. Do we necessarily expect them to choose the same lifestyle as they grow up? No. Are we pushing our convictions down their throats? No. Do we want them to have choices? Yes, absolutely. And making your own choices, right along with creative thinking, just isn't something that is usually taught in schools these days.

On a day-to-day basis, we strive to get our children involved in practical, hands-on ways, in everything that has to do with animals, land, and Nature. We feel that, despite not having the money or means to provide many extracurricular activities or the best and latest of everything, we are creating rich opportunities and raising children who are curious, active, brave, and independent-minded — children who are learning, simply in their daily lives, many of the self-reliance skills I wish I had been taught as a kid — cooking from scratch, growing vegetables, raising chickens, doing yard work, building, and finding creative ways of obtaining what you need for little to no cost.

So what do we do, exactly?

Gardening with children — Gardening involves water and dirt, two elements especially loved by children. Furthermore, it is an area where parents and children meet on equal terms, digging together in the ground and marveling at the magic of a seedling that bursts out of the earth. Gardening teaches planning, perseverance, and diligence: you can't plant tomatoes in a shady spot and expect them to grow very well. You can't let your vegetable patch get overrun by weeds and still expect a good harvest. It also teaches us to mind the seasons, the sun, the wind, and the rain.

Tending to animals — Like gardening, taking care of animals teaches responsibility and diligence, as well as consideration for other living creatures. Our children help us feed and water the chickens, gather eggs, and clean the coop. In the past, when we had goats, they loved to help with milking and making cheese.

Taking care of animals has another part, not always a pleasant one — that which deals with death and loss. While we don't raise meat animals, we have lost a number of animals over the years to predators, illness, and other issues. Our children have gained some important insight on the fragility of life, with death being the sad but inevitable part of it.

Teaching resourcefulness — When our children set their heart on something, they usually ask, How can we make this, rather than Where can we buy this. Seeing this kind of independent, out-of-the-box thinking is very satisfying to us. We don't mean to brag, but we do feel the difference between our children and "conventionally" raised ones, such as we had been at their age.

Often, as we drive by and see some scrap lumber or a discarded wooden frame, our children come up with creative ideas of what can be made out of these things ("This can be a new door for the chicken coop") — and often they are pretty good ideas.

This week and last week, we have been working on making garden beds out of local rock. My children helped me haul rocks from all the corners of our front yard, and then we discussed how to arrange the rocks one on top of the other in the best-fitting way. We all had great fun and derived tremendous satisfaction from it. There are few things as character-building for children as doing real jobs with real tools (which can be as simple as their two hands).

to be self-reliant

Teaching health — By training, I am a dietitian, so theoretically I'm supposed to know everything about food. However, it was not until after completing my degree in nutrition that I learned my most important lessons about healthy food choices. Among other things, I became convinced that the best and most reliable way of obtaining truly healthy, unadulterated food is to grow or raise it yourself. This leads to many interesting discussions with my children about food chemicals, pesticides, preservatives, and added sugar.

Extensive reading — Imparting the love of learning to children is the cornerstone to successful homeschooling. Children who like to read, both fiction and non-fiction, and will read to and for themselves often and with pleasure, have the foundation of their education all laid out. We foster love of reading by encouraging curiosity and answering all those questions that naturally come up as we work alongside each other. Our daily work around the home and garden is often peppered with questions — What is that plant? Why do goats have horns? — that invite us to crack open a book or go online to find satisfactory answers. I encourage my children to draw pictures and write passages related to what they observed outside. Math problems often involve the daily situations we encounter ("A chicken lays one egg per day. How many eggs will three chickens lay in a week? In 30 days?").

Alternative learning — The lifestyle change we made has brought us together with many like-minded people. Instead of taking our children to the mall, we have spent many day trips visiting local farms. The owners are usually happy to give us a tour of the place and explain about various farming methods they use. We have spent many a happy afternoon in the yard of poultry breeders, admiring the fancy breeds and learning all about their properties, and trading for eggs or chicks. We have visited beautiful and unusual houses in the area, and heard the stories of people telling us how they were built. So much more fun than the tedious "educational" day-trips we had as children.

When do you begin?

As soon as a child is old enough to walk, they will want to take an active part in whatever their parents and older siblings are doing. The process is so gradual that sometimes you won't know how or when it happened that a two-year-old who loved "helping" you plant seeds (and usually made a happy mess in the process) became a seven-year-old quite capable of watering, weeding, and collecting eggs without supervision.

However, to preserve a child's joy and enthusiasm in homemaking, homesteading, gardening, and taking care of animals, it's important to use your common sense and not give a child more than a reasonable share of age-appropriate chores. This is particularly true if you are making a lifestyle change and your children's usual pastime until now has been staring into a screen, not digging in soil. You don't want your child to feel like the family drudge swamped by work that never ends. Even children who are mature and responsible and like to help need time to just be children, so use discernment.

Opportunities for older children

Several times we have been accused of shortchanging our children and depriving them of opportunities: Money, distance, and having only one car mean that we can't commit to regular extracurricular activities. While our children are not yet old enough to make this a very pressing concern, I do think it is a valid issue and should be addressed.

Goals and priorities change as children grow. It is entirely possible for a homestead-raised child to grow up to prefer ice-skating lessons to farming. It is possible that children, especially as they hit the teen years, might grow resentful towards their parents' choice of living out there in the boonies. Maybe they'd rather hang out at the mall with their friends than weed a vegetable patch. Or maybe they truly are exceptionally talented at something — music, drawing, sculpting — and their demand for more opportunities is a legitimate one.

There are no easy answers. I do believe parents are supposed to help children develop their talents and capabilities, but I don't believe in staying in the city when your heart is yearning for the country, just so a five-year-old can start ballet classes. Or, as a friend of mine wisely put it, our children are a lot more likely to find a use for such practical skills as growing their own food, raising chickens, cooking, building and repairing, than end up as professional dancers or musicians.

Homeschooling while working towards a simpler, more self-reliant lifestyle can be a fascinating journey for the entire family. I know it is so for us. I am thankful that we have seized this opportunity of living, learning, growing, and working right alongside our children.

SPICE UP YOUR HOMESCHOOL

with these twelve creative activities

By Lisa Tanner

Does your homeschool need some new life breathed into it? Are you all getting tired of hitting the same old books again and again?

My family usually falls into a homeschooling rut a couple times each year. To help us snap out of it, we ditch the books for a few days and dive into other learning activities. Below are some of our favorites. Best of all, these activities aren't age or grade dependent. With slight adjustments they're tasks the whole family can enjoy.

The next time you're in a homeschooling rut, give one of these activities a try. Your children will be learning, and you'll all enjoy a nice break from your regular school.

English and Language Arts

Develop a sequel to a favorite book

Do you wish that book hadn't ended right then? Did it really need a sequel to wrap up all those loose ends? You and your children can create the missing parts. Write, act out, draw, or create an animation to represent what should happen next. As part of the process, you can discuss: • Which characters need to be included from the original? • Should there be any additional characters? Why or why not? • What will happen in your new sequel? • How does the sequel open? • What sequels have been your favorite, and why? (Thinking about what makes a good sequel improves critical thinking skills.) In this creative process, your child will be: • Improving writing skills • Developing plot summaries • Increasing critical thinking skills • Learning to create character sketches

Write a real letter

Some call it old-fashioned, but writing a letter helps people to stay connected. Your child can write to Grandma, a friend, or a faraway cousin. Once finished, take a field trip to the post office and put it in the mail. Writing a letter teaches: • Handwriting skills • Communication skills • The parts of a letter • The proper way to address an envelope • All about the postal system • Calculating postage

Setting study

The setting is where or when a book or movie takes place. In this activity, your child will study the setting. Have your child pick a book or a movie, and describe the setting. Where does it take place? When does it take place? Are there any pictures, scenes, or specific words describing the setting? Discuss what would happen if the setting changed. What in the story would have to be different? They can show their answers by drawing a comic strip, writing a script, discussing with you, or acting out the changes. Your child will be working on: • Using context clues from the book/movie • Analyzing how setting and plot are connected • Practicing communication skills

Budget game

Learning how to manage money is an essential skill. This game will help your students learn just that. Change the amount of money you assign based on age or ability. You can also add different requirements for each child, such as including meal expenses or a clothing allowance. First, have your child gather the advertisements from the newspaper. Sunday papers are a good choice. Then, write down an imaginary budget for each child. You could give $100 to a younger child, or $1000 to an older one. Ask your child to look through the ads and decide how to spend their money. Be sure to ask why they picked each item when they're finished. While playing this budget game, your child will practice:

• Adding and subtracting money • Making decisions based on money
• Prioritizing purchases

Bigger than, smaller than

This game is quick to play, and is a fun way to pass time in the car, while doing chores, or in a waiting room. You do not need any fancy materials to play, just two or more players. One person goes first, and picks an object. He asks, "What's bigger (or smaller) than (the object picked). For instance, "What's bigger than the cow?" The other player names an object that is bigger than the cow. It doesn't matter what this player says, as long as the size is right. They might say the barn, or the car, or an elephant. As long as it's bigger than a cow, it's a correct answer. Take turns naming an object and guessing. Here are some items to get you started: Bigger than a house, car, elephant, tool box, television, turtle, baby, gate. Smaller than a sunflower, tree, movie box, pair of pants, shoe, ladybug, box of wipes. This game teaches your student:

• Size comparison • Critical thinking skills
• Communication skills

Sorting practice

Sorting helps students to group like items together. It also involves explaining the classification system used and being able to decide which group another item would go in. There are numerous household or farm items to practice sorting. You can have your child sort laundry, silverware, items from the garage or attic, coins, tools, halters for the livestock. Some items have an established pattern for sorting that your child will need to follow, such as the silverware. There's already a place for the forks, the spoons, and the knives. Your child should follow the same pattern in this simple sorting task. Other categories require that the child develop their own pattern for sorting. For instance, when cleaning the garage, your child could make piles of like objects, and explain how they arranged each pile. Books and movies can also be sorted numerous ways. However your child sorts things, be sure she can explain the sorting pattern used. Sorting helps your child practice:

• Classification • Comparing size, shape, color, or another characteristic • Following patterns
• Organization skills

SPICE UP YOUR HOMESCHOOL

Science

Alive or not?

Ecosystems are comprised of living and non-living elements. This game helps students discover those elements, and sort them by the characteristic of alive or not-alive. First, gather old magazines with pictures that you don't mind your child cutting. Ask your student to cut out every picture that shows something from an ecosystem. They might find pictures of rocks, animals, people, or plants. When they're done cutting, ask them to sort their pictures into two piles. One of biotic (living) things, and one of abiotic (non-living). Then, your child can arrange the pictures onto a large piece of paper to create an ecosystem poster to share with others. Your child will discover:

• What items are in an ecosystem • How biotic and abiotic resources are needed • Critical thinking

Mystery substance

For this game, each person secretly selects one kitchen substance. Then, everyone places two tablespoons of that substance into their own disposable cup without anyone looking. Number the cups, and bring them to a common area, such as the table. Now, each person tries to identify the other substances through the process of scientific inquiry. Players can use:

• Their sense of smell • Their sight • Observation to see how the substance reacts with other substances • Knowledge of the states of matter (liquid, solid, etc.)

Each player takes a small bit of each sample, and tries to figure out what it is. After everyone has explored the substances for ten minutes, come back together and share your guesses. Then, reveal the correct answer. Did you get each one right? Your student will practice:

• Scientific inquiry • The scientific method • Exploring physical and chemical changes • Critical thinking skills.

What is in my backyard?

This game helps students become familiar with their local environment and the ecosystem of their backyard. Give everyone a piece of paper, a pencil, and, if desired, bring along a camera. Head outside to the yard. Then, give everyone 10 minutes to write down every living organism they see. Use the camera to take pictures if desired. Once your time is up, head back in the house and share your lists. Use digital or print references to identify each organism listed. This game focuses on:

• Observation skills • Classification of organisms • Environment features

History and Social Studies

Country report

Help your children learn more about the world around them by completing random country reports. To start, you need to pick your country. You can either select individual countries, or all work together. I love this random method of selecting a country: Put one finger on a globe, and give the globe a small spin. Whatever country is closest to your finger when the globe stops is the country you research. As you learn more about your country, use digital or print resources to discover: • Location • Population • Economic state • Capital • Flag • Official bird • Official animal • Motto and what it means • Languages spoken • Popular foods • Natural resources • An interesting fact Once your research is finished, create a power point presentation, a poster, or a different visual aid with the information you learned. Share the presentations to teach the rest of the family. If desired, cook a food from each country and have a feast while your share. Country presentations teach children: • Cultural awareness • Geography • Research skills • Oral presentation skills • Practice with public speaking

Bring history to life

Help your children bring history studies to life by acting out a scene from your history curriculum. You can select any event that's been studied this year. Once everyone knows what event will be portrayed, work together to write a script. Make a list of characters that will be needed. Encourage them to think about how the characters would have felt. This will help develop the characters as the play is written. You may need to take some artistic liberties to fill in missing information. When your script is done, create simple costumes using basic household supplies and your current wardrobe. I love watching the creative things my children come up with. After you've practiced a time or two, it's time to perform for the video camera, or for a small group of friends and family. Acting out history will teach your child: • How different historical figures interacted • How people may have felt in different historical situations • Creativity • Writing skills

Create a family timeline

History is the study of the past. Help your student learn more about his own past by creating a family timeline. Make a list of as many events as possible for your family. If you're into genealogy, include events from as far back as you can. You'll want to list: • Births • Deaths • Marriages (and divorces) • Moves • Graduation dates (high school and college) • When you started homeschooling • Notable job changes When you've completed your list, ask your child to arrange them chronologically, and create a timeline. He can use the computer or create it by hand on paper, and he can make it as fancy or plain as he desires. If you make the timeline with extra space on the end, you can continue adding key events to it throughout your homeschool career. Your student will learn: • How to order events chronologically • What events helped shape the family • How people in the family are related

Microwave bread

By Al Starner

There are few smells as delightful as that of fresh home-baked bread. The taste of warm fresh bread with butter is also a treat. To bake bread using traditional methods you should set aside half a day. The kneading and raising times are quite time consuming. I spend about an hour including raising time to make microbread. We have been making and eating it for more than 20 years. This bread lends itself especially well to toast or grilled sandwiches. Other features are the price — about fifty cents — compared with quality store bread which is now about four dollars a loaf. Another advantage is that the baker controls the ingredients. I have used many additives such as oatmeal, corn meal, ground flax seed, sunflower seeds, and even the tail end of various boxes of cereal. I used a can of beer once instead of milk and the results were quite good. You may have to adjust the ingredients a bit and make a couple of batches to get the recipe right for your altitude. I live at 5,400 feet in Colorado. You will, of course, need glass baking dishes for microwave use.

Microwave bread (two loaves)

5 cups flour
2 Tbsp. dry yeast
1 tsp. baking powder
2 Tbsp. sugar
2 tsp. salt
1½ cups milk at room temperature
1 cup (optional) dry ingredients such as oatmeal, flax seed, sunflower seeds, grape nuts, corn meal, or leftover cornflakes
2 Tbsp. molasses

Place two cups of flour into mixing bowl. Mix in all other dry ingredients. Add milk and molasses. Mix well and continue to add flour until the mixture is quite thick. Mixture should not flow when bowl is tipped. Let rise for about 30 minutes. Mash down, then divide between oiled glass bread pans. Let rise again. When dough is above top edge of pan or a bit higher, place in microwave separately and cook in microwave on high for seven minutes. Remove loaves to a cooling rack and let cool.

Advertiser Index

Bean and pumpkin soup

By Ilene Duffy

I really enjoy spending quiet time in my vegetable garden. Preparing the soil in the spring, planning where the vegetables will go, turning the compost pile and finding tons of worms, even weeding to keep a tidy garden are all enjoyable tasks. Then in the fall, after everything gets harvested, my husband, Dave, helps me turn the soil over and gather leaves to spread and churn in to prepare for the winter rains.

Growing pumpkins

Pumpkins are easy to grow. I buy fresh sugar pumpkin seeds each year, even if I have some left over from last year. Pumpkin seeds last for many years if kept dry, but I buy more anyway. To plant, I make a mound of well-tilled soil about 18 inches in diameter and about 6 inches tall. I put about six seeds on top of the mound, placing them as far apart as possible. I make a hole with my index finger next to each seed, then put the seed in the hole so that it is one inch below the surface. I cover the seed with soil and pat it down gently, then water the mound daily (unless it rains) until the plants emerge. I continue to give the new growth a bit of water every day for at least a week, then a watering every couple of days. If warm weather hits, it doesn't take long before these small plants grow large, elephant-ear-sized leaves.

Pumpkins like a lot of room to spread, which seems to be something I learn every year since I invariably plant them and other squash too closely together. The bad news is it gets harder and harder to get in between the plants to harvest the ripening produce, but the good news is those large leaves keep the ground shaded, moist, and weed-free.

If the weather cooperates here in northern Oregon, I can harvest most of the pumpkins in October, leaving some on the vines well into November. I don't have a root cellar, so I use the pumpkins as I pick them, and freeze the rest.

Freezing the purée

My family's favorite dessert has always been pumpkin pie. Last year's garden was such a huge success in that department. I intentionally grew several mounds of pumpkins, and many of my "compost surprise" plants also turned out to be hybrids of winter squashes. With so many pumpkins and squash to preserve, I needed help! So I invited my three college boys home for supper one night, and afterwards they helped me cook, mash, purée, measure, and package the pulp. We wound up with more than 30 bags for the freezer, with 1½ cups of purée in each, just the right amount needed for a pie.

If all goes well, I'll have plenty of pumpkins and winter squash to preserve for another year's worth of pies, soups, and side dishes.

But pumpkin and winter squash aren't just for dessert. One of my favorite holiday side dishes is roasted vegetables with the main ingredient being butternut or acorn squash. And when the weather turns cooler in the fall, a pot of hot soup and freshly baked bread is perfect. Recently, I created my own version of pumpkin soup using dried beans from my pantry as well as one of those precious baggies of frozen pumpkin. It came out spicy and good with plenty left for Dave's lunch the next day.

Bean and pumpkin soup

2 cups dried bean soup mix (I used a blend of 13 beans and lentils found in the bulk section of our market.)
2 quarts of water
1-2 Tbsp. olive oil
1 medium onion, chopped
1 cup celery, chopped
½ cup red bell pepper, chopped
½ cup yellow bell pepper, chopped
1 clove elephant garlic, chopped
1½ tsp. ground cumin
1 tsp. fresh thyme leaves
1 tsp. fresh oregano leaves, chopped
1 can (14 oz.) chicken broth
1½ cups pumpkin purée
1 tsp. salt
2 shakes of red pepper flakes
1 tsp. hot sauce (I used Sriracha.)
2 green onions, chopped (optional)
½ cup grated pepper jack cheese (optional)

Preparation:

Rinse beans, then add to a large pot and cover with at least 6 inches of water. Soak beans overnight.

Drain and rinse beans, then add to a large stock pot. Add water. Bring to a low boil, stir frequently at first, then simmer uncovered for 1-2 hours until beans are tender.

A bit of green onion and pepper jack cheese make this warm soup even better. Add some fresh bread right out of the oven and you've got a very nice meal.

In a large pan, heat oil and add onion, celery, peppers, and garlic. Cook about 5-10 minutes until onion and celery are tender. Stir in cumin, thyme, and oregano. Add contents of pan to the beans. Stir in broth, pumpkin purée, salt, red pepper flakes, and hot sauce. Simmer gently, stirring once in a while for about ½ an hour more.

Serve in bowls topped with a bit of green onion and grated pepper jack cheese if desired.

Poppy seed egg bread

When I make bread using my bread machine, I normally put it on the dough cycle, then take it out, gently knead the dough to release the gas, then form it into a loaf that fits into my long bread pan. I prefer the texture and size of my bread loaves compared to just allowing the bread machine to finish it off with the complete baking cycle.

I made a nice loaf of poppy seed bread in my bread machine and served it with our soup. I modified the original recipe to include whole wheat flour.

Poppy seed egg bread

½ cup milk
2 Tbsp. unsalted butter
3 large eggs
2 cups flour
1 cup whole wheat flour
1 Tbsp. sugar
1 Tbsp. gluten
1 Tbsp. oat bran
2 tsp. poppy seeds
1½ tsp. salt
2 tsp. bread machine yeast

Preparation:

In a 2 cup measuring cup, add milk and butter. Warm in the microwave or on the stove in a small pan until just barely warmed and the butter is soft, but not melted. Add eggs and gently mix.

In a mixing bowl, add remaining ingredients except yeast. Stir with a spoon or wire whisk to blend all the dry ingredients. Add milk mixture to the bread pan. Add flour mixture. Make a well in the flour and add yeast to the well. Start the bread machine on the dough cycle.

When the cycle is done, place the dough on a lightly floured surface and knead gently to expel gas. Grease and flour two bread loaf pans or one long loaf pan. Shape the dough as desired and place gently in the pan. Cover with a damp towel and let rise for one hour in a warm spot. Preheat oven to 350º F. Bake 25 minutes. Cool on a rack for 5 minutes, then take out of the pans to cool completely. That is unless the grandkids are visiting, in which case they'll want big, warm pieces slathered with butter.

Pumpkin Muffins

From the kitchen of Sally Boulding

4 eggs
1½ cup oil
1 can (14 oz.) pumpkin
2 cups sugar
3 cups flour
2 tsp. baking soda
2 tsp. baking powder
2 tsp. cinnamon
½ tsp. salt
chopped dates, raisins, chopped nuts (optional)

I've had this recipe for at least 25 years. All the while I thought it was two different recipes: one from my mother-in-law and the other from my dear friend, Claire. Recently upon looking at them side by side … they were both exactly the same! Two wonderful recipes from two very special ladies!

Yummy Stuff

From the kitchen of Hannah DeRousseau

2½ cups graham cracker crumbs
1 can sweetened condensed milk
½-¾ cup chocolate chips (semi-sweet, milk chocolate, or butterscotch)
dash of salt

This is so easy and quick to make. We never really knew the name of this recipe, so we just called it Yummy Stuff … since it is indeed yummy.

Peach Muffins

From the kitchen of Ilene Duffy

1¼ cups instant rolled oats
½ cup flour
½ cup whole wheat flour
1/3 cup sugar
1 Tbsp. baking powder
½ tsp. salt
1 tsp. cinnamon
2/3 cup milk
1 peach, peeled, chopped, cooked, and mashed
1 egg
¼ cup oil
1 tsp. vanilla
1/3 cup raisins
½ cup walnuts, chopped

The original recipe calls for 1 jar of apricot baby food. Instead I used a peach that was over-ripe. I peeled it, chopped it into small pieces, then cooked it with 1 Tbsp. of water, mashing it while it cooked.

Cracker Crumb Chicken

From the kitchen of Cindy Myers

1-1½ tubes Ritz crackers, crumbled
6 boneless chicken breasts OR 12 boneless thighs
¼ cup Parmesan cheese, grated
6 slices of Jack or pepperjack cheese
½ cup milk
1 egg
1 tsp. no-salt seasoning (I like Mrs. Dash.)

Tip: If using chicken breasts, you'll need to lay the piece flat on a cutting board and then slice it from one side to about 2/3 the way through the piece. That will be the slot that the cheese will fit into. If using thighs, you can just fold the piece in half after laying the cheese on one side of it.

Preparation:

- Preheat oven to 350° F.

Grease a 9x9 baking pan.

- Put graham crackers in a large baggie, zip it up, then crush the crackers with a rolling pin. Continue until you have 2½ cups of crumbs. You can also buy graham cracker crumbs that are pre-crushed.
- Mix all ingredients. It will make a very stiff batter. I use a big spoon since it is too thick for a mixer.
- Pour into 9x9 pan.
- Bake for 20-25 minutes.

(Yummy Stuff)

Preparation:

- Preheat oven to 400° F.
- In a large bowl mix eggs, oil, pumpkin, and sugar.
- In another bowl mix flour, baking soda, baking powder, cinnamon, and salt.
- Add dry ingredients to pumpkin mixture and blend just until moistened.
- Add a bit of raisins, dates, or chopped nuts, if desired.
- Fill muffin papers placed in muffin pan 2/3 full. Bake for 15 minutes. Makes 2½ dozen muffins.
- Tip: This recipe can easily be halved, which makes about 15 nice muffins.

(Pumpkin Muffins)

Preparation:

- In a large baggie, crush the crackers until the chunks are small, then add Parmesan cheese and mix.
- In a medium-sized bowl mix milk, egg and seasoning.
- Put a few of the chicken pieces in the milk mixture, then put in the baggie of cracker crumbs and coat thoroughly. Place chicken on a lightly greased baking pan or cookie sheet.
- If using breasts, take a slice of cheese and slide it into the cut opening. If using thighs, put a slice of cheese on one half of the thigh and then fold over.
- Bake breasts 45 minutes. Check for doneness. If still pink, then bake another 5-10 minutes. Bake thighs for about 30 minutes until they test thoroughly done.

(Cracker Crumb Chicken)

Preparation:

- Preheat oven to 350° F.

Grease and flour a muffin pan.

- In a large bowl, mix oats, flour, whole wheat flour, sugar, baking powder, salt, and cinnamon.
- In another bowl mix milk, peach purée, egg, oil, and vanilla.
- Add wet ingredients to dry and stir just until moistened.
- Fold in raisins and walnuts.
- Fill muffin cups 2/3 full and bake for 20-25 minutes.
- Makes 12 muffins.

(Peach Muffins)

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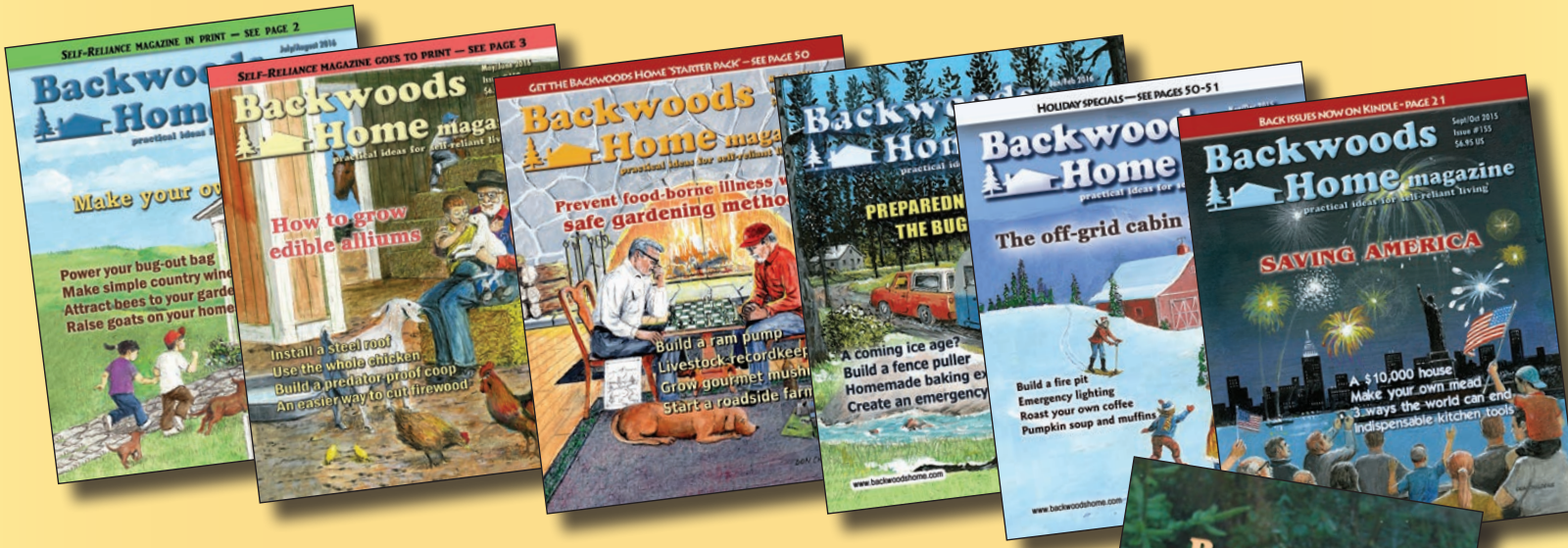

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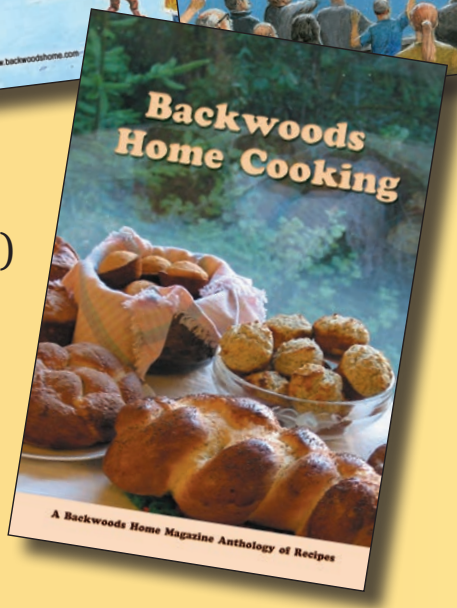

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Working my way up

Part 2: Moving up to a storage barn

(This series began in the Summer 2016 issue of SELF-RELIANCE.)

By Setanta O'Ceillaigh

Out of immediate need I had converted a 10x14 storage shed into a tiny cabin. It was cramped, overheated easily, and far from what I considered ideal. It was, however, livable. I spent the winter using it as a heated shelter but spent most of my time outside, either working or cutting more trees out of the way for gardens. I saved every cent I could from each paycheck and made plans for a better cabin.

In the spring I used hand tools to break up the ground around the stumps and planted the gardens, focusing on plants to improve the soil. I hacked out stumps with a Pulaski and carried buckets of soil to fill in holes.

The new storage building, outfitted much as the previous, smaller shed, proved to be much more livable.

My plans were set back a few times in the spring. Because I voluntarily surrendered a mortgage, I had to pay heavily on my taxes. The IRS wanted close to $4000 because I had to claim part of the foreclosed house as income. All the money I raised over the winter was cleaned out paying off the IRS. Shortly after taking the financial hit my supervisor informed me that the projects I had been working on were all coming to a close (my position was grant funded, and several multi-year projects were ending at the same time). My supervisor advised me that the program I worked for was probably going to be broke by August and advised me well in advance that I might be laid off.

Sure enough I was laid off in early August and it was not until the following spring that I was rehired. Because my supervisor had warned me of the budget problem, I had chosen not to start any construction and continued to live in the 10x14 storage shed and save money, spending my time working on improving the farm with hard labor.

When the layoff happened I assessed my options. I took into account the materials I had scavenged over the summer (lumber, windows, etc.) and all the money I raised. I considered the option of living in the

10x14 another winter and decided I would rather set up a bigger place. I was unsure when my job might resume and also considered the possibility that it might not.

My new 12x20 barn

I made the decision to purchase a larger storage building and weighed the options between size and price. A bigger building would cost more to buy and outfit, but would be more livable. I decided to buy a 12x20 storage barn made of similar design to the 10x14 shed. The new building had higher lateral walls and a roof peak of about 10 feet. It was built and delivered on skids. Being the basic model the manufacturer made, I was able to get one off the lot and have it delivered right away.

One of the first things I did upon its delivery was install additional windows. I had found a huge pile of used windows on the curb and had hauled them home with a friend's truck. I chose the best of the pile and added two windows facing east and one facing west. I placed the building so that the original window faced north and the doors faced south. I positioned the building this way so the morning sun would come through the two new windows, and planned to add a covered porch or an addition off the south-facing front in order to mount my solar array on top of it. The new west window would allow airflow with the prevailing wind and help cool the cabin in summer.

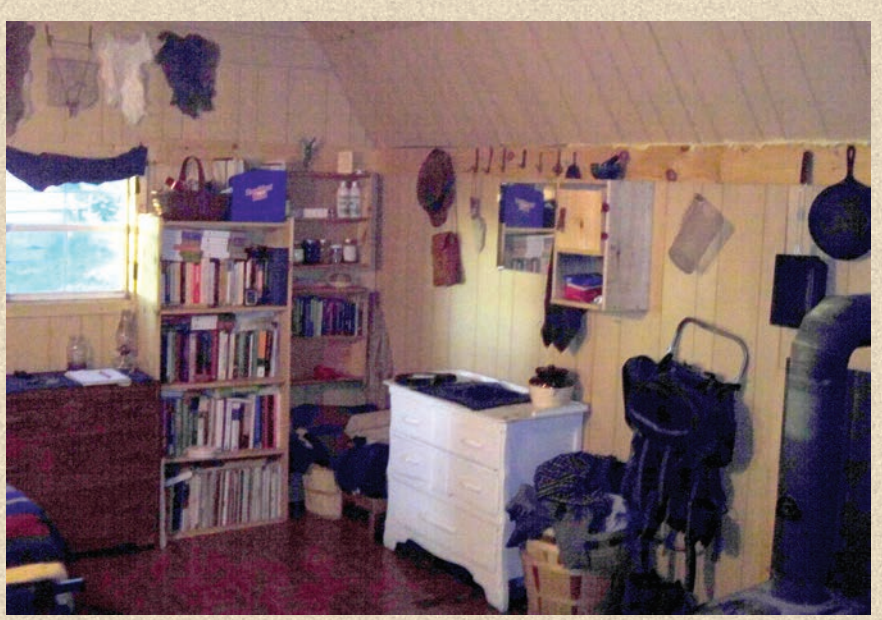
I insulated with R13 in the walls and part of the ceiling. However, I was able to enclose the peak, and the ceiling was further insulated with R19 fiberglass. I added a small vent to the gable ends by cutting holes in the T1-11 siding and stapling bug screen down, then vent plates I found on a broken refrigerator. This allowed excess moisture to vent while keeping out bugs and squirrels.

I was able to find a clearance sale on birch paneling so cheap that it was

I salvaged the two by five-foot kitchenette and electric lighting from my defunct camper.

cheaper than the Lauan paneling I used in the smaller shed. I broke up shipping pallets and used the best lumber as molding around corners and around windows. The double door was converted to a single door so the second door became a wall. I insulated the remaining door by screwing paneling over it and stuffing the gap with leftover insulation.

I already had a boxwood stove in the smaller building and cinder block for a combination heat shield and thermal mass (to retain heat). I purchased an insulated chimney kit and enough chimney to reach three



The taller side walls of the larger storage barn were insulated and covered with inexpensive birch paneling. Additional insulation went into the ceiling.

With the last of my funds, I built this crude structure to house firewood near the house and support my solar array. It also acted as a good windbreak.

feet higher than the peak of the roof. Through-the-wall kits may be more expensive than a roof kit, but can be easily installed in under an hour. With a better chimney, I had a safer and more effective draft.

Improvements

The funds I had saved up were mostly depleted at this point in the construction, so I began stripping resources from the camper. One of the most important of them was the kitchenette. The kitchenette was a 5-foot by 2-foot counter with a built-in mini sink and a space for a camp stove. The stove that came with my camper was not salvageable, however I was able to find a replacement by putting a wanted ad in a local paper. For $20 I got a stove with a built-in oven and a three burner range. After removing the counter from the camper, I installed it near the wood stove, and below the eastern windows. I bored out holes in the wall and ran a grill type hose and regulator to the stove and caulked the gaps closed. I added a small hose off the drain for the sink so that it would drain into a gray water bucket that could be dumped outside.

The kitchenette was not the only thing I stripped from the camper. I also pulled the AC light fixtures. The AC wiring in the camper was a lost cause but I was able to splice the end of a broken extension cord onto one of the fixtures and mount it to the wall. The other end of the cord had a plug on it that I could hook into my 200-watt inverter. This allowed me to run normal light bulbs to light the entire one room cabin. AC bulbs are easier to find and replace than the CF DC bulbs I had used in my smaller shed. For the bigger cabin I used both kinds.

I had picked up a camp cot in a yard sale and set it up as the bed with a cheap Walmart mattress. I liked the cot because I could fit 18 of those common 5-gallon buckets under it. Shelving was built from rough-cut pine and lumber salvaged from pallets. I had a chest of drawers and put it against the wall with the camper's mirror on the wall behind it.

As the last improvement before I was broke, I set up a crude enclosure to the south. I built two racks along the roof to hold up two rows of 15-watt solar panels. I moved the harbor freight kit panels from the smaller cabin and was able to buy three more kits. Wired together, they generated 270-watts. I wired three marine batteries together to act as one battery and set a 30-AMP charge regulator into a closet in the bottom of a shelf to regulate the charge. I wired the 200-watt inverter to a toggle switch so I could turn the AC on with the switch, and positioned it next to the switches for the DC light, making it convenient to turn things on and off. I ran an extension cord to the north side of the cabin and plugged the power strip into it. From this power strip I could plug in my laptop and either use the chest of drawers as a desk or sit on the bed with it.

Before winter set in I put a 55-gallon plastic drum near the stove and packed rocks under the cabin for skirting. The barrel was kept full of water acting as a thermal mass and water source. I had yet to have a well installed, so my water came from rain or a crudely dug well I made. For the first winter in the 12x20 storage barn I dumped ice and snow into the water barrel and let it melt.

The enclosure that supported the solar array was a good wind break and I stored a 45-gallon water trough in it and a cord of dry wood so it would be close at hand. The trough was used as a bathtub, and to save space was kept outside between uses.

With my funds depleted and a more livable cabin set up, I settled into the winter. During the cold months I continued cutting trees and making improvements via manual labor, living off the piles of food I canned or dried in the fall, and made plans to further develop my homestead.

Next issue — Part 3: Improving my cabin

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Drying food by a wood stove

By Setanta O'Ceillaigh

The Adirondack Mountains, where I live, are sometimes called the asbestos forest. Most of the time everything is so damp that it is impossible to dry anything. The air is always humid to the point of saturation. The one exception is during times of extreme drought or the dry cold of winter.

I have lots of canned food, so much so that it fills up just about every corner in my tiny cabin. To free up space I spent the winter drying the produce I had previously canned. The winter air is often as low as 16% humidity (the lowest possible display on my meter, but it may actually be lower) and this dry air will quickly suck the moisture out of anything.

To dry previously canned food, I set out baking trays/cookie sheets, the kind with a small lip on the sides. I set these around the wood stove where the air is driest. While food can be dried on trays directly, I have found that some foods are a real pain to clean off the trays, so I have recently started using plastic wrap as a liner. The food on the trays usually dries out completely between 24 and 48 hours. As it is drying I rotate the trays, as some corners tend to dry out faster, and remove them when the stove is hot enough to cause them to burn. Putting them by the stove should keep things warm but not hot enough to cook. I have noticed that if it takes longer than 48 hours for food to dry it becomes highly likely that it will start to mold.

After things are dried out I put them in jars and let them sit on a high-up spot on a shelf to further dry to be sure no moisture is left. Putting the jars in a hot place (90-degree temperatures) before putting the lid on will create a slight vacuum and will keep the jars sealed.

The types of food that can be dried this way are endless. I have dried apples, pears, and peach slices, and #10 cans of mixed fruit that I got on sale. Apple sauce dries out into a good fruit leather. Tomato sauce or pasta sauce can be dried out and added to hot water later (useful on overnight hikes into the mountains). I have dried out pickles, cabbage, corn, beans, etc.

Anything that is canned, then dried, becomes darker after drying but retains a lot of flavor and is very fast to prepare. It can often be eaten dry as a trail food or snack, such as the pickle chips in the photo.

Colcannon mix

One of my favorite uses for dried cabbage is to make a fast rehydrating Colcannon mix, which is an Irish recipe that combines potatoes and cabbage. I mix one part dried cabbage to two parts instant mash potatoes (easier than drying the potatoes myself). Put one cup of powdered milk into a quart jar, then top off the jar with the mix. When rehydrating, I add the mix to boiling water until it has the consistency of mashed potatoes.

Apple leather or other fruit leather can be rolled up if it was dried on plastic wrap, then the rolls cut into 2-inch sections (like the candy "fruit by the foot"). Otherwise it can be ripped or torn into strips. I always carry a bag of this dried fruit or fruit leather when I am out wandering.

From left, one quart of applesauce, one quart of applesauce fruit leather, one quart of dried pickles, and one quart of pickles.

Summer squash pickles and apple sauce

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Quinoa

By Linda Gabris

Up until a few years ago, most North American cooks like myself never heard tell of quinoa (pronounced KEEN-wah). Even if we had, we would have had a hard time tracking it down in our country, because until more recent times it could only be found at health food and speciality stores where, as an import item, it weighed in at a pretty hefty price!

Quinoa may well be a relatively new food in our corner of the world, but it has an amazing history with roots that can be traced all the way back to the ancient Incas where it originated in the Andes Mountains in South America and was domesticated for thousands of years as a major food crop.

Even though quinoa was introduced in the higher elevations of Colorado in the mid 1980s, it was a very experimental undertaking of trying to cultivate a new strain that suited the climate and growing conditions while at the same time producing a product which matched the wholesomeness of the "mother" grain. Growing it domestically is still in the developing stages, but there is optimistic speculation it will become an industrial crop in the near future.

When the Food and Agriculture Organization of the United Nations declared 2013 to be the International Year of Quinoa, hailing it as being one of the world's healthi-

Quinoa has been hailed as a "super food" by the United Nations Food and Agriculture Organization

est "super foods," interest in it quickly spread. Although most of the quinoa consumed in our country today is still imported from its homeland in South America, demand has made it readily available at grocery stores everywhere, and when bought in bulk, it is easy on the food budget.

Quinoa was highly-regarded by the ancient people as being the "mother grain" because it promoted a healthy pregnancy while enriching the mother's milk for nursing. Not only was it praised for delivering a strong start in a life, but it also was thought to be a major contributor to longevity.

One of the fascinating things about quinoa is that it is a member of the goosefoot species, closely-related to beetroot, spinach, and the common garden weed, lamb's quarters, thus its ripened head is actually a seed, not a grain. Technically speaking, it is a "pseudo cereal," meaning that even though it is not a member of the "true" grass family, it is still grouped as a grain because it is used in much the same manner and can be ground into flour.

Because it is not a member of the wheat family, quinoa is gluten-free, making it an excellent choice for those on a gluten-free diet or suffering from colitis, celiac, or Crohn's disease. It is a recommended first food for babies because it is easy to digest and a rich source of vitamins, minerals, and other nutrients needed for healthy growth.

Quinoa is a popular food with modern day dieters because it is filling and yet fatless, depending on how you cook it. It is a rich source of protein, so it's a good pick for people trying to cut down or eliminate their meat intake. I find using quinoa in place of meat a few times a week or mixing it in with meat is a thrifty way to "stretch" the family's meat budget. It is ranked as one of the top 10 muscle building foods because of its high protein, amino acid, and complex carbohydrates, and it's acclaimed as a high performance food for those looking for "excess energy to burn."

According to ongoing studies, adding quinoa to one's diet can help to reduce cholesterol, lower blood pressure, ward off stroke, and help to prevent gallstones, type 2 diabetes, and other various types of body invaders, like cancer.

There are so many wonderful, healthy reasons for introducing quinoa to your family that sometimes the best reason of all gets easily overlooked. It is a super healthy food, indeed, but even more importantly, it's super delicious on the table and super versatile to boot!

Various ways to buy quinoa

Most of the recipes I mention below call for quinoa in its "grain" or seed form. Quinoa seeds are available in three colors — white, which is the most common, and red and black, which are typically a little harder to come by and usually a bit more expensive. They can be used interchangeably and have pretty much the same nutritional values. I enjoy having creative fun using different colors of quinoa in any ratio I fancy for eye-pleasing results on the plate.

Toasting quinoa seeds in a hot skillet imparts a pleasant, nutty flavor.

My rule of thumb is to use white quinoa to complement darker foods such as beets, tomatoes, kidney, black and other colorful beans, as well as red-meat based dishes, and black and red quinoa to showcase lighter foods like cauliflower, Lima beans and pale lentils, chicken, fish, eggs, and creamed dishes. Mixed colors make pleasing coatings for cheese balls and other crumbed or coated foods, and are delightfully pretty scattered over salads, baked vegetables, or any dish needing a dash of extra goodness and a boost of color.

You can buy quinoa flour in fine to courser grinds or make your own at home as I do by grinding the seeds using a food processor, blender, or flour mill. Quinoa flour has a nutty flavor, enhanced by roasting the seeds first before grinding. Adding quinoa flour to muffin, cookie, cake, and other batters and dough is a great way to enrich baked goods but do take note that since it is gluten-free, breads

One cup of dry quinoa yields around three cups cooked.

will come out denser and heavier than those made from regular wheat flours. A little experimentation working other flours in with the quinoa for bread recipes can help to lighten the loaf.

You can buy "puffed" quinoa which is quite similar to puffed rice cereal, meaning it can be eaten in the cereal bowl or used as a substitute for puffed rice in cookie squares and similar recipes. Commercially puffed or "popped" quinoa produces a larger kernel than one could possibly make at home.

Recently I've noticed quinoa side-dishes popping up on the grocery store shelves in various types of pre-mixed, seasoned packages, such as those combined with brown rice, white rice, beans, and other types of combinations. I find pre-packaged food mixes such as these are far more expensive than making my own blends so what I do when I see an interesting mix on the shelf is have a look at the ingredients and try to recreate a personalized blend using the store-bought mix as a guide. I have shared a few of my ideas in the recipes below for making your own mixes.

Toasting quinoa seeds: If you wish to achieve a nuttier flavor, heat a cast-iron skillet over a medium-high burner, put rinsed quinoa into the pan and toast until golden, shaking pan constantly to prevent scorching. The seeds can be used in the same recipes as what I call "raw" ones and are especially nice for grinding into flour.

Cooking quinoa — plain and simple

My favorite method for cooking quinoa is in my rice cooker, which produces perfect results every time. However, if you don't have a rice cooker, a heavy-bottomed saucepan with a tight fitting lid works fine. Cooking quinoa is somewhat similar to cooking rice, millet, and couscous — and it can be used in many of the same recipes as these smaller grains. Upon cooking, it will absorb the liquid (water, stock, fruit juice, or whatever the recipe has called for), tripling in size. Like rice, it can be fluffed up with a fork before serving.

I use the same measurements every time — 1 part raw or uncooked quinoa seeds to 3 parts water (or stock or other liquid of choice) unless following a new recipe which recommends otherwise. I find one cup of raw seeds produces three cups cooked quinoa, yielding 4 to 6 servings which works well for most of my needs. But if this is too much or too little you can adjust up or down to suit your own purpose.

Please note: I have seen some instructions for cooking quinoa which call for just 2 parts water or other cooking liquid to 1 part quinoa so there are no solid rules as to exact measures. If you find 3 parts water too much for the quinoa to absorb in your chosen cooking method, then next time around reduce accordingly until you strike a measure that's right for you.

Don't forget to follow the old "rice cooking rule" to use a suitable size saucepan — smaller pan for little batches and larger pan for bigger amounts, allowing room for expansion.

Quinoa should be rinsed well in a fine sieve under cold running water before cooking, unless package states otherwise. This is done to remove any lingering traces of the seed's natural protective coating known as saponin. It is mostly removed upon processing but some may still be present, causing a slightly bitter taste if not rinsed away.

Rice cooker: Put rinsed quinoa in rice cooker, add liquid, and turn on the pot. My cooker automatically shuts itself off when the water has been absorbed, but since there are various types of cookers on the market today, follow your own manufacturer's directions for quinoa, rice, or millet.

Stovetop: Put rinsed quinoa in saucepan, add liquid, and bring to a boil. Cover, reduce heat, and simmer 10 to 15 minutes, or until liquid is absorbed and quinoa is done to your liking. Some enjoy it "al dente" and others prefer it a little softer. I like to let the cooked quinoa sit covered in the pot for about 5 to 10 minutes after removing it from stove in order for it to continue absorbing any liquid remaining in the pan.

Five simple ways to sample quinoa:

1) Fold cooked quinoa into yogurt (try black or red quinoa mixed into vanilla yogurt). Spoon it over ice-cream, mix it into partially set Jello. Make a parfait by layering it with pudding or fruit.

2) Sprinkle leftover cooked quinoa over tossed green salads, mix into coleslaw, potato salad, meatloaf and patties, add to tuna, salmon, or egg sandwich filling.

3) You can stretch eggs twice as far in an omelette simply by adding cooked quinoa to the beaten eggs before pouring into the pan. Or try scrambling the quinoa in with the eggs — black or red quinoa gives a caviar-like appearance to the dish.

4) Add cooked quinoa to broth or creamed soups for extra body and a big nutritional boost.

5) Mix cooked quinoa with cream cheese for lighter, fluffier cheese balls. Spread crackers with peanut butter or cheese and top with quinoa.

Below are some of my family's favorite quinoa dishes. Try them for good health and great eating! Recipes serve 4 to 6.

Kid's special — fruity quinoa porridge

This is so versatile and so good! My motto for the porridge pot is to use whatever fresh fruits or berries the season is producing and whatever dried fruits I have on hand in the pantry so no two bowls ever have to be the same.

1 cup raw quinoa (sometimes I use all white, sometimes I use mixed color for special effect)
3 cups water

1 cup chopped fresh fruit or berries (apple, pear, peach, orange sections, strawberries, raspberries, blueberries)
¼ cup raisins, dried currants, or cranberries
¼ cup chopped pitted dates or figs
1 tsp. ground cinnamon or nutmeg

Put all ingredients in rice cooker or saucepan, cook as above for plain quinoa, about 15 minutes. Let stand about 10 minutes before dishing up. Sweeten with honey, or maple or birch syrup upon serving. You can spoon yogurt over top or serve with milk. Leftover porridge can be formed into small balls, rolled in finely chopped nuts and eaten as a snack.

Make-the-night-before quinoa breakfast bowl

When our family needs to get off to an early start in the morning I'll set this up the night before and it's ready to serve upon rising.

1 cup raw white quinoa, cooked as directed above to make about three cups cooked quinoa
½ cup large flake rolled oats
3 Tbsp. brown sugar (or to suit taste)
¼ tsp. each ground cinnamon and ground nutmeg (or pumpkin pie spice to taste)
1 cup plain yogurt
¼ tsp. maple extract
½ cup chopped walnuts (or other nuts of choice)
¼ cup finely chopped dried fruit (apple, mango, apricots)
3 Tbsp. dried cranberries, raisins, or currants

Cooked black or red quinoa is appealing mixed into yogurt.

Fruity quinoa porridge

Quinoa breakfast bowl

In a container which has a lid, combine warm quinoa, oats, brown sugar, and spices. Stir in the yogurt and extract, mix well. Fold in the nuts and fruits. Put on the lid and set in the fridge overnight. In the morning serve cold in cereal bowls. Or if everyone is on the run, dish it up into "lunch box" containers and don't forget to tuck in a spoon! This will save for several days in the fridge. If you like it a little creamier, add more yogurt to the dish.

Quinoa and bean burritos

Kids love these! Makes a super fast supper. Serve with salsa and sour cream on the side, if desired. Makes 8 to 12 portions.

4 large (or 6 medium) tortillas (spinach, tomato, herb, or plain, homemade or store-bought)
½ cup raw quinoa
1½ cups water
2 Tbsp. olive oil
1 chopped onion
1 chopped sweet pepper
1 minced jalapeño or chili pepper (optional)
¼ tsp. ground cumin
½ tsp. ground coriander
salt and pepper to taste
1 can (or about 2 cups) cooked or canned beans (baked or "pork and beans" style)
1 cup grated cheddar, mozzarella, or other grated cheese or mixed cheese tidbits of choice

Cook quinoa in water as directed above, set aside. Melt butter in skillet, sauté peppers and onion until soft. Sprinkle with the spices and stir in the beans and quinoa. Divide the mixture evenly over the wraps, sprinkle with cheese and roll up, tucking the ends under. Place on baking sheet and broil in oven until golden. Slice in half and serve. Or if you find the roll-up method harder to do, especially with smaller wraps, you can pile the mixture on one side of the wrap, fold over and bake, then cut in half.

Quinoa and potato patties

These make a pleasant change from typical French fries or hash browns. In our house they often come to the table as a breakfast special or with fried fish or burgers in place of "chips." The quinoa mixed with the potato makes a much lighter patty, and is super crispy. Makes about 15, depending on size, but you can easily cut the recipe in half by saving half of the cooked quinoa in the fridge for another day's use and reducing the remaining ingredients accordingly. My family loves these and since they are good cold, too, I never fret about making too many. Serve with ketchup and watch them disappear!

½ cup raw quinoa
1½ cups water
2½ cups peeled grated raw potato
4 finely chopped green onions
2 small (or 1 large) egg
½ tsp. salt
1 tsp. pepper
flour for dredging
butter
vegetable oil

Cook quinoa in water as directed above, cool. Stir quinoa into remaining ingredients, except flour, butter, and oil. Heat a frying depth of two parts oil to one part butter (you can use all oil but I find butter lends richer flavor and color) in large heavy skillet until sizzling. Drop ¼ cupfuls of quinoa mixture into flour, and coat both sides of patty. Don't worry if the batter seems too moist, as once it hits the hot oil it will quickly set and hold together.

However, since some varieties of potatoes are juicier than others, upon grating you may have to add a tablespoon or two of flour to absorb the excess liquid.

Put the patties into the skillet of hot fat and flatten with a spatula to about ½ inch thickness. Cook 5 minutes per side, or until crispy and golden, working in batches if needed to prevent crowding, and adding more fat to pan as needed for each batch.

Weekend quinoa and pumpkin pancakes

These are a really special treat, and a nice way to kick off a leisurely weekend morning. Or serve them for an impressive company brunch. Makes about 12 to 15 pancakes, depending on size.

1¼ cups quinoa flour
¼ cup all-purpose flour (or gluten-free substitute if needed)
¼ cup brown sugar
2 tsp. baking powder
1 tsp. baking soda
2 tsp. pumpkin pie spice (or ground cinnamon, nutmeg, and ginger to suit taste)
1 cup canned pumpkin pie filling (pure unsweetened pumpkin purée)
1 cup buttermilk
2 eggs
2 Tbsp. melted butter
vegetable oil for frying

Mix dry ingredients in large bowl. Whisk milk, pumpkin, eggs, and melted butter together, pour into the dry ingredients, and stir just until blended. If batter is too stiff, add a

little more milk or pumpkin purée. If too thin, whisk in a little more flour. Heat oil in skillet, pour batter into hot pan and cook until bubbles appear on the tops of cakes. Flip and cook until golden on both sides and inside is done. Serve with a dab of butter and a drizzle of maple or birch syrup on top. For special occasions, a dollop of whipped cream and a sprinkle of walnuts or pecans turns these pancakes into a scrumptious "dessert."

Baked quinoa and sweet potato (or yam)

This is very nutritional — can be served as a side-dish or main feature in which case a tossed green salad rounds out the meal. I have used sweet potato but this is also a wonderful way to serve yam and squash. (I prefer harder fleshed types like acorn, butternut, or pumpkin.) If using orange sweet potato or pumpkin, mixing it with black quinoa makes a suitably-colored dish for Halloween!

1 cup raw quinoa
1 large sweet potato, peeled and cut into bite-sized chunks
3 cups chicken or vegetable stock or water
1 Tbsp. butter for greasing
2 Tbsp. olive oil
1 minced onion
3 cloves minced garlic
1 minced sweet pepper
salt and pepper to taste
pinch dried herbs of choice (I like a little basil, thyme, and rosemary.)

Grease a casserole dish with butter. Toast uncooked quinoa (this time around in the photo I have used black quinoa) in cast iron skillet as directed above. You can omit this step, but it adds a nice nutty touch to the dish. Put sweet potato and quinoa into the baking dish, set aside. In the same skillet in which you toasted the quinoa, heat olive oil and sauté onion,

Quinoa and bean burritos

Quinoa and potato patties

Quinoa and pumpkin pancakes

garlic, and pepper until soft. Sprinkle with seasonings. Stir the sautéed onion into quinoa mixture. Cover with stock. Cover and bake in 350° F oven 30 minutes or until liquid is absorbed and squash is tender, adding a little more liquid if needed to keep from going dry.

Lin's homemade quinoa side-dish mix

I can't really give exact measures for this recipe because I usually just mix and match in a carefree manner — but believe me, this homemade mix is every bit as delicious — and pretty — as those you buy ready-made at the grocery store. And even better news is homemade mixes like this are much more economical than commercial preparations and you have total control over the proportions of quinoa, rice, and lentils as well as the amount of salt, seasonings, and herbs that go into the dish.

You can make a small batch for starters to see if you like it. If so, then make a larger batch. If not, you can adjust the measures accordingly. And don't forget to buy in bulk to save even more money! These make pretty gifts when packaged in fancy jars with a printed card and recipe suggestion. Once you let your creative spirit take over, you'll find lots of other fun, tasty things you'll want to add to the mixing bowl.

In a large bowl, mix together 3 cups of raw quinoa. (I use 1 cup of each color). Add 1 cup red, yellow, orange, cream, or other small lentil, 1 cup small black beans, 1 cup long grain (not instant) rice of any type you fancy — or a mix of rice such as brown or wild rice.

Now you have about 6 cups of mix which you will want to season. You can season upon cooking the mix or, if making this as a camp staple, then premix the seasoning at home using about 1 tsp. salt, 1 tsp. garlic powder, 1 tsp. onion powder, 2 Tbsp. dehydrated red peppers (I make these myself but you can use roasted red pepper seasoning mix), and 1 tsp. black pepper. Mix up and sprinkle over the dry mixture. Put into a paper bag or jar and store. Shake before using to distribute the seasonings. One cup of raw mix serves 4 as a side-dish when cooked.

To cook, put 1 cup of mix in a saucepan with 3 cups of water or other liquid and cook according to directions above for plain quinoa. Please note the reason you only use small lentils or beans is because you want the legumes to cook in the same amount of time as the quinoa. Larger, harder beans require longer cooking times and thus will not work as well without adding more liquid and increasing cooking times in which case your quinoa may become overdone.

Vegetable-studded quinoa side-dish (made from the mix above)

Put 1 cup of homemade quinoa side-dish mix into a saucepan. Add 3 cups water, 1 diced carrot, ½ stick minced celery, ¼ cup diced sweet red pepper, 2 finely sliced green onions, and 1 cup frozen peas. Bring to a boil, cover, reduce heat, and simmer until water is absorbed at which time everything should be equally tender. Let stand, covered, in order for any remaining liquid to be absorbed. Fluff with a fork upon serving. Cooked meats such as chopped chicken or turkey, ham, or browned ground meat can be folded into the mix during the last few minutes of cooking to easily turn this into a full meal deal.

Meaty quinoa vegetable soup

Here's a working man's meal that the whole family will love, especially nice for cold weather dining. When I have venison in my larder I often use it in place of beef, but both are equally good. This makes a huge kettle of soup which is even better the second time around. I have given a rough guideline for vegetables, but like Grandma used to say, when it comes to the soup pot, "anything goes," so use what you have in amounts to suit your taste. If you like it super chunky like I do, then toss in as many vegetables as you wish. Since you are typically using a smaller amount of meat than in most soup recipes, a little trick is to cut the meat into smaller pieces so it gets equally distributed in the pot.

2 Tbsp. vegetable oil
½ pound soup-cut (diced smaller than stew) beef
½ cup raw quinoa (one color or mixed)
1 chopped onion
3 cloves minced garlic
2 chopped carrots
1 sliced parsnip
1 stick diced celery
1 cup diced turnip and/or sweet potato
1 cup chopped cabbage
1 cup dried baby lima beans, soaked for several hours (or any dried bean of choice or leftover cooked or canned beans)
6 cups water
1 quart (or 1 large can) chopped tomatoes (I use homemade stewed tomatoes.)
sprig each of rosemary and thyme, finely minced
salt and pepper to taste

Heat oil in a soup pot and brown the meat. Add the onion and garlic, and cook until soft. Add remaining ingredients. Bring to a boil, reduce heat, cover and simmer about two hours, or until beans are tender. Taste and adjust seasoning.

Greek quinoa salad

You can serve this with crusty bread and butter and it makes a wonderful, refreshing hot summer day supper.

½ cup raw (mixed color is nice) quinoa
1½ cups water

¾ cup crumbled feta cheese
1 cup pitted kalamata olives
1 sliced cucumber
2 cups cherry or grape tomatoes (halved if desired)
1 chopped green pepper
1 chopped red onion
3 Tbsp. minced fresh parsley
3 Tbsp. virgin olive oil
1 Tbsp. red wine or balsamic vinegar
1 Tbsp. lemon juice
3 cloves minced garlic
1 tsp. black pepper
sea salt to taste

Cook quinoa in water, cool. In a large salad bowl, combine quinoa with the feta cheese, olives, vegetables, and parsley. Mix oil, vinegar, lemon juice, garlic, and seasonings. Pour over salad and toss.

Quinoa and pork meatballs

A meaty meatball with only half the meat. What could be better? These meatballs make a delicious appetizer when speared onto toothpicks and served with a dipping sauce (try my easy ones below) in which case you may wish to make smaller balls. Another favorite way to serve these in my house is baked in pasta sauce and served over cooked spaghetti noodles. So good, I often double the batch! Makes about 15 to 20 meatballs, depending on size. In the old days before quinoa made its way into my kitchen, this recipe called for two pounds of meat.

½ cup raw quinoa (I use red for meatier color.)
1½ cups water
1 pound ground pork (if you wish a spunkier meatball, try using pork sausage meat)
1 minced red or yellow onion
3 cloves minced garlic
1 egg
1 tsp. salt


Quinoa side dish


Quinoa vegetable soup


Greek quinoa salad

1 tsp. pepper
1 Tbsp. sweet paprika
½ tsp. ground marjoram
¾ cup (more or less) fine seasoned breadcrumbs (I use homemade Italian seasoned crumbs.)
vegetable oil for frying

Cook and cool quinoa. Combine everything (except vegetable oil) in a large bowl, adding enough bread crumbs to bind. Mix well. Using hands, form into balls of desired size. Set in fridge for a few hours before cooking. Heat oil in heavy skillet (or Dutch oven if making the meatballs with sauce version), add meatballs and cook over medium heat until browned on all sides, shaking pan often. If serving as appetizers, remove from pan, drain on absorbent paper, spear with picks, and serve with dipping sauce or sauces of choice.

If serving with pasta, add a quart (or large can) homemade or store-bought pasta sauce to the browned meatballs in the Dutch oven along with some thinly sliced rings of sweet red pepper, sliced fresh mushrooms, a shake or two of grated Parmesan cheese, and a sprinkle of Italian dried herbs. Baked in the oven until thick and bubbly. Serve over spaghetti.

Easy-as-heck dipping sauces for quinoa and pork meatballs — no exact measures, below is just a quick guideline!

Ketchup and horseradish: Mix 3 parts ketchup with 1 part horseradish and sweeten to liking with liquid honey. I like to add some mashed garlic or garlic paste to the dish.

Honey mustard: Mix two parts prepared mustard (I like homemade stone-ground), with 1 part honey and season with dried dill weed.

Orange mayo: Mix equal parts mayonnaise with orange marmalade. Add a dash of red pepper sauce for kick.

Quinoa and salmon burgers

If you keep a stash of cooked quinoa in the fridge as I do, this is one of the fastest suppers you can land on the table. And it'll reel in big raves from your hungry gang, especially if you serve it "fish burger" fashion on a bun with mayo, lettuce, tomato, and anything else that tickles your fancy. Makes 4 to 6 patties.

¾ cup cooked, cooled quinoa
½ cup cold mashed potatoes
1 (7½ ounce) can of salmon with juice
1 minced onion
½ tsp. dried dill weed
1 egg
½ tsp. garlic powder
salt and pepper to taste
flour for dredging
vegetable oil for frying

Mash salmon with fork, removing larger bones. Mix with remaining ingredients except flour and oil in large bowl. Using your hands, form into patties, flatten and dredge in flour. Heat oil in cast iron or heavy skillet, fry patties about 5 minutes per side or until golden.

Quinoa and turkey loaf

A thrifty way to stretch a pound of ground turkey or chicken into a super supper loaf. And it's delicious, hot or cold! Makes about an 8 to 10 inch loaf.

½ cup raw quinoa
1½ cups turkey or chicken stock or water
1 pound ground turkey or chicken
2 Tbsp. olive oil
1 minced onion
¼ cup diced celery
1 grated carrot
3 cloves minced garlic
1 Tbsp. Worcestershire sauce
1 egg
1 tsp. salt
1 tsp. pepper
¼ tsp. poultry seasoning (or sage)
½ cup finely crushed soda cracker crumbs (more or less as needed)

Glaze:

1 Tbsp. olive oil
¼ cup chopped onions
2 Tbsp. ketchup
2 Tbsp. brown sugar
1 Tbsp. water

Cook quinoa in stock as directed above. Cool. Heat olive oil in skillet and sauté onion, celery, carrot, and garlic until soft. Put turkey, quinoa, Worcestershire, sautéed vegetables, egg, and seasonings into a bowl and mix well, adding enough cracker crumbs to bind. Pack the mixture into a greased loaf pan.

Make glaze by frying onion in oil until soft. Add ketchup, brown sugar, and water to pan and cook until thickened. Spoon over top of the loaf. Cover with a piece of greased foil. Bake in preheated 350° F oven for 1½ hours or until center of loaf reaches at least 160° F on a meat thermometer. Remove foil last 10 minutes of baking to allow top to glaze a little more. Allow meatloaf to cool 15 minutes to ease slicing.

Shortcut: you can simply glaze the meatloaf with ready-made barbecue sauce, if you'd rather, or leave it without any glaze at all.

Beefy-corny quinoa chili

This spicy, chunky chili is always a big hit in our house. Serve with crusty rolls and supper is on. What I like most about the recipe is that I am only using half a pound of ground beef and still making a pot of hearty chili that serves 6! That's what I call stretching the meat dollar.

½ pound ground beef
1 cup raw quinoa (red or black) cooked according to directions above
2 Tbsp. olive oil
1 chopped onion
1 chopped red pepper
1 minced chili pepper
5 cloves minced garlic
1½ tsp. ground cumin
1 Tbsp. ground coriander
1 tsp. chili powder (more or less to suit taste)
1 tsp. salt
1 tsp. black pepper
4 cups cooked (or canned) kidney beans with juice
2 cups frozen corn kernels
2 cups tomato sauce
1 cup water
1 avocado, peeled and diced (for garnish)
grated cheddar cheese for garnish
sour cream for topping, if desired

Heat oil in a Dutch oven and brown the meat. Add onion, peppers, and garlic, and cook until soft, then sprinkle in the spices and cook until absorbed. Add the kidney beans with juice, corn kernels, tomato sauce, water, and the cooked quinoa. Simmer over low heat for 20 minutes or until desired thickness is reached.


Quinoa and turkey loaf


Quinoa chili


Lana's banana quinoa chocolate muffins

If you like a saucier chili, add more water as needed. I like it nice and thick. Ladle the chili into bowls and top with avocado and cheese.

Lana's banana quinoa chocolate muffins

My daughter, Lana, tweaked this recipe from one she found in a new-age cookbook and it is really moist and super good! You can add finely chopped walnuts as she often does, or go nutless as I sometimes do. Either way, these are a big hit for breakfast, lunchbox fare, or anytime a chocolate craving strikes.

1¼ cups all purpose flour (or gluten-free flour substitute)
¼ cup plus 2 tablespoons of cocoa powder
⅓ cup brown sugar
⅓ cup white sugar
2 tsp. baking powder
¼ tsp. baking soda
¼ cup finely chopped walnuts (optional)
1 cup cooked quinoa (For this recipe we typically cook 1 cup of raw quinoa in the normal fashion which yields 3 cups of cooked quinoa — and use the remaining 2 cups for other purposes. Or you can double or triple this muffin recipe, if you wish to have some for freezing as they freeze well.)
¼ cup chocolate chips (Lana typically tosses in a handful more than called for!)
2 big or 3 smaller ripe bananas (mashed with a fork)
3 Tbsp. melted margarine, butter, or vegetable oil
2 lightly beaten eggs
2 Tbsp. buttermilk

Preheat oven to 350° F. Line 12 to 15 medium to large muffin cups with baking paper cups, or grease and lightly flour. Combine dry ingredients. Stir in nuts (if using), quinoa, and chips. Whisk egg, banana, buttermilk, and margarine together. Fold into the dry ingredients and mix until just blended. Fill muffin tins ¾ full and bake 15 to 20 minutes or until tops spring back when lightly touched. Allow to stand until cool in order for muffins to firm up.

Apple Pie Brandy

Here's to thee, old apple tree,
That blooms well, bears well.
Hats full, caps full,
Three bushel bags full,
An' all under one tree.
Hurrah! Hurrah!

By Gail Butler

Each year I wonder what to do with my abundant apple harvest. There's the usual juicing for cider and canning for juice, pies, and applesauce. I dehydrate some and cold-store others for winter eating. Then, with an eye to holiday gift-giving I make Apple Pie Brandy. It tastes like apple pie in a glass!

Give yourself a seven- to eight-week head start to make this cordial for holiday sipping and gifting.

Apple pie brandy

1 clean quart jar and lid
1 cup sugar OR ¾ cup honey OR ¼ cup Truvia, or to taste
Two 2-inch pieces of whole cinnamon sticks
Scant pinch of nutmeg
3½ to 4 cups chopped apples, cored, but not peeled
Brandy

Add the sweetener, cinnamon sticks, nutmeg, and apples to the jar. Top with brandy to the shoulders of the jar. Screw on the lid and shake the jar to distribute the sugar. Shake the jar daily for about a week, until the sugar has dissolved. Store the jar in a cool, dark pantry or cupboard for six weeks.

Strain the brandy, reserving apples. Further clarify the brandy by straining through coffee filters, changing them as they clog up, or use cheese cloth.

Pour the brandy into pretty decanters or canning jars topped with fabric and tied with twine, ribbon, or raffia. Add a label, and spread the cheer!

Holiday visitors will enjoy a small warming glass of brandy at your hearth side, too. If desired, you may use the reserved apples to make a tasty, brandy-infused pie or tarts!

You may make pear brandy, also. Just be sure to use pears that are still firm, not soft, otherwise the finished libation will be cloudy. Proceed as with apples, but reduce the cinnamon by half and add a full pinch of nutmeg or a half-pinch of allspice or mace.

With just a few ingredients you can make warming holiday gifts with your autumn-harvested apples.

Save Seeds Save Money Grow Better

By Gail Butler

Once upon a time I bought bedding plants from the nursery to grow my first ever vegetable garden. They grew well and I had a nice harvest. I thought I'd save some money on the following year's garden, so when those plants set seed I saved seeds to plant the following spring.

The results of my first seed saving efforts were dismal. Some of the seeds molded in their paper packets over the winter. Others failed to germinate in the next spring's garden, and those that did were spindly and disappointing.

Since then, I've learned that there's more to saving seeds than just gathering, storing, and replanting. Researching the ins and outs of seed saving showed me all the things I'd done wrong, even though my seed saving idea had been a good one.

With the implementation of a few simple rules, my seed saving efforts have become both rewarding and abundant. I now save seeds to share with friends and neighbors and sell some, too.

Here are a few rules I keep in mind when I plant and select seeds for saving and perpetuating.

Consider the length of your growing season

When I plant new varieties to experiment with in my gardens, I look for seeds that produce abundantly in my short-season growing area which is only about 90 to 100 days between the last spring frost and the first killing frost of autumn. Choosing seeds that grow, mature, fruit, and produce savable seeds in my area of the country is of utmost importance.

The year I tried to grow Cherokee Purple tomatoes comes to mind. These tomatoes supposedly produce a crop in 80 to 100 days. It must be closer to 100 days because my 90-day season was over before the tomatoes produced ripe fruit. When the first killing frost arrived I hadn't yet harvested a single ripe tomato. The vines froze with large, green tomatoes still in place. Thus, I learned three important lessons. First, I look for seeds that produce a crop in 50 or 70 days to allow for fruiting, ripening, harvesting, seed saving, and the occasional earlier-than-usual frost.

Second, I've learned to always start tomato seeds (peppers and eggplants, too) indoors in a sunny south-facing window or under grow lights a couple months before the last spring frost. This way my plants are already well on their way by the time it's safe to plant them outside.

In addition, I learned that you cannot save viable seed from unripe tomatoes or green peppers. Although green peppers — both hot and sweet — are tasty in their green state, the seeds aren't viable until the fruit has turned completely red (or to its fully mature color — some tomatoes mature to yellow or purple, too).

Saving money, saving diversity

I save seeds to save money and preserve choice for the following reasons. First, the price of commercial seeds goes up every year, and simultaneously the amounts of

Store seeds in jars, labeled envelopes, or the envelopes they come in.

seeds in those packets diminish in number. Second, plants are very abundant producers of seeds. A plant produces many more than the 10 to 100 seeds found in the typical seed packet. Plant productivity of seeds ensures that the enterprising seed saver has plenty of seeds to swap, give away, and even sell.

Third, when I save my own seeds from favorite heirloom and open-pollinated varieties, I'm perpetuating seeds that have proven themselves over many generations and in my own gardens, as well. Over time, a subtle evolution takes place among plants of the same variety, and eventually they adapt to the growing conditions, soil, and climate in the parts of the country where they're grown. Natural selection and seed saving efforts of generations of gardeners has steadily improved plants with those desirable traits that we prize so much, such as flavor, abundant harvest, disease resistance, and keeping qualities. The gradual adaptations plants make may take many generations. Therefore if we plant heirloom seeds, much of the evolving and breeding for desirable traits has already been done by our ancestors and others who have grown the plants and saved the seeds for decades and even centuries. This makes the planting of tried and true heirloom seeds a real bonus for the gardener.

A fourth reason to save seeds is that they are so easy to start in a sunny window or under a grow light, making seed saving and seed starting a budget-friendly pair of options. A growing medium, light, and water are all seeds need. And, the sprouting green plants are such a welcome sight after a long, cold winter of monochromatic colors and scenes.

Last, but not least, a very good reason to save and perpetuate seeds of your favorite open-pollinated/heirloom varieties is that corporate plant hybridizers are buying up small seed companies that sell specialty and rare seeds and replacing these with their own hybridized, patented varieties. As this occurs, our planting choices suffer and we pay more for less diversity.

To store seeds for long term, they're gathered — usually in the autumn — cleaned, air-dried, packaged, and stored in a cool, dry spot.

An easy way to check if your stored seeds still contain enough life force to germinate is to wet a paper towel or clean cloth and squeeze out the excess moisture. Fold in half and sprinkle 10 seeds on the lower half, then fold over again so the seeds are sandwiched between. Place the towel or cloth into a plastic bag. Wait seven to 10 days before taking a peek. You'll be able to approximate the percentage of seed viability by how many have sprouted. If all 10 sprout, you've got a 100% germination rate. If only five show any growth you can figure about 50% viability, and so on.

Open-pollinated, heirloom, and hybrid plants

I grow only open-pollinated and heirloom seeds. All heirlooms are open-pollinated. Open-pollinated means that when pollinated by the same variety — such as pollination occurring between Danver's half-long carrot plants, you'll get seeds that produce only Danver's half-long carrots. However, if pollen from Imperator carrots pollinates your Danver's half-longs, the resulting seeds will carry traits from both Danver's and Imperator.

Squash will not cross-pollinate with others of a different species group

This crossing of carrots could be a good thing if you like particular characteristics of both types and want to try to breed a variety of carrot that melds those positives. On the other hand, there's the likelihood that you may be dismayed by getting characteristics from the cross you won't like. As an example, Imperator carrots are prettier than Danver's, but don't do as well in rocky soils like mine, and the Imperator crowns rot in the ground over the winter in my area, even with mulch. The short, thick, never-bitter Danver's persist through winter and set viable seed the following spring. They're better keepers, too, making this carrot the one I plant year after year.

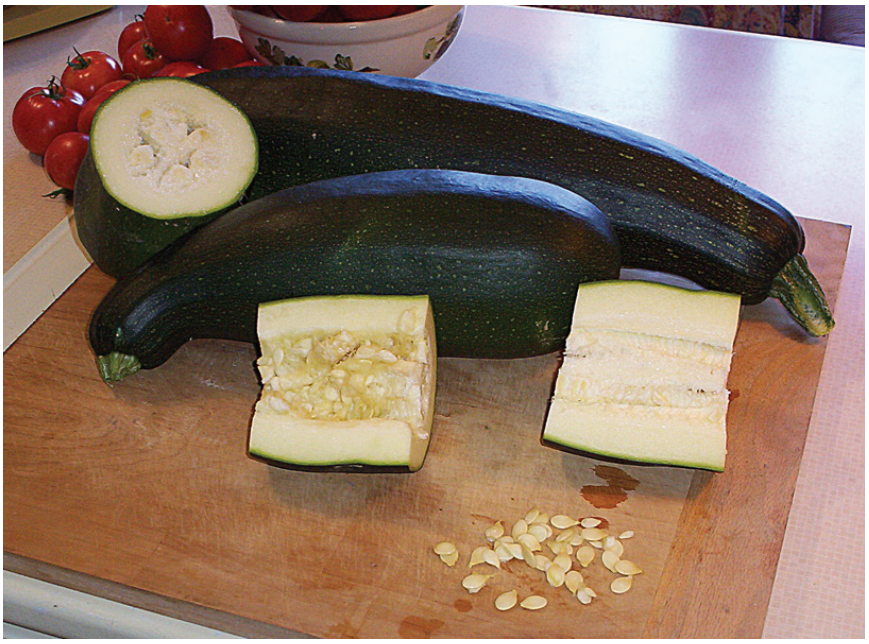
Plant crossing takes time and trial and error but after many generations of selective seed saving and cross-breeding for the traits you want, you may succeed with an open-pollinated hybrid that will come true from seeds you've saved and perpetuated.

Saving and replanting only the seeds from those plants that have the traits you want will eventually result in seeds that reliably come true-to-form with each planting.

In this way, our ancestors created new varieties that are now our heirlooms. What you may create with cross-breeding carrots, peas, etc, will be open-pollinated hybrids of your choosing carrying only the characteristics you want to promote.

On the other hand, commercial plant breeders create popular hybrid strains each year, breeding separate secret parental/varietal lines together. Pollination is often done by hand. Achieving desired results may take many years of experimentation by plant breeders, but once success is achieved, those results are typically patented along with the breeding strategies that led to their results.

When you purchase an F1 hybrid from the nursery or home center it will not produce seeds that are like the plants you purchased. To achieve those garden center beauties, very specific plant parents are continually crossed anew each season to produce the desired hybrids. Only by crossing the pure lines again and again can that pony pack of bedding plants we buy at the nursery be created season after season — and only the original breeder has the necessary pure lines and breeding formula to do so. So F1 hybrids, although they'll produce a tasty crop or some pretty flowers, are



To save seeds of zucchinis, harvest them BIG when the seeds have enlarged and hardened.

not of any value to the seed saver. Those seeds will inevitably produce throwbacks, as well as some drawbacks.

As an example, I bought a lovely pumpkin at the grocery store one autumn. It looked like Cinderella's carriage pumpkin. It was ridged, kind of flat, had glossy orange flesh, and was very tasty. I assumed it was a Rouge d'Etampes variety of pumpkin, so I saved the seeds after it ripened. The next season I planted the saved seeds. I got a few small, orange pumpkins that didn't look like the hefty parent pumpkin. I also got some very long vines that grew some zucchini-like squash that were spongy, flavorless, and looked nothing like pumpkins. And, if those throwbacks weren't enough, I got some funny-looking squash with bottoms similar to turban squash with lots of seeds, but little edible flesh.

It was clear to me that my misidentified Rouge d'Etampes French pumpkin was not what it looked like, but was instead a hybrid of mixed parentage. The next year I ordered Rouge d'Etampes seeds to grow, harvest, save, and replant. From then on I had reliable, predictable results. A word of warning here, plants of the same family, such as many types of squash, should not be planted within a half mile or more of each other. If planting needs to be close due to space restrictions, different squash varieties will need to be isolated under netting to prevent cross-pollination by insects, or seeds of mixed parentage will result.

As an example, the squash family (Cucurbita) consists of the four species mixta, maxima, moschata, and pepo. You can plant one of each type together and they will not cross-pollinate.

However, if you plant two C. pepos together, such as zucchini and Connecticut field pumpkins, they will cross-pollinate. Although they will fruit according to type in the same year you plant them, their seeds will be of mixed heritage and will produce a hodgepodge of genetic results. They may not look or taste like zucchini or field pumpkins.

In my gardens I usually grow a crop of zucchini (C. pepo), Rouge d'Etampes (C. maxima), and Waltham butternut (C. moschata) all in close proximity, knowing there is no cross-pollination possible among these separate species. I could also grow C. mixta which are of the "Cushaw" types of squash, and those white and blue-green pumpkins seen around Halloween, but the first three species provide sufficiently for all my eating and storing needs.

Plants or seeds labeled as heirloom are those species that have been around for at least 50 years, and often much longer. They've been found worthy of being in our gardens by generations of growers. Because of these favorable qualities, they've been saved, sold and swapped, sewn into immigrants' coat hems, toted on wagon trains, and gifted over back garden fences to beloved neighbors.

To collect seeds from this ripe yellow tomato, cut it in half and squeeze the seeds into a cup.

Increasingly many modern hybrids are genetically modified through gene-splicing and will not breed true. They are likely to produce seeds that, if not sterile, may have characteristics quite unlike their parents. This is a discussion beyond the scope of this article. For my part, the food I grow is open pollinated and non-GMO. Growing genetically modified or F1 hybrid seeds would completely defeat my purpose of saving seeds.

You will want to take into consideration wind and insect pollination and the proximity of neighboring gardens so that you can take steps to insure that your heirlooms remain pure. Tomatoes rarely cross-pollinate due to wind or insects, because their flowers are constructed in such a way as to make access to their pollen difficult. However, if several varieties are planted closely together you might get a cross.

Simply asking any nearby and upwind neighbors what they're planting will let you know if your crops will need isolation by distance, wind direction, or garden mesh covering.

I like to experiment with varieties that grow best in the short growing season where I live. To that end I try one or

This photo shows both the green, unripe seeds, and the brown ripened seeds ready for gathering on the same Lovage plant.

two heirloom vegetable seeds each season, based upon catalog descriptions and results reported by my gardening neighbors. In this way, I've been able to find varieties that taste great, are good keepers, produce in the shorter season where I live, and have time to set autumn or springtime seeds (biennials such as carrots, parsley, and leeks set seeds usually in the spring of the following year).

Saving your seeds

Saving seeds from open-pollinated and heirloom plants is easy and fun. Save seeds only from the best, tastiest, largest veggies and fruits that are fully ripened. Most tomato fruits, for example, will be large and tasty while a few may be small and lackluster. Take seeds only from the best and most flavorful, and be sure to save seeds from many different plants in the row or block. This insures diversity and strength in future generations of plants. When I harvest carrot seeds, I take them from all the most robust plants in the rows.

When harvesting pumpkin seeds, I want to clean off most of the stringy fibers. Some types of squash have very clean seeds and I simply spread them on wax paper-lined trays to dry. With pumpkins and squash having sticky strings I'll soak the seeds in a bowl of water for 10 minutes while I gently knead the seeds, squeezing off the strings. The seeds are then poured into a sieve and clean water run over them. Shaking the sieve gently drains away more water and settles the strings to the bottom of the sieve. Then I spread the seeds in a single layer on a wax paper-covered tray to dry. If some fibers remain, this isn't a deterrent to either storage or planting as long as the fibers and seeds are completely dry when stored. When thoroughly dry, I put the seeds into labeled envelopes and store them in a cool, dry place over the winter. To freeze seeds I store the envelopes in a Ziploc baggy to prevent moisture damage to the seeds.

Some people save tomato seeds by putting them in a jar with water and letting the mixture ferment until it becomes a funky slurry, which rots the gel away from the seeds. For me it's simpler to squeeze the seeds from ripe tomatoes into a cup or directly into a fine-meshed sieve, run a brisk stream of water over them, drain, then spread seeds in a single layer onto wax paper to dry. No smell, no muss, and they grow vigorously the following season. I've planted tomato seeds that have spent up to five years at room temperature storage, and while the germination rate declines a little each year, I've had success growing delicious tomatoes.

Gathering seeds from root veggies and greens (carrots, beets, parsnips, salsify, radishes, spinach, kale, collards, and lettuce) and alliums (leeks and onions) is simply a matter of allowing the blossoms to fade and the seeds to form and dry to a brown or black color before gathering them. I use an old pie tin to gather the seeds by cutting the seeds heads or knocking seeds free into the pan. Just be sure to gather the seeds on a dry day in the afternoon so no moisture remains on them, or they'll mold in storage.

Seeds from the above crops can be stored without rinsing or cleaning in paper envelopes or glass or plastic jars. If you want really clean seeds for selling or gifting you can huff and puff lightly to blow dust and plant

debris from small seeds, being careful not to blow them out of your pie tin or gathering bowl. Seeds can also be screened to remove debris.

To save beans and peas for replanting (and winter eating) allow some of the pods to dry thoroughly on the vines. Crack these open and save the hardened, dried beans or peas in jars in a cool, dark pantry or cupboard.

If I want to store seeds for a long time — several years beyond their natural germination span — I'll put my seed envelopes in a Ziploc baggy, squeeze out extra air, close tight, and put the bag in the freezer.

Freezer storage is a way to preserve seeds for several seasons more in case of a crop failure or accidental cross-pollination. I never give away, sell, or plant all my seeds from a single season. I usually have at least three seasons of seeds saved. Then, I'll mix and match several seasons of seeds to plant out in the spring. When I moved from Utah to Idaho I wasn't able to plant a garden the first year. The second year, I started tomatoes from seeds I'd frozen for two years and got a luscious crop.

By inter-planting seeds saved from several seasons, I ensure more diversity in parentage and robustness when they pollinate one another. If seeds are saved from only one fruit or plant, over a period of time the plant progeny will likely weaken and become prone to disease and lack of vigor. Diversity in seed saving is the key to healthy and robust future crops.

Selecting varieties to save

Catalogs and seed packets are sources of inspiration and information. Read the descriptions on flavor, disease resistance, and length of time needed from sprouting to fruiting. Many catalogs give information on keeping qualities. I always look for varieties that have long keeping qualities in fruits such as apples and vegetables like squash, cabbage, carrots, beets, and onions. These are stored in my root cellar, pantry, or the bottom of the fridge.

Dried bean pods once green are now tan, dry, and wrinkly.

Tomatoes, peppers, summer squash, greens, and most stone fruits aren't known for keeping qualities so these are eaten fresh, dehydrated, canned, or frozen.

Each year I scan the plant catalogs for one or two plant varieties to bring diversity to my food supply. Some pass muster, others don't. In this way, over a period of 15 years, I've found favorite varieties that I grow each year.

It's fun to experiment and try growing something new to augment my diet. Trying something new each season stretches my culinary ability and tickles the palate, too. One year it might be open pollinated soybeans, another okra, purslane, or edible flowers.

When you grow open-pollinated and heirloom plants, you'll be able to save seeds and money. You'll garden more frugally and more fruitfully. And, you'll definitely grow better!

Rainwater diverter project

By Christopher J. Ranallo

My wife and I have been collecting and purifying rainwater for the last six years, but have at times struggled with the problem of a yellow tint in our rainwater. Even after filtering through the ceramic filters of our Big Berkey, the tint remained. We tried both ceramic and charcoal filters, cheesecloth, coffee filters, boiling, and purifying tablets. We emptied and scrubbed our collection barrels and apparatus. All attempts failed to remove the stubborn yellow menace.

Top: The disassembled kit and other components required for installing the rainwater diverter. Left: Flexible PVC attaches the diverter to the downspout and water collection barrel.

Left: The assembled diverter, after spray painting to match the house. Ignore the wiring, it is unrelated.
Right: Two rainwater collection barrels are now full of clean, clear water, thanks to the working diverter.

Only after scouring the internet and soliciting the advice of our prepper friends were we able to finally identify the culprit. It turned out to be pollen that is very heavily concentrated during spring and summer in our area of northern Ohio. We do have debris screens over all of our gutters, but these, of course, will not prevent the pollen from entering our collection barrels.

I considered many possible solutions, and after much careful deliberation, I decided to build a homemade PVC diverter system that would collect and dispose of the initial runoff of every rain event. There are many models available for home systems, but most did not seem robust and durable enough, or lacked the capacity to handle the initial flush off the roof. The best option seemed to be modifying a commercial diverter to the needs of our own collection system.

I chose to purchase two 12" Post/Wall Mount First Flush Diverter Kits from Rain Harvest Systems. These kits included the top and bottom caps, wall mount bracket, float ball and a removable dual mesh filter for the collected first flush.

I had to provide an 18" long section of 12" diameter PVC tubing, 24" long sections of 2" and 3" PVC used to connect the end pieces, PVC glue, #14 2½" stainless steel screws for the wall mount, three cans of almond paint and 2' of ½" clear vinyl tubing to be used as a drain for each of the diverters.

All of the pollen, bird droppings, insects, and other organic/inorganic debris is routed into the diverter, which holds approximately six gallons. Once the diverter is full, a float (plastic ball) inside rises to seal off the intake and the following, clean rainwater is then directed into the collection barrels. The diverter has a gasketed valve on the bottom that will slowly drain the dirty water out into the yard or to be collected for other uses such as gardening, flushing toilets, etc. This water also passes through a dual screen filter before being released into the drainage tube on the bottom.

Once the diverters were assembled and installed, we awaited the next rainstorm with great anticipation. Ten days later, our efforts proved worthwhile. The diverters performed perfectly, the rainwater in our barrels was clean, clear, and pure. After a day or so, the first flush was slowly drained from the diverters and the whole system reset itself for the next use.

Our configuration may not fit every rainwater collection setup, but it can be easily and inexpensively adapted to work for any system or any size roof.

Good luck and keep prepping!

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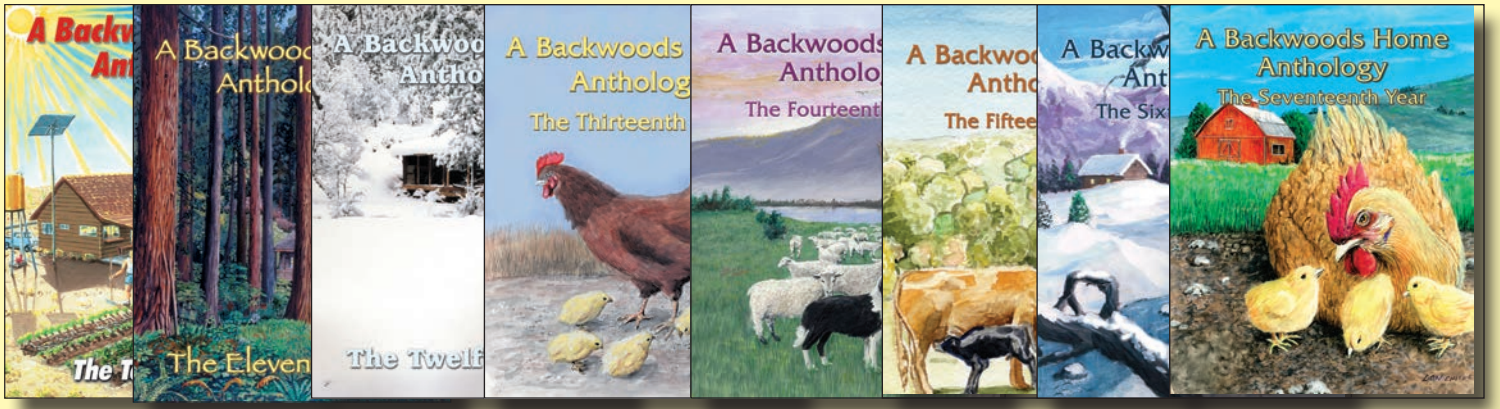

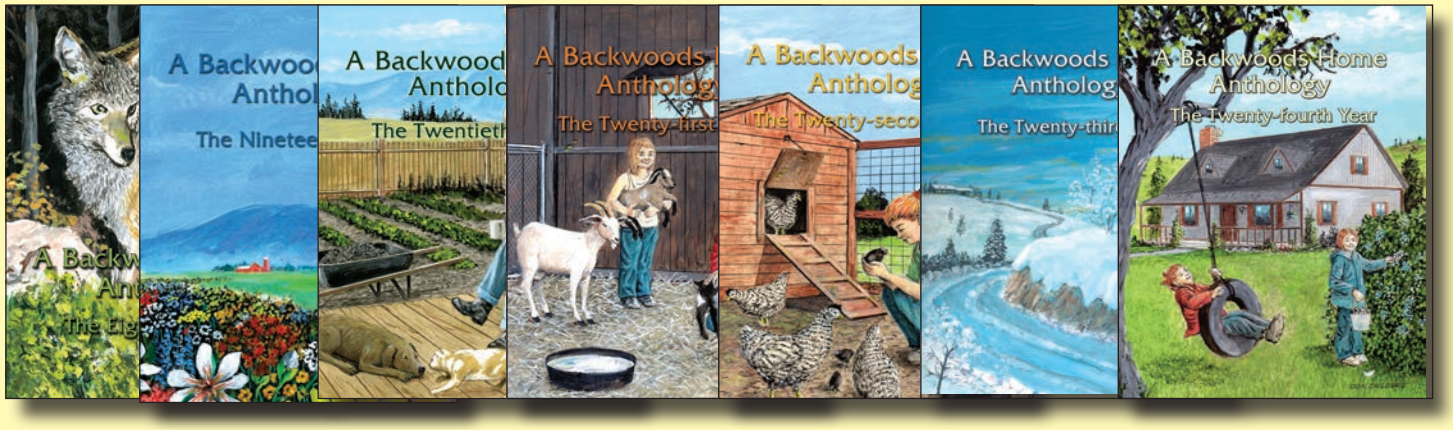

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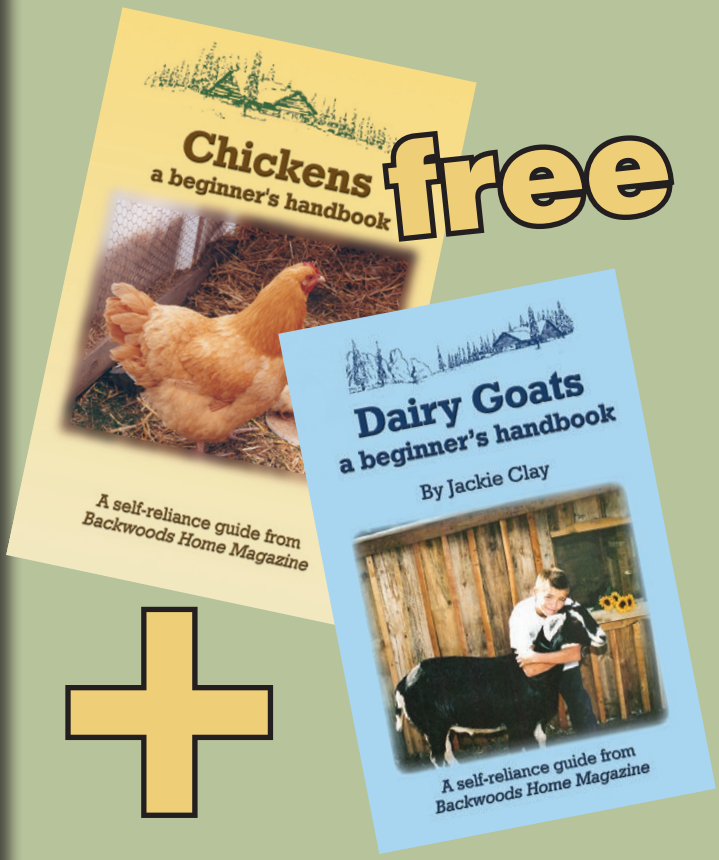

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Tanning sheepskins

By Lacey Jean

"I would sleep on this. And wear it! I would bring it everywhere!" one cherub-cheeked youngster exclaimed as he pressed his face into the sheepskins hanging in my farmers market booth. Others stroked the tightly woven curls of wool and plunged hands deep into its fibers. Kids just get it. They don't need to be told how to use sheepskins. At one time, I had my own sheepskin awakening at a market when I asked the vendor what I could use it for. Her eyes lit up as she said, "Well…"

I bought the Navajo-Churro pelt and promptly fell in love with everything about it. But I didn't love the fact that it smelled of chemicals so strongly I had to air it out on the line for several days before bringing it into the house. Surely there must be a way to tan hides without the use of chemicals? I reasoned that the native peoples have been practicing this craft for centuries, long before the uprise of factory production.

My dilemma took me on a search, which led to a determination to try my hand at this. How hard could it be? I have since found that while it isn't so much a hard skill to understand, it is one that must be carefully practiced to get a feel for the nuances and to build the right muscles for the task.

Procuring a hide

Local farmers who sell lamb have always been my best source of skins. I started by asking for the throw-away pelts which had been botched up during butchering, had undesirable wool, or were simply unwanted. It is always a good idea to have something for trade. Some eggs, work trade, or home-canned goods will ensure that you keep a good connection with the sheep farmer, with the hope that there may be more sheepskins in the future. As my tanning skills have improved, I have begun giving back a tanned hide for every several that I get to keep, depending on the quality of the pelts. I have even bought a few sheepskins when the fiber and length has been right.

So now you have your practice pelt. Until you can begin working on it, either roll it up into a plastic bag and stick it in the freezer, or liberally salt it with some kiln dried salt found from the feed store. You want to cover the entire inside of the skin with salt in a heavy layer. It helps if you can put the sheepskin wool side down on a slightly slanted pallet or other surface that allows air flow. This will encourage the sheepskin to dry and moisture can easily drip off. The sheepskin will keep this way in a covered building for a very long time. If you plan to leave it there for more than a week or so, I would suggest pulling any large bits of fat and tissue off, as this is likely to rot the hide.

My eldest son helps out by brushing the completed sheepskins.

Tools of the trade. None of my tools are tanning specific, but they all work well and were inexpensive to acquire. 1) Pumice stone, used to sand down thick sections of the hide like the neck and back. 2) My favorite buck knife made by my father for trimming edges. 3) An antique antler handled carding comb, used to brush out the wool and pull out debris. 4) Leather needle and nylon thread for stringing up the hide. 5) Antique rocker kitchen knife for fleshing and scraping. 6) Jade ulu knife for stubborn membrane bits that need a smaller edge to remove.

Fleshing

I will start by warning you that this part of the process can take a very long time to perfect. Much like becoming an artisan baker, the only way to get good at it is to spend time struggling through it and finding your groove.

I have found my favorite tool for fleshing to be some antique kitchen rocker knives with no sharp points. They vary slightly from many ulu knives that often do have points on their ends. The knife you choose should be rather dull and easy to grip with two hands so you can keep good control.

A fleshing board is also helpful for this step. I use a thick, slightly concave board of 4½ foot length (as I am not tall in stature), with one end sanded down like the top of an old surfboard, so as not to damage the hides. I straddle the bottom of the board which is placed at an angle to the wall, lightly pinching the base of it between my boots. The top of the board rests against something solid like a fence or building. I prefer a fence, so that the board can rest directly on top of it. Lay your sheephide, skin side up, over the top of the board, and draw a portion of the hide between the fleshing board and the fence or building to pinch it in place while you work. Some folks use a clamp, but you will need to move the hide often, and repositioning a clamp can become rather tedious.

Helga, one of my first Shetland ewes, who provides to me an annual share of wool, meat, and sheepskins.

My fleshing board and knife, both well worn by use and age

It is easiest to start fleshing where there is a natural edge, either from the way it was butchered, or towards the center of the back where there is typically less tissue. I have found it easier to get your dull blade under the tissue at these places to begin the work of removing it from the skin.

Here is where I will have to admit that no amount of written direction can replace time spent just getting a feel for fleshing the hide. I watched videos and read countless books, and it came down to just finding my own rhythm. With my fleshing knife, I make a controlled chop at an angle, slanted towards my knees — not straight down into the flesh, and most definitely not side to side! There is no sawing or slicing. Controlled, dull chops downward with the slant of the fleshing board to get the tissue and fleshy bits to loosen up. When you can get a good bit loose, use your hands. Work your fingers between tissue and flesh, and slowly pull the flesh slightly up with one hand while pushing down on the hide with the other. This ensures that you will get an even layer, without the risk of cutting the pelt. It is my hope that one day my hands will be the only tool I need for this part of the process.

My first sheepskin took about three hours to flesh and appeared to have been chewed on by ravaged wolves when I finished. Today, I can flesh out a hide in 15 minutes and it will be clean and free of additional tears or cuts. Don't fret if you don't think you've gotten all of the membrane removed. Removing the muscle and fat is most important.

Cleaning

My favorite step. This is when the transformation begins, when the sheepskin goes from being a ragged, drab, smelly dead animal skin to something luxurious. In the summer months, I have found it best to hand wash the hides in a large tote or an old bath tub if you have one outside to use. Rainwater seems best, but well or city water won't ruin it. Fill the tub with cold water and add a soap of your choosing. Some use a dish soap, but I prefer to use a biodegradable soap because I dump the used water onto the pasture where my animals live and eat. Depending on the density and length of the fiber, this can be rather time consuming, and you may wish to take shifts. It is fine to soak in the tub for a good portion of the day. Swish it around and try to loosen bits of dirt and debris. Be careful not to agitate the wool too vigorously lest you felt the wool. Exchange the soiled water for clean as many times as it takes until the water stays clear. During the colder months, I will wash the sheepskin in my clothes washing machine on delicate with cold water. I have a very understanding spouse. In this instance, I will run it through the spin cycle twice to remove as much moisture as possible. Hanging the hide up on a clothes line or fence for a few hours to let it drip out is a good idea if you're not able to ring it thoroughly with your hands.

Braining

Once your hide is cleaned it is time to get the tanning solution onto the skin side. I prefer to use brains from a pig. I order a large box of pork brains from my local butcher. One pig brain will cover three to four sheepskins. If you are only doing one sheepskin, you may try to remove the brain from the sheep you are tanning, or ask the farmer who had them butchered. Each animal has enough brain to completely tan their own pelt. Nature is industrious like that.

Plop the whole brain into a container twice the volume of the brain at least. Add hot water until it is submerged, and using an immersion blender or other blending implement, give it a few good pulses until it's the consistency of a thick strawberry smoothie. I'll admit, I think twice before sipping on a pink colored smoothie these days. The mixture should be warm. Using your hands, smear the mixture over the skin, massaging it in to help the solution set into the cell structure. I typically do this step at night, roll the skin up so that all the brain-soaked parts are touching each other only, and let it sit overnight before beginning the next step. Do your best to keep the brain matter from touching the wool.

Stretching

I prefer to stretch the hides on a rack. This makes the step slightly less physically demanding than if I were to do it by hand. Since I tan three or four sheepskins a week, that would become rather tedious work. By stretching the skin on a rack, I'm also able to scrape off excess membrane, dirt, or tissue that may still be stuck to the skin. A rack can be constructed of many things, but I have simply used some 2x4s to make a square. I have 4x4, 5x6, and 6x8 foot racks to accommodate the various sizes of hides I work with. Bracing the corners will keep your rack from shifting under the pressure of the pulling cordage while your hide stretches. Drive nails every six inches or so along each side of the rack, leaving approximately an inch of nail sticking out, around which you'll wrap the cording. I use nylon cording because it is hardy enough for repeated reuse.

Lay the rack over a tarp or cloth on the ground, then lay the cleaned and brained sheepskin, skin side up, in the very center. I begin threading my cording in one corner of the hide, typically where a leg would be. Using a leather needle threaded with the cording, punch through the underside (wool side) and draw the cord through the skin. You may need pliers to pull the needle through, depending on how thick the skin is and how slippery your fingers are. Pull through enough cording to do an entire side of the hide. You'll eventually get a feel for the length required. Make a slip knot in the end of the cording and attach it to a nail on the rack. Pull the cording taut and continue piercing the hide and looping the cord over nails in this pattern until you run out of cording, working your way down the edge of the hide. I usually push the needle through ½ to 1 inch from the edge of the skin so that it does not easily tear. Do not worry about pulling the string tight until you have gotten the whole hide threaded.

Thread the opposite corner of the hide next, then the two remaining sides. Take care to pull the hide evenly, with firm, but slow motions to keep it from tearing. It is best to use your hands to pull on the hide while you tighten the string, as opposed to pulling only on the string. All the pieces of hide that are not tight will rot, so be sure all edges are being pulled. I test my strings by plucking them. They should sound tight like a guitar string. The hide itself should have some spring to it, but not be so tight that it will tear if you push on it. Experience will be your best teacher.

Once the hide is on the rack, you will have to make a judgement call. Is it humid? How damp is the hide? I

Pulling fat and tissue from the hide.
Your hands will do better work than any tool.

Sheepskins drying as they stretch on racks in my tanning "office"

rarely leave the hide to stretch at this point without doing an initial scrape of the skin to remove excess moisture. If your hide does not dry quick enough in this stage, it will begin to rot and the hair will "slip" or fall out. Your heart will sink if this happens after all the work you've already put into it. But if it should happen, at least save the wool! It can be spun into yarn and the skin can still be worked into leather. The racked hide should be somewhere dry at this point. If rain is in the forecast, bring it indoors.

Scraping

This portion may take 12 hours. It may take a week. It depends on many variables. Weather, humidity, where you are working the hide, how damp the hide is, how thick the skin is, how big it is, and how much time you have to dedicate to it all will affect the amount of time required. Thankfully at this stage, if you really needed to, the hide could stay on the rack for quite some time and you could come back to it, re-soften it and continue to work. I like to try to finish a sheepskin in four days if possible. Using the tool you fleshed with, you will begin to gently scrape and press against the hide to push the cell fibers apart so they do not lock up and stiffen, but stay soft and pliable even after they've dried. Starting from the edges, work into the center in slow, deliberate motions, pressing and scraping your tool down the hide. You will scrape off vile looking liquid and tissue. Keep a bucket and towel handy. Occasionally flip the rack so the hide is being worked from a different angle. If the hide seems brittle, or like it is not softening, you can add another layer of brain mixture. This will help soften the skin. As you scrape, look for the skin to turn white, or the color of rawhide. That is when you know you are close to being done. I hesitate to suggest this next tool, due to how many hides I've ripped with it, but for particularly stubborn and thick sheepskins, using a sanded down hammer handle can be used to apply dull direct pressure to help push out the cell fibers and soften. Work slowly and avoid weak spots, lest you tear through. You will use the end of the handle, being sure all sharp edges have been sanded down smoothly. I happened to have an extra handle laying around from a broken hammer. Any other blunt stick of this size and shape would also work.

Should your hide dry too fast and stiffen, don't despair! Simply dampen the skin with a warm damp sponge until the hide becomes pliable again. When the entire skin side of the hide is the color of rawhide, pliable, and dry, flip it around to comb out the hair. Most sheepskins I get are full of seed-heads, straw, thorns, and other debris. Some must be plucked out by hand, and then brushed and brushed and brushed some more. A metal-toothed dog grooming brush and a carding comb are my weapons of choice. I have found a spray on, dry-shampoo for horses works well for this stage, but it isn't necessary. It will loosen up tangles for longer haired breeds, like Shetland or Icelandic.

Finishing

Your sheepskin is almost complete! You will be cutting it off the rack now. I prefer to use my go-to blade, or even a razor knife, and I work my way around the edges of the skin cutting it where the edges are soft. I find that inevitably some of the edge hardens and doesn't get worked well. I cut this off. Work slowly. Sides first, then bottom, and lastly the top. Pull the hide free. What a transformation! Give it a good once over. Does the hair need more brushing? Could it use some hand stretching? I have a stretching post that I work my hides over to finish them. It is a short, stumpy post secured to a small platform that I can

A finished sheepskin will last through years of daily use with just a little care.

stand on while I press the hide down on the sanded down point of the post. All my hides get a good once over on the stretching post, especially the edges. The last step is to oil the skin, which keeps it pliable, soft, works as a preserving agent, and helps the sheepskin stay water resistant. I use a natural beeswax and mink oil-based leather conditioner that I pick up from my feed store. Using a damp sponge, I massage the oil into the skin until it disappears. I then roll up the hide, skin side in, and let that soak in overnight. The following morning I revel in my finished product.

My very first successful sheepskin is nearly two years old now and it is as soft and lovely as the day I finished it. For continued maintenance and care, I oil the underside occasionally and brush out the wool to keep it from looking matted. It should last for years and years, even with daily use.

And now to answer the question: What *can* you do with sheepskin? In this house they are used as chair and couch cushions, blankets, mattress toppers, car seat covers, camp mattresses, picnic cushions, rugs, dog beds (spoiled pups!), and lawn chair cushions in the summer. And any hide that has too many holes in it is used to make collars for coats and other crafty type projects.

Should you fail on your first (or first dozen) tries, start over and try again. You are honoring the animal by using every part. A failed hide is not a waste. There must be some grace given for practice. No artisan has ever perfected their craft with their first attempt.

Happy tanning!

The Library — Books for Self-Reliance

Naturally bug free – $10.95

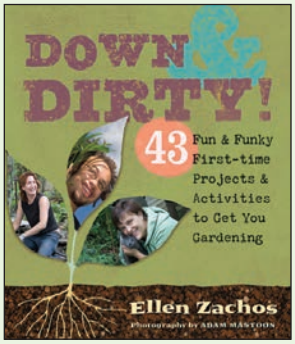
Protect yourself, your children, your pets, and your home from bugs — without using harsh or toxic chemicals! Herbalist Stephanie Tourles offers 75 simple recipes for safe, effective bug repellents you can make at home from all-natural ingredients. The collection includes sprays, balms, body oils, and tinctures.
176 pages; 5x7" **Book #ST001**

Epic Tomatoes – $19.95

Savor your best tomato harvest ever! Craig LeHoullier provides everything a tomato enthusiast needs to know about growing more than 200 varieties of tomatoes, from planting to cultivating and collecting seeds. He also offers a comprehensive guide to various pests and tomato diseases, explaining how best to avoid them.
256 pgs; 8½x11" **Book #ST002**

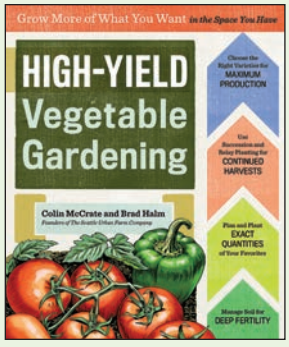
Grow a Little Fruit Tree – $16.95

Grow your own apples, figs, plums, cherries, pears, apricots, and peaches in even the smallest backyard! Ann Ralph shows you how to cultivate small yet abundant fruit trees using a variety of specialized pruning techniques. These little fruit trees are easy to maintain and make a lovely addition to any home landscape.
168 pgs; 7x9" **Book #ST003**



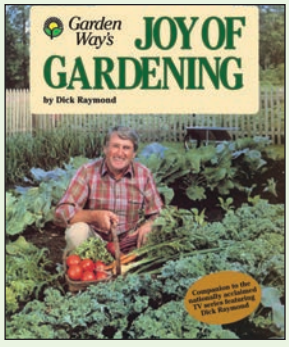
Down & Dirty! – $19.95

Get outside and start digging! Designed for the novice gardener, Down & Dirty! provides clear instructions, simple strategies, helpful advice, and lots of encouragement for those looking to brighten a small yard, porch, or home. Perfect for the first-time homeowner or apartment dweller, this guide will inspire you get your hands dirty.
256 pgs; 9¼x10" **Book #ST004**



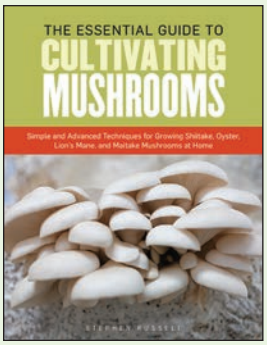
High-Yield Vegetable Gardening – $18.95

You won't believe your eyes when you see the size of your harvest! In this book authors Colin McCrate and Brad Halm show how to make your food garden much more productive. You'll learn secrets for preparing the soil, selecting and rotating your crops, and mapping out a customized plan to make the most of your space and your growing season.
320 pgs; 7x9" **Book #ST005**



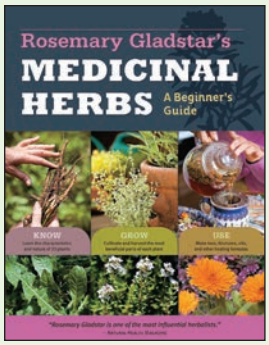
Joy of Gardening – $24.95

Full of useful tips and practical garden wisdom, this guide shows you everything you need to know to grow a more bountiful harvest with less work. Stressing the utility of raised beds and wide rows, gardening expert Dick Raymond shares his time-tested techniques for preparing the soil, starting plants, and controlling weeds.
384 pgs; 8½x10" **Book #ST006**



The Essential Guide to Cultivating Mushrooms – $24.95

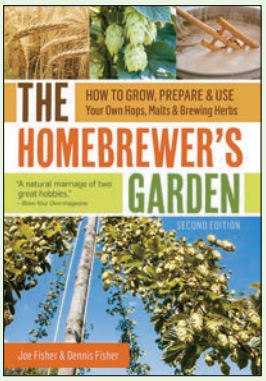
Clear instructions and step-by-step photographs show you how to cultivate mushrooms in your own home. Whether you're interested in growing them for your own kitchen or to sell at a local market, you'll soon be harvesting a delicious and abundant crop of mushrooms.
232 pgs; 7x9" **Book #ST007**



Rosemary Gladstar's Medicinal Herbs: A Beginners guide – $14.95

In this introductory guide, Rosemary Gladstar shows you how easy it can be to make your own herbal remedies for life's common ailments so you can stock your medicine cabinet full of all-natural, low-cost herbal preparations.
224 pgs; 7x9" **Book #ST008**

The Library — Books for Self-Reliance

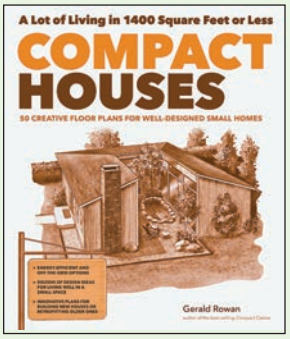


The Homebrewer's Garden, Second Edition – $16.95

If you have a backyard, or a sunny porch or balcony, you can grow hops, brewing herbs, and malt grains to enhance the flavor, aroma, and uniqueness of your home-brewed beer. Simple instructions from experts Joe and Dennis Fisher guide you through every step of the process.
224 pgs; 6x9" **Book #ST009**

The Fence Bible – $24.95

From classic whitewashed pickets to family-friendly hedgerows, fences add character to any property. The Fence Bible contains all the information you need to plan, build, and install beautiful fences and sturdy gates of every type. Learn how to stake out your own distinctive boundaries and create a fence that complements your landscape.
272 pgs; 8½x11" **Book #ST010**

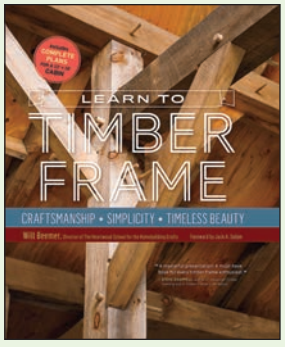


Compact Houses – $19.95

Discover the huge possibilities of a small house! Whether you're building from scratch or retrofitting an existing structure, these 50 innovative floor plans will show you how to make the most of houses measuring 1,400 square feet or less. Gerald Rowan presents creative and efficient layouts that use every inch of space.
208 pgs; 8x9" **Book #ST011**

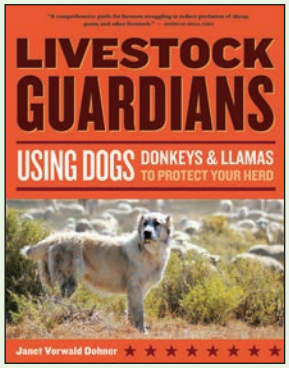
Build Your Own Beekeeping Equipment – $19.95

Save time and money by building your own beekeeping equipment. Step-by-step illustrated instructions show you how to build hive bodies, supers, covers, stands, frames, swarm catchers, feeders, and more using basic hand tools and easy-to-find materials.
160 pgs; 8½x11" **Book #ST012**



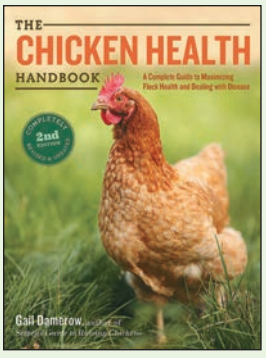
Learn to Timber Frame – $24.95

The first guide to timber framing written specifically for beginners! Expert Will Beemer takes you through the entire process from start to finish, beginning with timber sourcing and ending with a finished building. This book includes full-color photos, detailed drawings, and clear step-by-step instructions.
160 pgs; 8x9¼" hardback **Book #ST013**



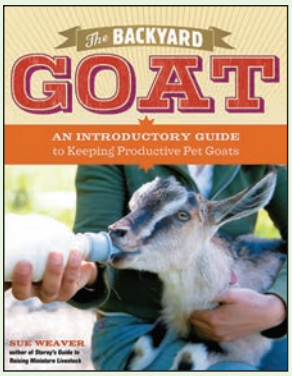
Livestock Guardians – $24.95

Keep sheep, goats, and other livestock safe from attack with guardian dogs, donkeys, and llamas. Effective and economical, livestock guardians can be the solution to your predation problems. This book covers everything from selecting an appropriate breed for your needs to advanced training techniques.
240 pgs; 8½x11" **Book #ST014**



The Chicken Health Handbook, 2nd Edition – $24.95

This one-of-a-kind reference book covers the health problems that plague chickens of all breeds and ages. Practical charts identify common symptoms and causes of infection, while an alphabetic listing of diseases provides advice on treatment.
496 pgs; 7x9¼" **Book #ST015**



The Backyard Goat – $16.95

Pulling carts around the farm or serving as loyal pack animals, goats are naturally hardworking and make for friendly companions. This straightforward guide teaches you how to choose, house, feed, train, and breed the best goats for your space and needs. For anyone who wants to keep goats, this book covers the essentials.
224 pgs; 7x9" **Book #ST016**

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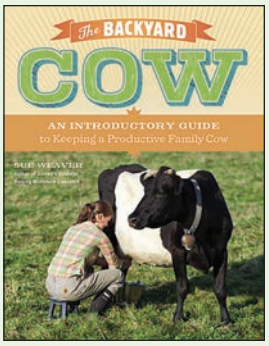
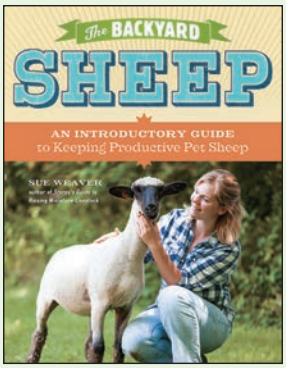


The Backyard Cow – $18.95

You don't need acres of land to keep a cow healthy, happy, and productive. You can raise one right in your own backyard, producing more than enough milk for a single family — up to six gallons per day! This book covers everything you need to know about cows, from selecting the right breed to understanding your cow's behavior.

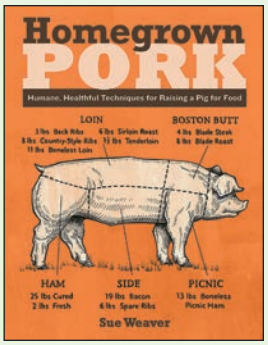
240 pgs; 7x9" **Book #ST017**



The Backyard Sheep – $16.95

Raise a flock of sheep in your backyard. Even with a limited amount of space, you can enjoy homegrown fleece and fresh milk, as well as the endearing company of these family-friendly animals. Sue Weaver provides all the instructions you need for selecting a breed; housing and feeding; harvesting fleece; and milking.

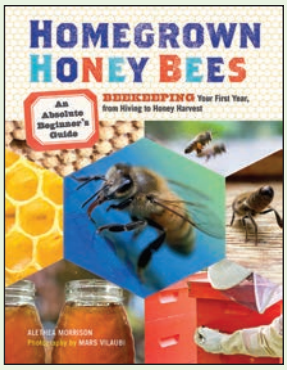
227 pgs; 7x9" **Book #ST018**



Homegrown Pork – $18.95

Raising a pig for meat is easy to do, even in a small space. In just five months, a 30-pound shoat will become a 250-pound hog and provide you with more than 100 pounds of pork. Learn to raise your own pig, from selecting a breed to feeding, housing, fencing, health care, and humane processing.

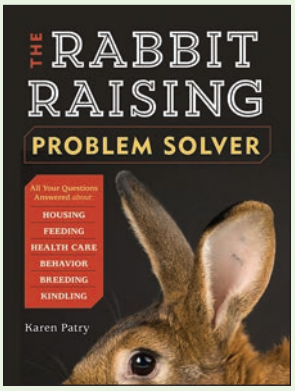
256 pgs; 7x9" **Book #ST019**



Homegrown Honey Bees – $14.95

Discover the joys of harvesting honey from your own backyard. This introduction to beekeeping covers everything from acquiring bees to sampling honey. Alethea Morrison outlines what you'll need to know to make it through the first year, while stunning macrophotography by Mars Vilaubi brings the inner workings of the hive to life.

160 pgs; 7x9" **Book #ST020**



The Rabbit Raising Problem Solver – $19.95

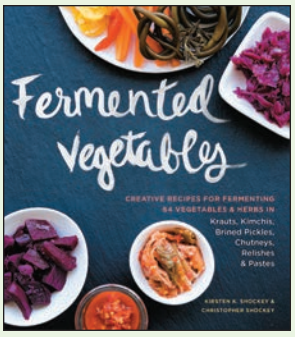
In a handy question-and-answer format Karen Patry addresses every aspect of rabbit care, including housing, feeding, breeding, kindling, health, and behavior. This informative, easy-to-use guide has reliable, humane solutions that will keep your animals healthy and happy.

328 pgs; 6x9" **Book #ST021**

The Big Book of Kombucha – $24.95

Brew your own kombucha at home! With more than 400 recipes, including 268 unique flavor combinations, you can get exactly the taste you want — for a fraction of the store-bought price. This complete guide, from the proprietors of Kombucha Kamp, shows you how to do it from start to finish, with illustrated step-by-step instructions.

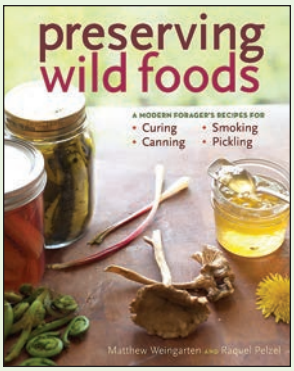
400 pgs; 8x9" **Book #ST022**



Fermented Vegetables – $24.95

Even beginners can make their own fermented foods! This easy-to-follow comprehensive guide presents more than 120 recipes for fermenting 64 different vegetables and herbs. With a variety of creative and healthy recipes, you'll enjoy this fun and delicious way to preserve and eat your vegetables.

376 pgs; 8x9" **Book #ST023**

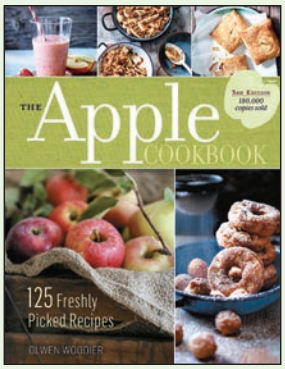


Preserving Wild Foods – $19.95

Whether you forage in the wild or at the farmers' market, you'll delight in the unique preserves featured in this one-of-a-kind collection. With a reverence for the natural world, Matthew Weingarten and Raquel Pelzel encourage you to explore the ways in which wild ingredients can be transformed into tasty foods.

256 pgs; 7x9¼" **Book #ST024**

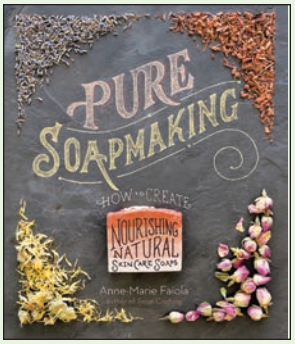
The Library — Books for Self-Reliance



The Apple Cookbook – $14.95

From sweet to savory and from breakfast to bedtime, apples take center stage in this fun volume. Apples enhance and complement other ingredients in everything from soups and salads to entrées and desserts. With plenty of vegan and gluten-free options, you'll be cooking apple-based dishes that you can enjoy with all of your friends.

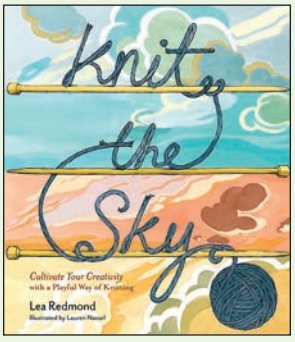
240 pgs; 7x9" **Book #ST025**



Pure Soapmaking – $19.95

The pure luxury of soaps made with coconut butter, almond oil, aloe vera, oatmeal, and green tea is one of life's little pleasures. And with the help of author Anne-Marie Faiola, it's easy to make luscious, all-natural soaps right in your own kitchen. This is an exciting resource for both new and experienced soapmakers.

240 pgs; 7x9" hardback **Book #ST027**



Knit the Sky – $19.95

Record the beauty, emotions, and experiences of everyday life — not in your journal but with your knitting needles! 32 enchanting projects that will inspire you to create beautiful finished pieces full of personal meaning and memories. Lea Redmond provides instructions for all the stitches and techniques you need, as well as required patterns.

168 pgs; 7x8" hardback **Book #ST029**

The Water-wise Home – $24.95

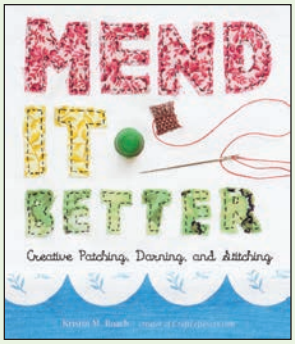
Save the earth's most precious resource while also saving yourself money. Laura Allen provides expert strategies for using water smartly and efficiently while fulfilling all of your home and garden needs. Learn how to create a water-wise landscape, reuse gray water, harvest rainwater, and even set up a waterless composting toilet.

256 pgs; 8½x11" **Book #ST031**

The Backyard Homestead Book of Kitchen Know-how – $19.95

Growing vegetables and raising livestock is only the beginning of a successful homestead — that fresh food goes to waste unless you can properly prepare, cook, and preserve it. You'll learn all the techniques you need to get the most from your homegrown foods.

256 pgs; 8½x11" **Book #ST026**



Mend It Better – $18.95

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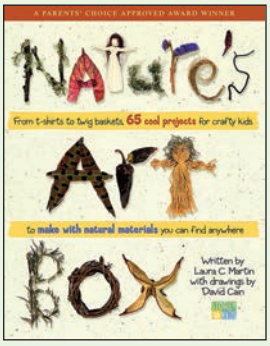

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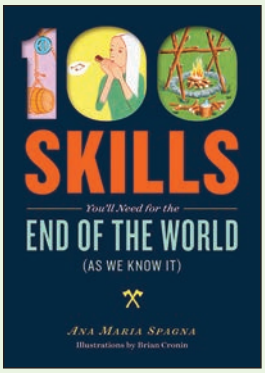

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