A PLAIN-ENGLISH PRACTICAL GUIDE

Food Storage and Home Canning, Step by Step

Tested USDA Methods, Adjusted for High Altitude



Safe Canning, Freezing, Drying and a Rotating Home Food Supply

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Before You Begin

Putting up food at home is one of the oldest skills there is. A shelf of jars you filled yourself, a freezer stocked from a good harvest or a sale, and a pantry you rotate on purpose all make a household steadier. They save money, cut trips to the store, and give you a cushion when the power is out, the roads are closed or the budget is tight.

Home canning also carries a real risk. A jar of green beans or meat that was not processed the right way can grow the germ that causes botulism. You cannot see it, smell it or taste it, and a small amount can kill. That is not a reason to stay away from canning. It is a reason to do it the tested way, every time, with no shortcuts.

This book teaches only tested methods. Every process time, pressure, headspace and recipe in these pages comes from the United States Department of Agriculture (USDA) Complete Guide to Home Canning or the National Center for Home Food Preservation (NCHFP) at the University of Georgia, which publishes and supports the USDA guide, plus a few university Extension fact sheets that follow the same research. The sources are listed at the back with links.

The One Rule That Matters Most

Follow the tested recipe exactly Use the exact process method, jar size, headspace, process time and pressure given for the food. Do not guess, do not shorten times, do not swap a boiling-water canner for a pressure canner, and do not add thickeners, extra starch, extra low-acid vegetables or extra oil to a canning recipe. If a recipe or method is not in a tested source, freeze the food or eat it fresh instead.

Altitude Matters Here

Water boils at a lower temperature the higher you live. Almost every canning time and pressure has to be adjusted once you are above 1,000 feet. Much of Northern Nevada sits well above that. Dayton, where I live, is listed at about 4,397 feet. Carson City, Reno and the valleys around them are all high enough that sea-level times are not safe.

Chapter 2 shows how to find your elevation and which column of each table to use. Every table in this book shows the altitude columns. Use the column for your elevation every time.

How This Book Is Organized

The first seven chapters are the foundation: why tested methods matter, altitude, equipment, getting jars ready, the two canning methods step by step, and what to do after the jars come out of the canner. Read those first.

Chapters 8 through 13 give tested directions for the foods most households put up: tomatoes, fruits, jams and jellies, pickles, vegetables, and meat and stock. Chapter 14 covers what can go wrong and what to do about it. Chapters 15 and 16 cover freezing and drying, which are often the better choice for foods that do not have a tested canning process. Chapter 17 covers storing and rotating a home food supply. The appendices have quick-reference tables, a canning log, a pantry inventory sheet, a glossary and the sources.

What This Book Is and Is Not

This is a practical guide for home cooks. It is not a substitute for the full USDA Complete Guide to Home Canning, which covers many more foods. When you want to can something not in this book, get

the tested directions from the NCHFP website (nchfp.uga.edu) or your county Extension office.

Food safety guidance changes as research continues. The process times here were checked against the sources listed at the back as of November 18, 2026. Before you can something for the first time, take a minute to check the NCHFP site for any update.

If you think someone may have botulism, call 911 or go to an emergency room right away. The Centers for Disease Control and Prevention (CDC) lists symptoms such as double or blurry vision, drooping eyelids, slurred speech, trouble swallowing or breathing, and muscle weakness. Botulism is a medical emergency.

Chapter 1: Why Tested Methods Matter

Canning works by heating food in a sealed jar long enough, and hot enough, to destroy the germs that would spoil it, then sealing out new ones. Get the heat right and the food keeps on the shelf. Get it wrong and the jar can look perfectly fine while something dangerous grows inside.

The Germ You Are Up Against

The main danger in home canning is Clostridium botulinum, the germ that causes botulism. It lives in soil and is found on fresh produce and meat. Its spores are harmless on fresh food in open air. The problem starts when those spores end up in a sealed jar of moist, low-acid food.

According to the NCHFP, the botulism germ can produce a deadly toxin within 3 to 4 days in a moist, low-acid food held between 40 and 120 degrees F with less than 2 percent oxygen. A sealed jar of underprocessed green beans on a pantry shelf is exactly that setting.

The spores are tough. Boiling water at 212 degrees F does not reliably destroy them in low-acid food in any practical amount of time. The NCHFP says low-acid foods must be heated to 240 to 250 degrees F, which only a pressure canner can reach in a home kitchen, at 10 to 15 pounds of pressure. At those temperatures, the needed time runs from 20 to 100 minutes depending on the food and jar size. To get the same effect in a boiling-water canner would take 7 to 11 hours.

Acid Foods and Low-Acid Foods

Every canning decision starts with one question: is this food acid or low-acid? The dividing line is a pH of 4.6.

Type	pH	Examples	Canning method
Acid foods	4.6 or lower	Most fruits, jams and jellies, pickles, sauerkraut, fruit butters	Boiling-water canner (or tested steam canner, Chapter 3)
Tomatoes and figs	Near 4.6, some slightly above	Tomatoes, tomato juice, figs	Add acid, then boiling-water canner, or use a tested pressure process
Low-acid foods	Above 4.6	All fresh vegetables (except most tomatoes), meat, poultry, seafood, milk, soups, stock	Pressure canner only

In acid foods, botulism spores cannot grow, so the boiling-water canner only has to destroy molds, yeasts and other spoilage germs. In low-acid foods, the spores can grow, so only the higher heat of a pressure canner is safe. The USDA says pressure canning is the only recommended method for canning meat, poultry, seafood and vegetables.

Mixtures follow the lowest-acid ingredient. A salsa or spaghetti sauce with onions and peppers is not the same as plain tomatoes. That is why you should only can mixtures from tested recipes.

Why You Cannot Make Up a Recipe

A tested process time is not a guess. It comes from lab testing of that food, packed that way, in that jar size, to see how fast heat reaches the coldest spot in the center of the jar. Change any of those and the heat moves differently.

- **Thicker food heats slower.** Flour, cornstarch, rice, pasta, noodles, cream, milk, and mashed or pureed starchy vegetables all slow the heat. The USDA says not to add noodles, pasta, rice, flour, cream, milk or other thickeners to home canned soups. Add them when you open the jar and heat it.

- **Bigger jars need more time.** Do not use a pint time for a quart. Times for half-pints and pints are the same, and times for pint-and-a-half and quart jars are the same, but only when the directions say so.
- **More low-acid ingredients lower the acid.** Adding extra onions, peppers or garlic to a tomato recipe can push it into unsafe territory.
- **Packing style matters.** Raw-packed food often needs more time than hot-packed, and tightly packed food heats slower.

Methods That Are Not Safe

The USDA and NCHFP list these as not recommended. Some of them are still passed around by well-meaning friends and online videos.

- **Open-kettle canning.** Pouring hot food into jars and capping them without processing. There is no processing to kill germs that get in while filling.
- **Oven canning.** Dry oven heat does not heat jars evenly or reliably, and jars can break.
- **Microwave or dishwasher canning.** Neither reaches or holds a tested temperature.
- **Canning powders.** They do not replace heat processing.
- **Boiling-water canning low-acid foods.** No safe time exists for vegetables or meat in a boiling-water canner.
- **Small pressure saucepans and electric multi-cookers.** The NCHFP does not recommend its canning processes for electric multi-cookers. More on this in Chapter 3.
- **Pressures above 15 pounds.** Not recommended for home equipment.

Signs of Trouble, and the One Big Warning

Spoiled canned food sometimes shows signs: a bulging lid, a broken seal, spurting liquid, mold, foam, a bad smell or cloudy liquid where

there should not be any. But food with botulism toxin can look and smell normal. That is why the method matters more than the inspection.

> **Never taste to test** Never taste food from a jar that has lost its seal, shows signs of spoilage, or that you are not sure was processed the right way. Chapter 14 explains how to handle and get rid of suspect jars safely.

Your Next Step

Read Chapter 2 and write your home's elevation on the inside cover of this book. Every table you use from here on depends on it.

Chapter 2: Know Your Altitude

At sea level, water boils at 212 degrees F. As you go higher, the air pressure drops and water boils at a lower temperature. Lower boiling temperature means less heat reaches the food in the same amount of time. To make up for it, you add time in a boiling-water canner and add pressure in a pressure canner.

The NCHFP warns that food may spoil if you fail to add process time for lower boiling temperatures at elevations above 1,000 feet. In Northern Nevada, that applies to nearly every kitchen.

Find Your Elevation

Use the elevation of the house where you do the canning, not the nearest town. Elevation can change by hundreds of feet across one valley.

- A topographic map or a mapping app that shows elevation for your address.
- Your county Extension office. The NCHFP suggests calling your county Extension agent if you do not know your elevation. In Nevada, that is University of Nevada, Reno Extension.
- Local planning, surveying or well records.

For reference, Dayton is listed at about 4,397 feet. If your home is near a boundary line in the tables, use the higher range. Going up one column is always the safe direction.

My elevation Write it here and on your canning log: _____ feet. Boiling-water column: _____ Dial-gauge pressure: _____ Weighted-gauge pressure: _____

Boiling-Water Canner Adjustments

For boiling-water canning, you add minutes. The amount depends on the food, so each table in this book shows the times for each altitude range. Most USDA tables for fruits and tomatoes use four columns:

Elevation	Typical column
0 to 1,000 feet	Base time
1,001 to 3,000 feet	Usually base time plus 5 minutes
3,001 to 6,000 feet	Usually base time plus 10 minutes
Above 6,000 feet	Usually base time plus 15 minutes

Some products, such as jams, jellies and pickles, use three columns: 0 to 1,000 feet, 1,001 to 6,000 feet, and above 6,000 feet. The "plus 5, 10, 15" pattern is common but not universal, so always read the time from the table for that food rather than doing the math yourself.

Pressure Canner Adjustments

For pressure canning, you keep the same time and raise the pressure. How you raise it depends on the type of gauge.

Gauge type	0 to 1,000 ft	1,001 to 2,000 ft	2,001 to 4,000 ft	4,001 to 6,000 ft	6,001 to 8,000 ft
Dial gauge	11 lb	11 lb	12 lb	13 lb	14 lb
Weighted gauge	10 lb	15 lb	15 lb	15 lb	15 lb

These are the pressures the USDA uses for the vegetables, meats and stocks in this book. A weighted gauge only comes in 5, 10 and 15 pound settings, so it cannot make small steps. Above 1,000 feet, you

move up to 15 pounds. A dial gauge can be set to the exact pressure, which is why its column has more steps.

Around Dayton At about 4,400 feet: use the 3,001 to 6,000 foot column for most boiling-water foods, the 1,001 to 6,000 foot column for jams, jellies and pickles, 13 pounds on a dial gauge, and 15 pounds on a weighted gauge. If your home is above 6,000 feet, every one of those moves up.

Other Things Altitude Changes

- **Sterilizing empty jars.** Boil 10 minutes at up to 1,000 feet, plus 1 more minute for each additional 1,000 feet. At about 4,400 feet, that comes to about 14 minutes, rounding up.
- **The jelly point.** Jam and jelly made without added pectin sets at a lower temperature as you go up. See Chapter 10.
- **Boiling suspect low-acid food.** The extra boiling time for home canned vegetables before tasting goes up with altitude. See Chapter 14.

Your Next Step

Find your elevation, fill in the box above, and copy those numbers onto a card you keep with your canner.

Chapter 3: Equipment

You do not need much to start, but what you use has to be the right kind. Most of this list lasts for years. Lids are the only part you buy new each time.

Jars

- **Use Mason-type canning jars.** The USDA calls regular and wide-mouth Mason-type threaded jars with self-sealing lids the best choice. Common sizes are half-pint, pint, pint-and-a-half and quart. Half-gallon jars are only for a few very acid juices, so leave them out of this book's recipes.
- **Check every jar.** Run a finger around the rim before each use. A chip or crack on the sealing edge will keep the lid from sealing. Retire jars with cracks or chips.
- **Skip mayonnaise and other store jars.** The USDA says they are not recommended for pressure canning because they break too often, and they seal less reliably even in a boiling-water canner.
- **Do not use old-style closures.** Wire-bail jars with glass lids, zinc caps and jars that cannot take a two-piece lid are not recommended.

Lids and Bands

The standard closure is a two-piece lid: a flat metal lid with a sealing compound, and a threaded screw band that holds it in place during processing.

- **Use new flat lids every time.** The sealing compound is made for one use.
- **Buy only what you will use in about a year.** The USDA says lid gaskets work well for at least 5 years from manufacture,

but older stock can fail. Do not use dented or bent lids or lids with gaps in the sealing compound.
- **Follow the lid maker's directions** for whether to warm the lids before use.
- **Bands can be reused** as long as they are not rusted, dented or bent.

Boiling-Water Canner

A boiling-water canner is a large, deep pot with a lid and a rack that keeps jars off the bottom.

- It must be deep enough to hold at least 1 inch of briskly boiling water over the jar tops, plus room to boil. For processes over 30 minutes, the USDA calls for 2 inches over the tops.
- On an electric range, it needs a flat bottom and should be no more than 4 inches wider than the burner.
- Most hold 7 quart jars or 8 to 9 pints.
- A large stockpot with a rack and a tight lid works, if it is deep enough.

Pressure Canner

A pressure canner is a heavy pot with a lid that locks and seals, a vent pipe, a safety fuse or plug, and a gauge. It is not the same as a pressure cooker or a pressure saucepan.

- **Size.** The USDA says a canner should hold at least 4 quart jars to count as a pressure canner for USDA processes.
- **Dial gauge.** Shows the exact pressure. It can drift over time, so have it checked every year before canning season. The NCHFP says to replace a gauge that reads off by more than 2 pounds at 5, 10 or 15 pounds. Many county Extension offices and some manufacturers test gauges.

- **Weighted gauge.** A weight that sits on the vent pipe and rocks or jiggles to hold 5, 10 or 15 pounds. It does not need testing, but keep the vent clean.
- **Use a listed canner.** The USDA says to use only canners approved by Underwriters Laboratories (UL).
- **Burners.** The NCHFP says not to use a pressure canner on an outdoor LP gas burner or a gas range burner over 12,000 British Thermal Units (BTU), unless the canner maker says otherwise.
- **Care.** Clean the gasket and vent pipe before each use. Do not scratch or pick at the safety fuse. Replace the gasket when it gets hard or cracked.

Steam Canners

An atmospheric steam canner uses a small amount of water to surround jars with steam instead of covering them with boiling water. The 2015 USDA guide said steam canners were not recommended while research continued. Since then, University of Wisconsin research has shown that some models can be used safely within limits. Michigan State University Extension and University of Maine Extension guidance says:

- Use them only for acid foods (fruits, acidified tomatoes, pickles, jams and jellies) with a tested recipe.
- Use them only for recipes with a process time of 45 minutes or less.
- Adjust time for altitude, just as for a boiling-water canner.
- Follow the canner maker's directions for heating and venting.

A steam canner never replaces a pressure canner. If you are new to canning, a standard boiling-water canner is the simplest place to start.

Electric Multi-Cookers

Electric pressure cookers and multi-cookers are handy for cooking, but the NCHFP does not recommend its canning processes for them. Their pressure and temperature behave differently from a stovetop pressure canner, and the tested times do not apply. Some appliances are built and sold as electric canners with their own tested directions. If you use one, follow its own instructions exactly, and do not apply the stovetop times in this book to it.

Small Tools

- ☐ Jar lifter (grips jars below the neck)
- ☐ Wide-mouth canning funnel
- ☐ Headspace tool or small ruler
- ☐ Plastic bubble remover or thin plastic spatula
- ☐ Clean cloths or paper towels for wiping rims
- ☐ Timer or clock
- ☐ Large pots for cooking and syrup
- ☐ Colander, sharp knives, cutting boards, measuring cups and spoons
- ☐ Food mill or sieve (for tomatoes and applesauce)
- ☐ Kitchen scale
- ☐ Bottled lemon juice or citric acid (for tomatoes)
- ☐ Canning or pickling salt, vinegar labeled 5 percent acidity
- ☐ Labels or a marker
- ☐ Towels or a wooden cutting board for cooling jars
- ☐ Thermometer (candy or jelly type, for jelly and pickle pasteurizing)

Your Next Step

Pick the method you will use first. If it is tomatoes, fruit, jam or pickles, gather a boiling-water canner. If it is vegetables or meat, start with a pressure canner and get the dial gauge tested.

Chapter 4: Getting Ready: Jars, Food and Packing

Most canning problems start before the jars ever go into the canner. Good produce, clean jars, the right headspace and a clean rim do more for a good seal than anything else.

Pick Good Food

Canning does not improve food. University of Illinois Extension puts it plainly: preserving food does not improve its quality. Use fresh, firm produce at its peak, with no mold, rot or bruised spots. Can it as soon as you can after picking or buying. For meat, start with fresh, chilled meat and trim away excess fat.

Wash and Heat the Jars

1. Wash jars in hot, soapy water and rinse well, or run them through a dishwasher.
2. Keep the jars hot until you fill them. The USDA suggests holding them in simmering water at about 180 degrees F. A dishwasher on a heated dry cycle or a canner of hot water also works.
3. Prepare lids as the lid maker directs.

Washing and heating do not sterilize jars. That is fine for most foods, because the processing does that job. Jars must be sterilized first only when the food is processed for less than 10 minutes in a boiling-water canner, which mainly means some jams, jellies and pickles.

Sterilizing empty jars Set the jars right side up on the rack in a boiling-water canner, fill the canner and jars with water to 1 inch above the tops, and boil 10 minutes at up to 1,000 feet. Add 1 minute for each additional 1,000 feet. Keep them in the hot water until you fill them.

Hot Pack and Raw Pack

	Hot pack	Raw pack
What it means	Heat food in liquid to boiling, simmer 2 to 5 minutes, fill jars loosely with hot food and hot liquid	Fill jars tightly with raw, unheated food, then add hot liquid
Good points	Less floating, better color, more food per jar, better for boiling-water canning	Faster to prepare, works well for many pressure-canned foods
Watch out for	Takes more prep time	Food floats and shrinks; trapped air can discolor food within 2 to 3 months; often needs longer processing

Use only the pack style the recipe gives a time for. If a table lists only a hot pack time, do not raw pack.

Headspace

Headspace is the empty space between the top of the food or liquid and the rim of the jar. It lets food expand and lets air be driven out to form a vacuum seal.

Food	Usual headspace
Jams and jellies	1/4 inch
Fruits, tomatoes and pickles in a boiling-water canner	1/2 inch
Vegetables and meats in a pressure canner	1 to 1-1/4 inches

Always use the headspace given in the recipe. Too little and food can boil out and keep the lid from sealing. Too much and the jar may not drive out enough air, which can cause poor seals and discolored food at the top.

Fill, De-Bubble, Wipe, Lid

1. Set a hot jar on a towel. Use a funnel to fill it with food, then liquid, to the right headspace.
2. Slide a plastic bubble remover or thin plastic spatula down between the food and the jar in a few places to release trapped air. Add more liquid if the level drops.
3. Check the headspace again.
4. Wipe the rim and threads with a clean, damp cloth. Any food, seed or grease on the rim can stop a seal. For meat, wipe the rim well because fat on the rim is a common cause of seal failure.
5. Center a lid on the jar and screw the band on fingertip tight. That means snug, but not forced. A band that is too tight can keep air from venting and cause the lid to buckle. One that is too loose can let liquid escape.
6. Put the jar in the canner right away.

Salt, Sugar and Acid

- **Salt** in canned vegetables and meats is for flavor only and can be left out. Use canning or pickling salt for best results.
- **Sugar** in canned fruit helps color, flavor and texture, but fruit can be canned safely in water or juice.
- **Sugar in jams and jellies** is part of how they set and keep. Use the amount in the recipe, or use a pectin made for less sugar.
- **Acid** in tomatoes and pickles is for safety. Never cut it.

Your Next Step

Before your first batch, practice filling a jar with water to 1/2 inch and 1 inch headspace so you can see what each looks like.

Chapter 5: Boiling-Water Canning, Step by Step

The boiling-water canner is for acid foods: most fruits, acidified tomatoes, jams, jellies and pickles. These are the USDA steps, in order.

The Steps

1. **Fill the canner.** Put the rack in the canner and fill it about halfway with clean water before you start the food. That is about right for a load of pints. You will adjust the level later.
2. **Preheat the water.** Heat the water to about 140 degrees F for raw-packed food or about 180 degrees F for hot-packed food. Hot water that is not yet boiling keeps the jars from breaking when they go in.
3. **Load the jars.** Fill and close the jars as shown in Chapter 4. Set them on the rack and lower it, or lower them one at a time with a jar lifter. Keep the jars upright and grip below the band.
4. **Cover the jars.** Add boiling water until it is at least 1 inch over the jar tops. For processes longer than 30 minutes, cover by at least 2 inches.
5. **Bring it to a full boil.** Put the lid on and turn the heat to high until the water boils hard.
6. **Start timing.** Set a timer for the full process time for your altitude only once the water is at a full, rolling boil.
7. **Keep it boiling.** Keep the lid on and keep the water boiling the whole time. You can lower the heat a little, as long as the boil stays steady. If the water stops boiling at any point, bring it back to a full boil and start the timing over from the beginning.

8. **Keep the jars covered.** Add boiling water if the level drops below the tops.
9. **Finish.** When time is up, turn off the heat and take off the lid. Wait 5 minutes.
10. **Remove the jars.** Lift them straight up with a jar lifter, without tipping. Set them on a towel or board, at least 1 inch apart, away from drafts.
11. **Let them cool.** Leave them alone for 12 to 24 hours. Chapter 7 covers what to do next.

> **Timing rule** The clock starts at a full boil and must restart if the boil stops. A few minutes short can mean spoiled food. Set a timer; do not guess.

Common Mistakes

- Starting the timer when the jars go in, instead of when the water boils.
- Using a sea-level time at a Nevada elevation.
- Letting the water level drop below the jar tops.
- Cooling jars in cold water or a cold draft. The NCHFP says cooling jars in cold water can lead to spoiled food.
- Crowding a canner so jars touch the sides or each other tightly. Water has to move around every jar.

Your Next Step

For your first batch, try something forgiving such as applesauce or a jam. Chapter 9 and Chapter 10 have the directions.

Chapter 6: Pressure Canning, Step by Step

A pressure canner is the only safe way to can vegetables, meat, poultry, seafood, soups and stock at home. It is not hard, but it does demand attention. Read your canner's manual first. Where the manual and these steps differ, follow the manual for how your canner works and these steps for the times and pressures.

Before Each Use

- ☐ Dial gauge tested this year (dial-gauge canners only)
- ☐ Gasket soft, clean and seated
- ☐ Vent pipe clear: hold the lid to the light and look through it
- ☐ Safety fuse or plug in place and not damaged
- ☐ Rack in the bottom of the canner
- ☐ Your elevation and the right pressure written down

The Steps

1. **Add the rack and water.** Unless your canner's directions say otherwise, the NCHFP says to add 2 to 3 inches of water. Heat it to about 180 degrees F for hot-packed food or 140 degrees F for raw-packed food. Do not let it boil away.
2. **Load the jars.** Set filled, closed jars on the rack with a jar lifter, upright.
3. **Lock the lid.** Fasten it securely. Leave the weight off the vent pipe, or leave the petcock open.
4. **Vent for 10 minutes.** Turn the heat to high. When steam pours steadily from the vent pipe in a funnel shape, set a timer and let it vent for a full 10 minutes. This drives out the air. Air

trapped in the canner lowers the temperature at a given pressure and can leave food underprocessed.

5. **Close the vent.** Put the weight or weighted gauge on the vent pipe, or close the petcock. The canner will come up to pressure in about 3 to 10 minutes.
6. **Start timing at pressure.** With a dial gauge, start when it reads the right pressure for your altitude. With a weighted gauge, start when it jiggles or rocks the way the maker describes.
7. **Hold the pressure.** Adjust the heat to keep the pressure at or a little above the target. Big swings up and down can force liquid out of the jars.
8. **If the pressure drops below the target at any time, bring it back up and start the timing over from the beginning.** Use the full original time.
9. **Turn off the heat.** When time is up, turn off the burner and, if you can, move the canner off the hot burner. Let it cool on its own.
10. **Let the pressure drop naturally.** Do not run cold water over the canner, open the vent early or lift the weight to hurry it. Forced cooling can cause spoilage, liquid loss, seal failure and a warped lid. Wait until the dial reads zero or the lid lock drops. Even then, tilt the weight carefully before lifting it off. For older heavy canners without a dial gauge, the NCHFP says cooling takes about 30 minutes for pints and 45 minutes for quarts.
11. **Wait 10 more minutes.** After the canner is fully depressurized and the weight is off or the petcock open, wait 10 minutes. Then unfasten the lid and lift it with the far side up, so the steam goes away from your face.

12. **Remove the jars.** Lift them out one at a time without tipping. Set them on a towel or rack, at least 1 inch apart, away from cold surfaces and drafts.
13. **Cool 12 to 24 hours.** Do not tighten the bands or press on the lids until the jars are completely cool.

> **Two rules that keep you safe** Vent 10 minutes before you close the vent. Restart the timer any time the pressure falls below the target. Skipping either one can leave food underprocessed with no outward sign.

How Long It Takes

The NCHFP gives this rough breakdown for a full load: 12 to 15 minutes to start venting, 10 minutes of venting, about 5 minutes to build pressure, the process time itself, and 20 to 60 minutes to cool down. Most loads take 55 to 100 minutes from start to finish, and longer for meat. Plan your day around it, and do not leave the kitchen while the canner is under pressure.

After Canning

- Remove the bands from sealed jars once they are cool, and wash off any residue on jars and lids.
- Refrigerate any jars that did not seal and use them first, or reprocess them as described in Chapter 7.
- Dry the canner, lid and gasket. Take out removable petcocks and safety valves, wash and dry them, and store the canner with the lid upside down or loosely set on so the gasket does not flatten.

Your Next Step

Run a practice load with jars of water. Vent, bring it to pressure, hold it for 10 minutes, and let it cool down. You will learn how your burner and canner behave without risking a batch of food.

Chapter 7: After the Canner: Seals, Labels and Storage

The work is not done when the jars come out. What you do in the next day decides whether the food is safe to put on the shelf.

Cooling

Leave the jars alone for 12 to 24 hours at room temperature. Do not cover them with towels, set them in a draft, or move them around. You may hear lids pop as they seal. That is normal.

Do not tighten the bands after processing. The USDA says retightening can break the seal that is forming.

Testing the Seal

After 12 to 24 hours, test every jar.

1. Remove the band.
2. Look at the lid. A sealed lid curves down slightly in the center.
3. Press the center of the lid with a finger. If it does not move or spring back, it is sealed. If it pops up and down, it did not seal.

Any jar that fails one of these checks did not seal.

Jars That Did Not Seal

You have three choices for unsealed jars, and you need to act within 24 hours:

- **Refrigerate it** and use it within about a week, the NCHFP says.
- **Freeze it.** The NCHFP says the food can be frozen for up to a year, with about 1 inch of headspace so it can expand. You can also move it to a freezer container.
- **Reprocess it within 24 hours.** Remove the lid, check the jar rim for nicks, put on a new prepared lid, and process again

using the same method and full time. Reprocessed food will be softer.

Clean, Label and Date

1. Wash the outside of the jars and lids to remove any food or residue. The NCHFP warns that residue left on lids and rims can grow mold in storage, even with a little humidity.
2. Dry the jars well.
3. Store them without bands. The NCHFP recommends storing jars without bands, because it keeps the lids dry and makes a failed seal easy to spot. Wash and dry the bands and keep them for next time.
4. Label each lid with what is in it and the date. Add a batch number if you canned more than one load that day, so you can trace a problem back to its load.

Where to Store

The NCHFP says to store canned food in a clean, cool, dark, dry place, at 50 to 70 degrees F for best quality.

- Do not store jars above 95 degrees F, near hot pipes, a range, a furnace, in an uninsulated attic, or in direct sunlight.
- Keep them dry. Dampness can rust lids and break seals.
- If jars might freeze, as in an unheated garage or shed in a Nevada winter, wrap them in newspaper and put them in heavy cartons. Freezing does not cause spoilage unless the seal breaks, but it can soften the food.
- The NCHFP notes that one jar maker advises stacking no more than two layers high. Single layers make it easiest to spot a lid that has popped.

How Long It Keeps

Can no more food than you will use within a year, the NCHFP advises, unless the directions for a specific food say otherwise. After a year, quality starts to drop. Chapter 17 covers rotation.

Your Next Step

Set up a shelf for “this year’s jars” and another for “use first,” and put every new batch on the back of the first shelf.

Chapter 8: Tomatoes

Tomatoes are the food most home canners start with, and the one where an old family method most often goes wrong. Some tomatoes have a pH slightly above 4.6, so the USDA requires added acid for every jar of tomatoes processed in a boiling-water canner. This chapter uses the University of Georgia tested directions (publication FDNS-E-43-2, revised May 2015), which follow the USDA guide.

Add Acid to Every Jar

Jar size	Bottled lemon juice	or Citric acid	or Vinegar (5 percent)
Pint	1 tablespoon	1/4 teaspoon	2 tablespoons
Quart	2 tablespoons	1/2 teaspoon	4 tablespoons

- Put the acid right in the jar before you fill it.
- Use bottled lemon juice, not fresh. Bottled juice has a steady acid level.
- Vinegar works but may change the flavor.
- Never cut the acid to change the taste.

Choosing and Peeling Tomatoes

Use firm, ripe tomatoes free of disease and rot. Tomatoes that are overripe, soft or bruised are best eaten fresh or frozen.

To peel, dip tomatoes in boiling water for 30 to 60 seconds, until the skins split, then plunge them into cold water. The skins slip off. Remove the cores and any green or bruised spots.

Crushed Tomatoes (Hot Pack)

Crushed tomatoes are the most useful all-purpose pack, good for soups, stews and sauce.

1. Wash, peel and quarter the tomatoes.
2. Heat about 1 pound of the quarters in a large pot, crushing them with a spoon to release juice. Keep stirring while they come to a boil.
3. Slowly add the rest of the quarters, stirring. They do not all need to be crushed; they soften as they cook.
4. Boil gently for 5 minutes.
5. Add acid to the hot jars. Add salt if you like: 1/2 teaspoon per pint or 1 teaspoon per quart.
6. Fill the jars right away with hot tomatoes, leaving 1/2-inch headspace. Remove air bubbles, wipe rims and put on lids.
7. Process in a boiling-water canner.

Crushed tomatoes	0 to 1,000 ft	1,001 to 3,000 ft	3,001 to 6,000 ft	6,001 to 8,000 ft
Pints	35 min	40 min	45 min	50 min
Quarts	45 min	50 min	55 min	60 min

Whole or Halved Tomatoes Packed in Water (Hot Pack)

1. Wash and peel the tomatoes. Leave them whole or cut them in half.
2. Put them in a large pot, cover with water and boil gently for 5 minutes.
3. Add acid to the hot jars, plus salt if you like.
4. Fill the jars with hot tomatoes, then cover with the hot cooking liquid, leaving 1/2-inch headspace. Remove air bubbles, wipe rims and put on lids.
5. Process in a boiling-water canner.

Whole or halved, in water	0 to 1,000 ft	1,001 to 3,000 ft	3,001 to 6,000 ft	6,001 to 8,000 ft
Pints	40 min	45 min	50 min	55 min
Quarts	45 min	50 min	55 min	60 min

Tomato Juice (Hot Pack)

1. Wash, core and quarter the tomatoes.
2. Heat about 1 pound at a time in a pot, crushing as you go, and keep adding the rest while it boils.
3. Simmer 5 minutes.
4. Press through a sieve or food mill to remove skins and seeds.
5. Add acid to the jars. Bring the juice back to a boil, add salt if you like, and fill the jars, leaving 1/2-inch headspace.
6. Process in a boiling-water canner.

Tomato juice	0 to 1,000 ft	1,001 to 3,000 ft	3,001 to 6,000 ft	6,001 to 8,000 ft
Pints	35 min	40 min	45 min	50 min
Quarts	40 min	45 min	50 min	55 min

Salsa and Sauces

Salsa, spaghetti sauce, barbecue sauce and ketchup all mix tomatoes with lower-acid foods such as onions, peppers and garlic. Each needs its own tested recipe with its own acid and time. Do not can your own salsa or sauce recipe. Use a tested one from the NCHFP or the USDA guide, or freeze your own recipe instead.

Old ways that are not safe Canning tomatoes without added acid, using an open-kettle method, or turning jars upside down to seal are all unsafe. If your family recipe does any of these, update it to the tested method.

Your Next Step

Buy bottled lemon juice before tomato season, and tape the acid table to the inside of your canning cabinet.

Chapter 9: Fruits and Applesauce

Fruit is acid food, so it goes in a boiling-water canner. It is a good place to build your skills. The directions here come from USDA Guide 2, Selecting, Preparing and Canning Fruit and Fruit Products.

Keeping Fruit From Darkening

Apples, peaches and pears turn brown quickly once cut. Drop the cut pieces into a solution of ascorbic acid and water as you work. Ascorbic acid is sold as a powder or as tablets, and in commercial fruit-fresh mixes. Follow the package directions, then drain the fruit before you pack it.

Syrups

Fruit can be canned in water, apple juice, white grape juice or a sugar syrup. Syrup helps the fruit hold its color, shape and flavor, but it is not needed for safety.

Syrup	About sugar	For 9 pints: water	For 9 pints: sugar
Very light	10 percent	10-1/2 cups	1-1/4 cups
Light	20 percent	9 cups	2-1/4 cups
Medium	30 percent	8-1/4 cups	3-3/4 cups
Heavy	40 percent	7-3/4 cups	5-1/4 cups

Heat the water and sugar together until the sugar dissolves and the syrup boils. The USDA says light corn syrup or mild honey can replace up to half of the sugar. The 9-pint amount is also enough for a 4-quart load.

Applesauce

1. Wash, peel and core the apples. Slice them into ascorbic acid solution to keep them from darkening, then drain.

2. Put the slices in an 8 to 10 quart pot and add 1/2 cup of water. Stir often to keep them from burning, and heat quickly until tender, 5 to 20 minutes depending on the apples.
3. Press through a sieve or food mill, or leave it chunky.
4. Add sugar if you like, about 1/8 cup per quart. Taste and add more if needed.
5. Bring the sauce back to a boil. Fill hot jars with hot sauce, leaving 1/2-inch headspace. Remove air bubbles, wipe rims and put on lids.

Applesauce, hot pack	0 to 1,000 ft	1,001 to 3,000 ft	3,001 to 6,000 ft	Above 6,000 ft
Pints	15 min	20 min	20 min	25 min
Quarts	20 min	25 min	30 min	35 min

Sliced Apples

1. Wash, peel and core the apples. Slice them into ascorbic acid solution, then drain.
2. Put the slices in a large pot with 1 pint of water or very light, light or medium syrup for every 5 pounds of sliced apples.
3. Boil 5 minutes, stirring now and then.
4. Fill hot jars with hot slices and hot liquid, leaving 1/2-inch headspace. Remove air bubbles, wipe rims and put on lids.

Sliced apples, hot pack	0 to 1,000 ft	1,001 to 3,000 ft	3,001 to 6,000 ft	Above 6,000 ft
Pints or quarts	20 min	25 min	30 min	35 min

The USDA notes that raw-packed apples make a poor quality product, so only a hot pack time is given.

Peaches

1. Dip peaches in boiling water for 30 to 60 seconds, then in cold water, and slip off the skins.
2. Cut them in half, remove the pits and slice if you like. Hold them in ascorbic acid solution, then drain.
3. Prepare very light, light or medium syrup, or use water, apple juice or white grape juice.
4. **Hot pack:** Bring the fruit to a boil in the syrup, water or juice. Fill hot jars with hot fruit and liquid, leaving 1/2-inch headspace. Place halves in layers, cut side down.
5. **Raw pack:** Fill hot jars with raw fruit, cut side down, and add hot syrup, water or juice, leaving 1/2-inch headspace. The USDA notes that raw packs make a lower quality product.
6. Remove air bubbles, wipe rims and put on lids.

Peaches	0 to 1,000 ft	1,001 to 3,000 ft	3,001 to 6,000 ft	Above 6,000 ft
Hot pack pints	20 min	25 min	30 min	35 min
Hot pack quarts	25 min	30 min	35 min	40 min
Raw pack pints	25 min	30 min	35 min	40 min
Raw pack quarts	30 min	35 min	40 min	45 min

Pears

1. Wash and peel the pears. Cut them in half and remove the cores. Hold them in ascorbic acid solution, then drain.
2. Prepare very light, light or medium syrup, or use apple juice, white grape juice or water.
3. Boil the pears 5 minutes in the syrup, juice or water.

4. Fill hot jars with hot fruit and liquid, leaving 1/2-inch headspace. Remove air bubbles, wipe rims and put on lids.

Pears, hot pack	0 to 1,000 ft	1,001 to 3,000 ft	3,001 to 6,000 ft	Above 6,000 ft
Pints	20 min	25 min	30 min	35 min
Quarts	25 min	30 min	35 min	40 min

Other Fruits

USDA Guide 2 covers many more fruits. Use those tested times rather than borrowing a time from a similar fruit. A pink or blue color in canned apples, pears or peaches is usually a harmless natural pigment change, according to the NCHFP.

Your Next Step

Pick one fruit that is in season near you and can a small batch of 4 to 5 pints to learn the rhythm.

Chapter 10: Jams and Jellies

Jams and jellies are acid, high-sugar foods, so they are processed for a short time in a boiling-water canner. USDA Guide 7 calls for Mason canning jars, self-sealing two-piece lids and a processing time adjusted for altitude. The directions here come from USDA Guide 7, Preparing and Canning Jams and Jellies.

What Makes Jam Set

A good set needs the right balance of fruit, pectin, acid and sugar. Some fruits, such as tart apples, crab apples and many grapes and blackberries, have enough natural pectin to set with long cooking. Most cooks use commercial pectin, which comes in powdered and liquid forms. They are not interchangeable: follow the directions that come with the pectin you buy.

- The USDA says to buy fresh pectin each year. Old pectin may give poor gels.
- Use the sugar the recipe calls for. Cutting sugar in a regular pectin recipe can keep it from setting. For less sugar, use a pectin labeled for low-sugar or no-sugar recipes and follow its directions.
- Do not double a recipe unless the pectin directions say you can.

Jars and Processing

Use Mason jars and two-piece lids. Fill hot jam or jelly into hot jars, leaving 1/4-inch headspace. Because the processing time is under 10 minutes at low elevations, the USDA calls for jars that were sterilized first (see Chapter 4).

Jams and jellies	0 to 1,000 ft	1,001 to 6,000 ft	Above 6,000 ft
Half-pints or pints	5 min	10 min	15 min

This table applies to jams without added pectin, jellies and jams with added pectin, and remade soft jellies. A few spreads, such as some reduced-sugar fruit spreads, have their own longer times. Use the time printed with the recipe.

Jam With Commercial Pectin

The pectin package insert is the tested recipe for jam made with that pectin. Each brand and type of pectin has its own fruit, sugar and acid amounts. Follow the insert exactly, then process using the table above.

Jam Without Added Pectin

This is the old-fashioned method: crushed fruit and sugar, boiled until thick. It takes more time and attention, but it needs nothing from the store but sugar.

Fruit	Crushed fruit	Sugar	Lemon juice	Yield
Berries (blackberries, raspberries, strawberries and similar)	4 cups	4 cups	none	3 to 4 half-pints
Peaches	5-1/2 to 6 cups	4 to 5 cups	2 tablespoons	6 to 7 half-pints

1. Sterilize the jars (Chapter 4).
2. Wash and crush the fruit, measure it into a large pot, and add the sugar and lemon juice if listed.
3. Bring it slowly to a boil, stirring until the sugar dissolves, then boil hard, stirring often so it does not scorch.
4. Cook until it reaches the jelly point for your elevation (table below), or until it passes the cold plate test.

5. Remove from heat and skim off any foam.
6. Fill hot jars, leaving 1/4-inch headspace. Wipe rims, put on lids and process using the table above.

The Jelly Point by Altitude

For jam and jelly made without added pectin, cook to 8 degrees F above the boiling point of water. Because water boils at a lower temperature as you go up, so does the jelly point.

Elevation	Sea level	1,000 ft	2,000 ft	3,000 ft	4,000 ft	5,000 ft	6,000 ft	7,000 ft	8,000 ft
Jelly point	220 F	218 F	216 F	214 F	212 F	211 F	209 F	207 F	205 F

At about 4,400 feet, aim for 212 degrees F, or test your thermometer by checking the temperature of boiling water in your own kitchen and adding 8 degrees.

Cold plate test Guide 7 also allows a refrigerator test. Chill a small plate. Put a spoonful of the hot jam on it and set it in the freezer for a few minutes. If it gels and does not run, it is done. Take the pot off the heat while you test so it does not overcook.

Soft Jam or Runny Jelly

Some jellies firm up after a few days, so wait before deciding a batch failed. If it stays too soft, the USDA has tested directions for remaking soft jelly with powdered pectin, liquid pectin, or without added pectin. You can also use it as a syrup for pancakes or ice cream.

Refrigerator and Freezer Jams

Freezer jams and refrigerator spreads are not processed, so they must be kept cold. Follow the pectin maker's directions for how long they keep. The USDA refrigerated spreads made with gelatin must be used within 4 weeks.

Your Next Step

Buy a fresh box of pectin and make one batch of jam using the recipe in the box, processing it for your altitude.

Chapter 11: Pickles

Pickles are low-acid vegetables made safe by adding enough vinegar, or by fermenting. The acid is what makes them safe in a boiling-water canner, so the vinegar-to-vegetable balance in a tested recipe is not something to play with. The recipes here come from USDA Guide 6, Preparing and Canning Fermented Foods and Pickled Vegetables.

Ingredients That Matter

- **Vinegar.** Use vinegar labeled 5 percent acidity. Every Guide 6 recipe calls for it. Do not use homemade vinegar or vinegar of unknown strength, and do not dilute vinegar beyond the recipe.
- **Salt.** Use canning or pickling salt. Table salt is safe, but the anti-caking agents in it can cloud the brine. Flake salt is not recommended. Reduced-sodium salt substitutes can be used only in quick pickle recipes, not in fermented pickles.
- **Cucumbers.** Use pickling varieties, fresh and firm. The recipes call for cutting a thin slice off the blossom end.
- **Water.** The NCHFP lists minerals in hard water as a cause of cloudy liquid and sediment. Soft water gives the best result.

Two Ways to Process

Most pickles are processed in a boiling-water canner for the time in the recipe. Some recipes also allow a **low-temperature pasteurization** treatment that gives a crisper pickle. Use it only when the recipe says you may.

Low-temperature pasteurization Put jars in a canner half full of warm water (120 to 140 degrees F). Add hot water to 1 inch above the jar tops. Heat the water to 180 to 185 degrees F and hold it in that range for 30 minutes, checking with a candy or jelly thermometer. The water must stay at 180 degrees F or more the whole time. Above 185 degrees F the pickles may soften.

Quick Fresh-Pack Dill Pickles

Makes about 7 to 9 pints.

- 8 pounds of 3 to 5 inch pickling cucumbers
- 2 gallons of water, for the brine soak
- 1-1/4 cups canning or pickling salt, divided
- 1-1/2 quarts vinegar (5 percent)
- 1/4 cup sugar
- 2 quarts water, for the pickling liquid
- 2 tablespoons whole mixed pickling spice
- About 3 tablespoons whole mustard seed (1 teaspoon per pint)
- About 14 heads of fresh dill (1-1/2 heads per pint) or 4-1/2 tablespoons dill seed (1-1/2 teaspoons per pint)

1. Wash the cucumbers. Cut 1/16 inch off the blossom end and discard it, but leave 1/4 inch of stem attached.
2. Dissolve 3/4 cup of the salt in 2 gallons of water. Pour it over the cucumbers and let them stand 12 hours. Drain.
3. Combine the vinegar, the remaining 1/2 cup of salt, the sugar and 2 quarts of water. Tie the mixed pickling spice in a clean white cloth, add it, and bring the mixture to a boil.
4. Fill hot jars with cucumbers. Add 1 teaspoon mustard seed and 1-1/2 heads of fresh dill per pint.

5. Cover with the boiling pickling liquid, leaving 1/2-inch headspace. Remove air bubbles, wipe rims and put on lids.
6. Process in a boiling-water canner, or use low-temperature pasteurization.

Quick dill pickles, raw pack	0 to 1,000 ft	1,001 to 6,000 ft	Above 6,000 ft
Pints	10 min	15 min	20 min
Quarts	15 min	20 min	25 min

Bread-and-Butter Pickles

Makes about 8 pints.

- 6 pounds of 4 to 5 inch pickling cucumbers
- 8 cups thinly sliced onions (about 3 pounds)
- 1/2 cup canning or pickling salt
- 4 cups vinegar (5 percent)
- 4-1/2 cups sugar
- 2 tablespoons mustard seed
- 1-1/2 tablespoons celery seed
- 1 tablespoon ground turmeric

1. Wash the cucumbers. Cut 1/16 inch off the blossom end and discard it. Cut into 3/16-inch slices.
2. In a large bowl, layer the cucumbers and onions with the salt. Cover with 2 inches of crushed or cubed ice. Refrigerate 3 to 4 hours, adding more ice as needed.
3. In a large pot, combine the vinegar, sugar and spices. Boil 10 minutes.
4. Drain the cucumbers and onions, add them to the pot, and slowly bring back to a boil.

5. Fill hot pint jars with the slices and cooking liquid, leaving 1/2-inch headspace. Remove air bubbles, wipe rims and put on lids.
6. Process in a boiling-water canner, or use low-temperature pasteurization.

Bread-and-butter pickles, hot pack	0 to 1,000 ft	1,001 to 6,000 ft	Above 6,000 ft
Pints or quarts	10 min	15 min	20 min

After processing, store the jars 4 to 5 weeks before eating so the flavor develops.

Fermented Pickles and Sauerkraut

Fermented dills and sauerkraut take weeks of careful temperature and brine control. They are well worth learning, but follow Guide 6 directions exactly, and never use reduced-sodium salt for them.

Refrigerator Pickles

Quick refrigerator pickles that are never processed are fine to make, but they must stay in the refrigerator. Do not store them on the shelf.

Your Next Step

Buy a jug of 5 percent vinegar and a box of pickling salt so you have them on hand when the cucumbers come in.

Chapter 12: Vegetables

Every fresh vegetable except most tomatoes is a low-acid food. That means a pressure canner, every time, with no exceptions. The directions here come from USDA Guide 4, Selecting, Preparing and Canning Vegetables and Vegetable Products.

Pressures for Every Vegetable in This Chapter

All of the vegetables below use the same pressures. Only the times change.

Gauge	0 to 1,000 ft	1,001 to 2,000 ft	2,001 to 4,000 ft	4,001 to 6,000 ft	6,001 to 8,000 ft
Dial gauge	11 lb	11 lb	12 lb	13 lb	14 lb
Weighted gauge	10 lb	15 lb	15 lb	15 lb	15 lb

Use 1-inch headspace for every vegetable in this chapter. Salt is optional: up to 1 teaspoon per quart.

Process Times at a Glance

Vegetable	Pack	Pints	Quarts
Snap and Italian beans (green and wax)	Hot or raw	20 min	25 min
Carrots, sliced or diced	Hot or raw	25 min	30 min
Corn, whole kernel	Hot or raw	55 min	85 min
Potatoes, white, cubed or whole	Hot	35 min	40 min
Sweet potatoes, pieces or whole	Hot	65 min	90 min
Dried beans or peas	Hot	75 min	90 min
Mixed vegetables	Hot	75 min	90 min

Snap and Italian Beans

About 2 pounds per quart. A 30-pound bushel makes 12 to 20 quarts.

1. Choose filled but tender, crisp pods. Discard any diseased or rusty pods.
2. Wash and trim the ends. Leave whole or cut or snap into 1-inch pieces.
3. **Hot pack:** Cover with boiling water, boil 5 minutes, and fill hot jars loosely with beans and hot cooking liquid, leaving 1-inch headspace.
4. **Raw pack:** Fill hot jars tightly with raw beans, leaving 1-inch headspace, and add boiling water to 1-inch headspace.
5. Remove air bubbles, wipe rims, put on lids and pressure can: pints 20 minutes, quarts 25 minutes.

Carrots

About 2-1/2 pounds without tops per quart.

1. Choose small carrots, about 1 to 1-1/4 inches across. Larger carrots are often too fibrous.
2. Wash, peel and rinse again. Slice or dice.
3. **Hot pack:** Cover with boiling water, bring to a boil and simmer 5 minutes. Fill hot jars, leaving 1-inch headspace, and add hot cooking liquid to 1-inch headspace.
4. **Raw pack:** Fill hot jars tightly with raw carrots, leaving 1-inch headspace, and add hot water.
5. Remove air bubbles, wipe rims, put on lids and pressure can: pints 25 minutes, quarts 30 minutes.

Whole Kernel Corn

About 4-1/2 pounds in the husk per quart.

1. Choose ears with slightly immature kernels of ideal eating quality. The USDA warns that some extra-sweet varieties and very immature kernels may turn brown when canned, so try a small batch first.
2. Husk the corn, remove the silk and wash.
3. Blanch the ears 3 minutes in boiling water.
4. Cut the kernels from the cob at about three-fourths of their depth. Do not scrape the cob.
5. **Hot pack:** To each quart of kernels in a pot, add 1 cup of hot water. Heat to boiling and simmer 5 minutes. Fill hot jars with corn and cooking liquid, leaving 1-inch headspace.
6. **Raw pack:** Fill hot jars with raw kernels, leaving 1-inch headspace. Do not shake or press down. Add fresh boiling water to 1-inch headspace.
7. Remove air bubbles, wipe rims, put on lids and pressure can: pints 55 minutes, quarts 85 minutes.

Cream-style corn is a separate product with its own tested process. Do not use the whole kernel time for it.

White Potatoes

About 2-1/2 to 3 pounds per quart.

1. Choose small to medium mature potatoes. Potatoes 1 to 2 inches across can be canned whole. The USDA notes that potatoes stored below 45 degrees F may discolor when canned.
2. Wash and peel. Drop them into ascorbic acid solution to keep them from darkening.
3. Cut into 1/2-inch cubes if you like. Drain.
4. Cook cubes 2 minutes in boiling water, or whole potatoes 10 minutes. Drain.

5. Fill hot jars with hot potatoes and fresh hot water, leaving 1-inch headspace. The NCHFP says to use fresh boiling water, not the starchy cooking water, to avoid cloudy liquid.
6. Remove air bubbles, wipe rims, put on lids and pressure can: pints 35 minutes, quarts 40 minutes.

Do not can mashed or pureed potatoes. Mash them after you open the jar.

Sweet Potatoes

About 2-1/2 pounds per quart.

1. Choose small to medium, mature sweet potatoes that are not too fibrous. Can them within 1 to 2 months after harvest.
2. Wash, then boil or steam until partly soft, 15 to 20 minutes. Remove the skins.
3. Cut medium potatoes so the pieces are about the same size. Do not mash or puree them.
4. Fill hot jars, leaving 1-inch headspace. Cover with fresh boiling water or syrup to 1-inch headspace.
5. Remove air bubbles, wipe rims, put on lids and pressure can: pints 65 minutes, quarts 90 minutes.

The USDA says it is not recommended to dry pack sweet potatoes.

Dried Beans or Peas

About 3/4 pound of dry beans per quart.

1. Sort and discard discolored seeds.
2. Soak in water 12 to 18 hours in a cool place. Or quick-soak: cover with water, boil 2 minutes, take off the heat, soak 1 hour, and drain.
3. Cover the soaked beans with fresh water and boil 30 minutes.

4. Fill hot jars with beans and cooking water, leaving 1-inch headspace.
5. Remove air bubbles, wipe rims, put on lids and pressure can: pints 75 minutes, quarts 90 minutes.

The NCHFP notes that dried beans that are not fully rehydrated soak up liquid in the jar. Soak them fully.

Mixed Vegetables

Makes about 7 quarts.

- 6 cups sliced carrots
- 6 cups cut whole kernel sweet corn
- 6 cups cut green beans
- 6 cups shelled lima beans
- 4 cups whole or crushed tomatoes
- 4 cups diced zucchini

You may change the proportions or substitute other vegetables, except leafy greens, dried beans, cream-style corn, squash and sweet potatoes.

1. Prepare each vegetable as you would to can it alone. Wash, trim and slice or cube the zucchini.
2. Combine everything in a large pot and add enough water to cover.
3. Boil 5 minutes.
4. Fill hot jars with hot pieces and liquid, leaving 1-inch headspace.
5. Remove air bubbles, wipe rims, put on lids and pressure can: pints 75 minutes, quarts 90 minutes.

Vegetables to Freeze or Pickle Instead

Some vegetables have no tested home canning process. The NCHFP says home canning is not recommended for mashed or pureed

pumpkin or winter squash; freeze the puree instead. Pumpkin and winter squash can be pressure canned only in 1-inch cubes by the USDA process. The NCHFP also says its recommendations for canning summer squash and zucchini on their own have been withdrawn. They can still go into the tested mixed vegetables recipe above, or be frozen or made into a tested pickle. When there is no tested process, freeze it (Chapter 15).

Soups

Vegetable, dried bean or pea, meat, poultry and seafood soups can be pressure canned by the tested NCHFP soup directions.

- Cook the meat and vegetables as you would to can them alone. Dried beans or peas must be fully rehydrated first.
- Fill jars halfway with the solid mixture, then add broth or other liquid, leaving 1-inch headspace.
- Process at the same pressures as vegetables: pints 60 minutes, quarts 75 minutes. If the soup contains seafood, process 100 minutes.
- Do not add noodles, pasta, rice, flour, cream, milk or other thickening agents. Add them when you heat the soup to serve.

Your Next Step

Start with green beans. They are forgiving, quick to process, and teach you every step of pressure canning.

Chapter 13: Meat, Poultry and Stock

Meat is the most demanding food to can, and the most rewarding. A shelf of canned chicken, beef and stock means a quick meal on any night, with or without power. It is all low-acid food, so it goes in a pressure canner only. The directions here come from USDA Guide 5, Preparing and Canning Poultry, Red Meats, and Seafoods.

Pressures

Meat uses the same pressures as vegetables.

Gauge	0 to 1,000 ft	1,001 to 2,000 ft	2,001 to 4,000 ft	4,001 to 6,000 ft	6,001 to 8,000 ft
Dial gauge	11 lb	11 lb	12 lb	13 lb	14 lb
Weighted gauge	10 lb	15 lb	15 lb	15 lb	15 lb

Process Times at a Glance

Product	Headspace	Pints	Quarts
Chicken or rabbit, without bones	1-1/4 inch	75 min	90 min
Chicken or rabbit, with bones	1-1/4 inch	65 min	75 min
Ground or chopped meat	1 inch	75 min	90 min
Strips, cubes or chunks of meat	1 inch	75 min	90 min
Meat stock (beef, chicken or turkey)	1 inch	20 min	25 min

Rules for All Meat

- Start with fresh, chilled meat from healthy animals. Keep it cold until you work with it.

- Trim away excess fat. Fat can creep onto the jar rim and is a common cause of seal failure, according to the NCHFP.
- Remove large bones from cubes and chunks.
- Wipe the jar rims very well, with a clean damp cloth, before putting on lids.
- Do not thicken. The USDA chili recipe in Guide 5 says plainly, do not thicken, and the soup directions forbid flour and other thickeners. Make gravy when you open the jar.
- Salt is optional, about 1 teaspoon per quart.

Chicken or Rabbit

1. Choose freshly killed and dressed, healthy animals. Large chickens are more flavorful than fryers. The USDA calls for chilling dressed chicken 6 to 12 hours before canning. For rabbits, soak 1 hour in water with 1 tablespoon of salt per quart, then rinse.
2. Remove excess fat. Cut the chicken into suitable sizes for jars, with or without bones.
3. **Hot pack (preferred):** Boil, steam or bake the meat until about two-thirds done. Add salt if you like. Fill hot jars with pieces and hot broth, leaving 1-1/4-inch headspace.
4. **Raw pack:** Add salt if you like. Fill hot jars loosely with raw meat pieces, leaving 1-1/4-inch headspace. Do not add liquid.
5. Remove air bubbles, wipe rims well, put on lids and pressure can.

Chicken or rabbit	Pints	Quarts
Without bones, hot or raw	75 min	90 min
With bones, hot or raw	65 min	75 min

Ground or Chopped Meat

For beef, lamb, pork, veal, venison or bulk sausage.

1. Choose fresh, chilled meat. With venison, add one part high-quality pork fat to three or four parts venison before grinding, if you like.
2. Shape into patties or balls, or cut cased sausage into 3 to 4 inch links, and cook until lightly browned. Ground meat may also be browned loose, without shaping.
3. Remove excess fat.
4. Fill hot jars with the pieces. Add boiling meat broth, tomato juice or water, leaving 1-inch headspace. Add salt if you like.
5. Remove air bubbles, wipe rims well, put on lids and pressure can: pints 75 minutes, quarts 90 minutes.

Strips, Cubes or Chunks of Meat

For beef, lamb, pork, veal or venison.

1. Choose quality chilled meat. Remove excess fat and large bones. Soak strong-flavored wild game 1 hour in brine (1 tablespoon salt per quart of water), then rinse.
2. **Hot pack:** Precook the meat until rare by roasting, stewing or browning in a small amount of fat. Fill hot jars with pieces and add boiling broth, meat drippings, water or tomato juice, leaving 1-inch headspace.
3. **Raw pack:** Fill hot jars with raw meat pieces, leaving 1-inch headspace. Do not add liquid.
4. Remove air bubbles, wipe rims well, put on lids and pressure can: pints 75 minutes, quarts 90 minutes.

Meat Stock

1. **Beef:** Saw or crack fresh, trimmed beef bones. Rinse and place them in a large pot, cover with water and simmer 3 to 4 hours.

2. **Chicken or turkey:** Place the carcass bones, with most of the meat removed, in a large pot, cover with water and simmer 30 to 45 minutes, or until the meat is tender.
3. Remove the bones. Strip off any meat and add it back to the broth if you like.
4. Cool the broth and skim off the fat. Reheat it to boiling.
5. Fill hot jars, leaving 1-inch headspace. Wipe rims, put on lids and pressure can: pints 20 minutes, quarts 25 minutes.

Fish and Seafood

Fish, clams, crab, oysters and shrimp each have their own Guide 5 directions, some with special jar sizes and long times. Smoked fish, for example, uses a measured 4 quarts of cool water in the canner, not the usual 2 to 3 inches. Follow Guide 5 exactly for any seafood, or freeze it instead.

Your Next Step

Can a load of chicken stock first. It has the shortest meat process and teaches you how your canner behaves with a long session on the stove.

Chapter 14: When Something Goes Wrong

Even careful canners have a jar fail now and then. Some problems only affect looks. Others mean the food is not safe. This chapter helps you tell the difference, and shows how to get rid of a bad jar without making anyone sick.

Check Every Jar Before You Open It

- ☐ The lid is still sealed and curved down
- ☐ No bulging, leaking or rust around the lid
- ☐ No mold, foam or unusual color inside
- ☐ When opened: no bad smell, no mold, nothing that looks wrong

If a jar fails any check, treat it as spoiled. Clemson Extension notes that a bulging lid or leaking container is a sign of spoilage. Remember that food with botulism toxin may show no signs at all.

> **Never taste to test** Do not taste food from a jar that shows signs of spoilage or that you are not sure was processed right. Clemson Extension says improperly canned low-acid foods should be thrown out or detoxified even when they show no visible signs of spoilage.

Boiling Home Canned Vegetables Before Eating

Some guidance advises boiling home canned low-acid foods before eating as an extra safety step. Clemson Extension puts it plainly: do not use home canned vegetables unless you have a way to boil them for 10 minutes before eating. The USDA adds 1 minute for each 1,000 feet above 1,000 feet, which means about 14 minutes at a

Dayton elevation. This step is a backstop, not a fix. It does not make an underprocessed jar safe to keep on the shelf.

Getting Rid of a Suspect Jar

These steps come from Iowa State University Extension and Clemson Extension, which follow USDA guidance.

If the Jar Is Still Sealed

Put the jar, unopened, in a heavy garbage bag. Close the bag tightly and put it in your regular trash, out of reach of children and pets.

If the Jar Is Unsealed, Open or Leaking

It must be detoxified before you throw it away.

1. Wear disposable rubber or heavy plastic gloves, and clothing or an apron you can bleach or throw away.
2. Carefully lay the jars and lids on their sides in an 8-quart or larger pot or canner. Wash your gloved hands.
3. Add hot water carefully, without splashing, until the jars are covered by at least 1 inch.
4. Cover the pot and bring it to a boil. Boil 30 minutes.
5. Let it cool, then throw away the jars, lids and food in the trash.

Cleaning Up

1. Wear rubber or heavy plastic gloves.
2. Mix 1 part unscented liquid household chlorine bleach (5 to 6 percent sodium hypochlorite) with 5 parts clean water.
3. Spray or wet every surface the food or liquid may have touched: counters, can opener, sink, utensils. Let it stand 30 minutes.
4. Wipe up with paper towels, put them in a plastic bag and throw them away.

5. Apply the bleach solution again, let it stand 30 minutes, then rinse.
6. Wash counters, containers, equipment and clothing. Throw the gloves away when you are done.

Do not breathe bleach fumes, and keep it off your skin.

Common Problems and What Causes Them

These come from the NCHFP table of causes and solutions.

Problem	Likely causes	What to do next time
Liquid lost from jars during processing	Pressure dropped suddenly or swung up and down; air bubbles not removed; jars packed too full; bands too loose; jars not fully covered in a boiling-water canner; starchy food soaked up liquid	Let canners cool naturally; hold steady heat; remove bubbles; use the right headspace; fully soak dried beans. Do not open a sealed jar to add liquid. Loss of liquid is not a sign of spoilage.
Jar did not seal	Chip or crack on the rim; food or fat on the rim; old or poorly prepared lid; bad band or wrong tightness; jars tipped or lifted by the lid while hot	Check rims; wipe them well; use new lids prepared as directed; fingertip-tight bands; keep jars upright. Deal with an unsealed jar within 24 hours (Chapter 7).
Food dark at the top of the jar	Air left in the jar; not enough liquid to cover the food; jar not processed after filling	Remove bubbles; keep food covered with liquid; process for the full time.
Color changes	Iron, zinc or copper in pans or water; overprocessing; produce too ripe or underripe; light in storage	Use the right utensils and soft water; follow times exactly; store in the dark. Pink or blue in apples, pears, peaches or cauliflower is a natural, harmless pigment.
Cloudy liquid	Starch from vegetables or potato cooking water; minerals in hard water; additives in table salt; spoilage	Use fresh hot water for potatoes; soft water; canning or pickling salt. If spoilage is possible, treat the jar as spoiled.
Sediment in the jar	Starch, minerals or salt additives; yellow sediment in green vegetables or onions and white crystals in spinach are natural	Same as cloudy liquid. If there are signs of spoilage, throw it out.
Spoilage	Poor produce; wrong method for the food; wrong time; wrong pressure; bad seal	Use the correct canner for the food, the full tested time and pressure for your altitude, and a tested dial gauge.

Mold on Canned Food

Mold inside a sealed jar means the food was not processed enough or the seal failed. Throw it out using the steps above. Do not scrape off the mold and eat the rest.

Your Next Step

Keep a box of disposable gloves and a jug of unscented bleach with your canning gear, so you are ready if a jar ever goes bad.

Chapter 15: Freezing

Freezing is the simplest and most forgiving way to preserve food at home. It does not kill germs, but it stops them from growing. It is often the best choice for foods with no tested canning process, for your own soup and sauce recipes, and for anything you are not sure how to can.

The Basics

- **Keep the freezer at 0 degrees F or colder.** The NCHFP says to freeze and store food at 0 degrees F or lower for the best quality. Put a freezer thermometer inside and check it now and then.
- **Cool food first.** Cool cooked food before packing it.
- **Freeze it right away.** Freeze food as soon as it is packed and sealed.
- **Do not overload the freezer.** Add only as much unfrozen food as the freezer can freeze quickly, and leave space between new packages so cold air can move around them until they are frozen.
- **Use moisture-vapor resistant packaging.** Freezer bags, rigid freezer containers, freezer-safe jars and heavy freezer wrap keep air out and moisture in. Thin bread bags and store wrap let food dry out.
- **Leave headspace.** Food expands as it freezes. Leave enough room so the package does not burst its seal, more for liquids than for dry-packed food.
- **Label everything.** The NCHFP says to label each package with the food, any added ingredients, the date, and the amount or number of servings.

How Long Frozen Food Keeps

Frozen food stays safe as long as it stays frozen at 0 degrees F, but quality slowly drops. The NCHFP gives these times for best quality:

Food	Months at 0 degrees F
Fruits and vegetables	8 to 12
Poultry	6 to 9
Fish	3 to 6
Ground meat	3 to 4
Cured or processed meat	1 to 2

For the best quality, use the shorter time. After that, the NCHFP says food should still be safe, just lower in quality. Rotate first in, first out.

Blanching Vegetables

Most vegetables need blanching before freezing. Blanching is a short scald in boiling water or steam that stops the enzymes that would otherwise make vegetables lose color, flavor and texture in the freezer. The NCHFP warns that underblanching is worse than not blanching at all, because it speeds up those enzymes instead of stopping them.

1. Use 1 gallon of water for each pound of prepared vegetables. Bring it to a rolling boil.
2. Put the vegetables in a blanching basket and lower them into the boiling water. The water should return to a boil within 1 minute. If it does not, use less food next time.
3. Start timing when the water boils again. Keep the heat high.
4. When time is up, plunge the vegetables into cold water, 60 degrees F or below, or ice water. Use about 1 pound of ice for

each pound of vegetables. Cool them for about the same time you blanched them.

5. Drain well, pack, label and freeze.

Steam blanching takes about 1-1/2 times as long. The NCHFP says microwave blanching may not be effective and will not save time or energy.

Vegetable	Water blanching time
Asparagus	Small stalks 2 min, medium 3 min, large 4 min
Beans: snap, green or wax	3 min
Beans: lima, butter or pinto	Small 2 min, medium 3 min, large 4 min
Brussels sprouts	Small 3 min, medium 4 min, large 5 min
Cabbage, shredded	1-1/2 min
Carrots	Small whole 5 min; diced, sliced or strips 2 min
Cauliflower, 1-inch pieces	3 min
Corn on the cob	Small ears 7 min, medium 9 min, large 11 min
Corn, whole kernel or cream style	Blanch ears 4 min, then cut
Greens	Collards 3 min, other greens 2 min
Okra	Small pods 3 min, large 4 min
Peas, green	1-1/2 min
Peppers	Halves 3 min, strips 2 min
Summer squash	3 min
Turnips or parsnips, cubed	2 min

Beets, pumpkin, winter squash and sweet potatoes are cooked fully before freezing rather than blanched.

Fruits

Most fruits do not need blanching. Freeze them plain on a tray and then bag them, or pack them in sugar or syrup for better color and texture. Treat light-colored fruits such as apples, peaches and pears with ascorbic acid to keep them from darkening, the same way you would for canning.

Meat, Poultry and Fish

Wrap meat tightly in freezer paper, heavy foil or freezer bags, pressing out as much air as you can. Divide it into meal-size packages before freezing.

Thawing Safely

The NCHFP says meat and poultry should never be thawed at room temperature or in a conventional oven.

- **Refrigerator:** Slowest and safest. Leave the food in its wrapping.
- **Cold water:** Seal the food in a watertight bag and submerge it in cold water.
- **Microwave:** Follow the microwave maker's directions, and cook the food right away.

You can also cook meat and poultry straight from frozen. Plan on more cooking time. Large roasts can take as much as 1-1/2 times as long.

Your Next Step

Put a thermometer in your freezer today and check that it reads 0 degrees F or below.

Chapter 16: Drying and Jerky

Drying removes enough water that germs cannot grow. It is one of the oldest ways to keep food, and it suits our dry Northern Nevada air. Dried food is light, compact and needs no power to store. The guidance here comes from the NCHFP drying pages, which follow the University of Georgia book So Easy to Preserve.

Equipment

An electric food dehydrator with a thermostat and a fan gives the most even, reliable results. The NCHFP says to dry foods fast at 140 degrees F. Good dehydrators have thermostats that run from about 85 to 160 degrees F.

Drying Fruit

1. Choose ripe, firm fruit. Wash it and remove pits, cores and bruised spots.
2. Slice it evenly so the pieces dry at the same rate.
3. Pretreat light-colored fruits such as apples, peaches and pears with an ascorbic acid dip to keep them from darkening.
4. Spread in a single layer on dehydrator trays and dry at 140 degrees F until no moisture remains when a piece is cut or squeezed.
5. Cool, then condition the fruit before storing (below).

Conditioning dried fruit Dried fruit still has about 20 percent moisture, and it is not always even from piece to piece. Pack the cooled fruit loosely in glass jars, close them and let them stand 7 to 10 days, shaking the jars daily. If you see condensation inside, put the fruit back in the dehydrator. When it stays dry, it is ready to package.

Drying Vegetables

Most vegetables are blanched first (see the table in Chapter 15), then dried until brittle, at about 10 percent moisture. Vegetables do not need conditioning. Dried vegetables keep only about half as long as dried fruits.

Fruit Leather

1. Puree about 2 cups of fruit for each 13 by 15 inch leather.
2. For light-colored fruit, add 2 teaspoons of lemon juice or 1/8 teaspoon (375 milligrams) of ascorbic acid for every 2 cups of fruit.
3. Sweeten if you like with 1/4 to 1/2 cup of corn syrup, honey or sugar.
4. Line a tray or pan with plastic wrap. The NCHFP says do not use waxed paper or aluminum foil.
5. Pour the puree about 1/8 inch thick.
6. Dry at 140 degrees F. In a dehydrator, it takes 6 to 8 hours. In an oven, it can take up to 18 hours.
7. It is done when you touch the center and leave no dent. Peel it off while still warm and roll it up.

Fruit leather keeps about 1 month at room temperature or up to 1 year in the freezer.

Jerky Done Safely

Jerky is raw meat dried at low heat, a setting where harmful germs can survive. The NCHFP's goal is to heat the meat to an internal temperature of 160 degrees F, before or after drying, without hardening the outside so it cannot finish drying. Drying alone at 140 degrees F does not reliably do that.

- **Use lean meat.** Lean beef, pork, venison or smoked turkey breast. The NCHFP says making jerky from raw poultry is generally not recommended.
- **Freeze pork and wild game first.** To protect against the Trichinella parasite, freeze meat 6 inches thick or less at 0 degrees F or below for at least 30 days before slicing.
- **Slice thin.** Trim all fat and slice no thicker than 1/4 inch.
- **Marinate in the refrigerator.** Never on the counter.

A Basic Jerky Marinade

For 1-1/2 to 2 pounds of lean meat:

- 1/4 cup soy sauce
- 1 tablespoon Worcestershire sauce
- 1/4 teaspoon black pepper
- 1/4 teaspoon garlic powder
- 1/2 teaspoon onion powder
- 1 teaspoon hickory smoke-flavored salt

Combine, add the meat strips, and marinate in the refrigerator 1 to 2 hours or overnight.

Two Safe Heating Methods

	Method A: heat first	Method B: heat after
When	Before drying	After drying
How	Bring the strips and marinade to a boil and boil 5 minutes, then drain. Check that thick pieces reach 160 degrees F with a food thermometer.	Dry the strips first, then heat them 10 minutes in an oven preheated to 275 degrees F. This works for strips 1/4 inch thick or thinner.

After heating, dry the strips in a preheated dehydrator at 140 degrees F until a piece cracks when bent but does not break.

Unheated strips usually take 10 to 24 hours. Strips heated first dry faster, so start checking after 3 hours.

Store jerky in sealed containers. It keeps about 2 weeks at room temperature. Refrigerate or freeze it for longer storage and best quality.

Packaging and Storing Dried Food

- Cool dried food completely before packaging.
- Pack it in clean, dry, insect-proof containers: glass jars, freezer containers, freezer bags or vacuum bags.
- Pack in small amounts, so you open only what you will use soon.
- Keep sulfured fruit from touching metal.
- Store in a cool, dry, dark place. Dried foods keep from 4 months to 1 year. The NCHFP says most dried fruits keep 1 year at 60 degrees F but only 6 months at 80 degrees F.
- Throw out anything that shows mold.

Your Next Step

Try one tray of apple slices. They are cheap, forgiving and show you how your dehydrator behaves.

Chapter 17: Storing and Rotating a Home Food Supply

A home food supply is only useful if it is food you will eat, stored where it keeps, and used before it goes stale. This chapter covers how long things keep and a simple system for rotating them. For what to store for emergencies and how much, see chapter 4 of the USA Survival Guide.

The Best Storage Spot

The same rules apply to home canned jars, store-bought cans and dry goods.

- **Cool.** Clemson Extension says the best temperature for canned foods is 50 to 70 degrees F, and storage time drops significantly above 75 degrees F.
- **Dry.** Moisture rusts cans and lids and can ruin dry goods.
- **Dark.** Light fades color and speeds quality loss.
- **Away from heat.** North Dakota State University (NDSU) Extension advises against storing food above the stove, under the sink, or anywhere with temperature extremes.

In Northern Nevada, an interior closet, a basement or a cool pantry on a north wall usually works better than a garage, which can swing from below freezing in winter to well over 95 degrees F in summer.

How Long Food Keeps on the Shelf

These are best-quality guidelines for unopened food stored in a cool, dry place.

Food	Best quality	Source
Home canned food, all types	1 year	Clemson, NDSU, NCHFP
Store-bought high-acid cans (fruit, juice, tomatoes, pickles, sauerkraut)	12 to 18 months	Clemson, NDSU
Store-bought low-acid cans (meat, poultry, most soups, vegetables, beans)	2 to 5 years	Clemson, NDSU
Oatmeal and similar cooked cereals	6 to 12 months; 3 months after opening	NDSU
Baking powder	6 months; 3 months after opening	NDSU
Cake, brownie and bread mixes	12 to 18 months	NDSU
Dried fruits, home dried	About 1 year at 60 degrees F; 6 months at 80 degrees F	NCHFP
Dried vegetables, home dried	About half as long as dried fruit	NCHFP
Frozen foods	See Chapter 15	NCHFP

Food that has passed its best-quality date is not automatically unsafe, but it loses flavor, color and nutrition. A can or jar that is bulging, leaking, badly dented, cracked or rusted is a different matter. Clemson Extension warns that dents, cracks or bulging lids can pose a risk of serious food poisoning. Throw those out.

First In, First Out

Clemson Extension, NDSU Extension and the NCHFP all give the same rule: first in, first out. New food goes behind old food, and you always take from the front.

1. **Date everything.** Write the canning date on every jar lid and the purchase date on every store package, as NDSU advises.

2. **Load from the back.** Put new items behind what is already on the shelf. A shelf that is deep enough for only two rows makes this easy.
3. **Use from the front.** Always pull the oldest item first.
4. **Keep a "use first" spot.** Anything near its date, any jar that did not seal and went in the refrigerator, and any dented can you decide to keep goes here.
5. **Check twice a year.** Pick two dates that are easy to remember, such as the start of daylight saving time and the end of it. Look at every jar and can, move older items forward, and pull anything that looks wrong.

Store What You Eat

The most common mistake is stocking food no one in the house likes. Build the supply from meals you already make. If your household goes through a jar of tomatoes a week, 52 jars is a year. If it uses two jars of green beans a month, 24 is a year. The NCHFP advice to can no more than you will use in a year is a good limit for store-bought food too.

Keep an Inventory

A simple list on the pantry door, or a sheet like the one in the appendix, tells you what you have, what you are running low on, and what to can or buy next. Record each item, the amount, the date and where it is stored. Cross items off as you use them.

Water and Power

A food supply works best with a few other pieces in place: stored drinking water, a way to cook without electricity, a manual can opener, and a plan for the freezer if the power goes out. The Household Survival Planner and the USA Survival Guide cover those in detail.

Your Next Step

Pick one shelf, pull everything off, write dates on anything undated, and put it back oldest in front.

Quick Reference: Boiling-Water Canner Times

All times are in minutes. Use the column for your elevation. Headspace is 1/2 inch except jams and jellies (1/4 inch).

Food	Jar	0 to 1,000 ft	1,001 to 3,000 ft	3,001 to 6,000 ft	Above 6,000 ft
Crushed tomatoes, hot	Pints	35	40	45	50
Crushed tomatoes, hot	Quarts	45	50	55	60
Whole or halved tomatoes in water	Pints	40	45	50	55
Whole or halved tomatoes in water	Quarts	45	50	55	60
Tomato juice	Pints	35	40	45	50
Tomato juice	Quarts	40	45	50	55
Applesauce, hot	Pints	15	20	20	25
Applesauce, hot	Quarts	20	25	30	35
Sliced apples, hot	Pints or quarts	20	25	30	35
Peaches, hot	Pints	20	25	30	35
Peaches, hot	Quarts	25	30	35	40
Peaches, raw	Pints	25	30	35	40
Peaches, raw	Quarts	30	35	40	45
Pears, hot	Pints	20	25	30	35
Pears, hot	Quarts	25	30	35	40

For tomatoes, the last column is 6,001 to 8,000 feet. Add acid to every jar of tomatoes (Chapter 8).

Food	Jar	0 to 1,000 ft	1,001 to 6,000 ft	Above 6,000 ft
Jams and jellies	Half-pints or pints	5	10	15
Quick dill pickles	Pints	10	15	20
Quick dill pickles	Quarts	15	20	25
Bread-and-butter pickles	Pints or quarts	10	15	20

Quick Reference: Pressure Canner

Gauge	0 to 1,000 ft	1,001 to 2,000 ft	2,001 to 4,000 ft	4,001 to 6,000 ft	6,001 to 8,000 ft
Dial gauge	11 lb	11 lb	12 lb	13 lb	14 lb
Weighted gauge	10 lb	15 lb	15 lb	15 lb	15 lb

Food	Headspace	Pints	Quarts
Snap and Italian beans	1 inch	20	25
Carrots	1 inch	25	30
Corn, whole kernel	1 inch	55	85
White potatoes	1 inch	35	40
Sweet potatoes	1 inch	65	90
Dried beans or peas	1 inch	75	90
Mixed vegetables	1 inch	75	90
Soups (no seafood)	1 inch	60	75
Soups with seafood	1 inch	100	100
Chicken or rabbit, without bones	1-1/4 inch	75	90
Chicken or rabbit, with bones	1-1/4 inch	65	75
Ground or chopped meat	1 inch	75	90
Strips, cubes or chunks of meat	1 inch	75	90
Meat stock	1 inch	20	25

Vent every pressure canner 10 minutes before closing the vent. Restart the timer if the pressure falls below the target. Let the canner cool on its own.

Canning Log

Keep one line for every canner load. If a problem ever shows up, the log lets you trace it to the batch.

Date	Food and recipe source	Jars and size	Method	Pressure or column	Time	Sealed

Pantry Inventory Sheet

Item	Amount	Date canned or bought	Use by	Location	Used

Item	Amount	Date canned or bought	Use by	Location	Used

Before Every Canning Session

- ☐ Tested recipe from the USDA, NCHFP or Extension in hand
- ☐ Right canner for the food: acid foods in boiling water, low-acid foods under pressure
- ☐ My elevation column or pressure written down
- ☐ Dial gauge tested this year
- ☐ Jars checked for chips and cracks; new lids on hand
- ☐ Bottled lemon juice or citric acid for tomatoes
- ☐ 5 percent vinegar and canning salt for pickles
- ☐ Timer, jar lifter, funnel, headspace tool, bubble remover
- ☐ Towels set out for cooling, away from drafts
- ☐ Labels and marker ready

Glossary

Acid food. Food with a pH of 4.6 or lower, such as most fruits, jams, jellies and pickles. Safe to process in a boiling-water canner.

Ascorbic acid. Vitamin C, used to keep cut fruit and potatoes from darkening.

Band. The threaded metal ring that holds the flat lid on during processing.

Blanching. A short scald in boiling water or steam to stop enzyme action before freezing or drying.

Boiling-water canner. A deep pot with a rack and lid, used to process acid foods covered in boiling water.

Botulism. A serious, sometimes fatal illness caused by a toxin made by Clostridium botulinum.

Conditioning. Holding dried fruit in closed jars for 7 to 10 days so its moisture evens out.

Detoxifying. Boiling suspect jars and food for 30 minutes before disposal.

Dial gauge. A pressure canner gauge that shows the exact pressure. Needs yearly testing.

Headspace. The empty space between the food or liquid and the jar rim.

Hot pack. Filling jars with food that was heated in liquid first.

Jelly point. The temperature at which jam or jelly without added pectin will set; 8 degrees F above the boiling point of water.

Low-acid food. Food with a pH above 4.6, such as vegetables, meat, poultry and seafood. Must be pressure canned.

Pectin. A natural substance in fruit that makes jam and jelly set. Sold in powdered and liquid forms.

pH. A measure of acidity. The lower the number, the more acid.

Pressure canner. A heavy pot with a locking lid, vent and gauge that reaches 240 degrees F or more under pressure.

Process time. The tested length of time jars stay in the canner at the right temperature.

Raw pack. Filling jars with unheated food, then adding hot liquid.

Steam canner. A canner that surrounds jars with steam instead of water. Only for tested acid-food recipes with process times of 45 minutes or less.

Venting. Letting steam escape from a pressure canner for 10 minutes to drive out air before building pressure.

Weighted gauge. A weight on a pressure canner's vent that holds 5, 10 or 15 pounds of pressure.

Acronyms

BTU. British Thermal Unit

CDC. Centers for Disease Control and Prevention

FIFO. First In, First Out

NCHFP. National Center for Home Food Preservation

NDSU. North Dakota State University

UL. Underwriters Laboratories

USDA. United States Department of Agriculture

Sources

All web pages were read on November 18, 2026.

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About This Book

Food Storage and Home Canning, Step by Step is part of a set of free plain-language guides from Trinfinity Enterprises. Every process time, pressure and recipe comes from the USDA Complete Guide to Home Canning, the National Center for Home Food Preservation, or university Extension guidance that follows the same research, checked as of November 18, 2026. This book is general information. Food safety guidance is updated as research continues, so check nchfp.uga.edu for changes before canning a food for the first time. If you find something that has changed or needs correcting, please write to andrew@trinfinityenterprises.com.