

**UC**  
**CE**

# Preserved Foods



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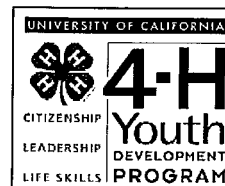
***This We Believe:***

- The boy and girl are more important than the projects.
- The member should be their own best product.
- No award is worth sacrificing the reputation of a member or leader.
- Competition is a natural human trait and should be recognized as such. It should be given no more emphasis than other fundamentals.
- Learning how to do the project is more important than the project itself.
- Many things are caught rather than taught.
- A blue ribbon member with a red ribbon project is more desirable than a red ribbon member with a blue ribbon project.
- To learn by doing is fundamental in any sound educational program.
- Generally speaking, there is more than one good way of doing most things.
- Every member needs to be noticed, to feel important, to win, and to be praised.
- Our job is to teach members *how* to think, not what to think.



# CLOVER SAFE

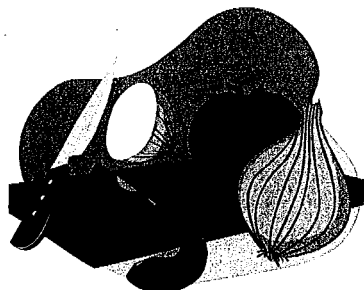
AGRICULTURE AND NATURAL RESOURCES  
ENVIRONMENTAL HEALTH AND SAFETY



#20

## GENERAL KNIFE SAFETY

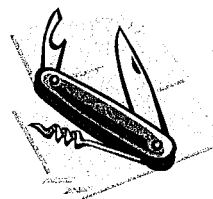
*Clover Safe notes are intended primarily for 4-H volunteers and members nine years and older.*



U.S. Consumer Product Safety Commission data indicate in 2005 more than 80,000 youth aged five to 19 years were treated in hospitals for injuries received while using knives. Most injuries occurred to the fingers (64%) followed by hands (20%), forearms (4%), and wrists (2%). Nearly all of the injuries were lacerations with a relatively small number of puncture wounds. Many of the injuries were caused by the knife user being careless or inattentive and could have been prevented by taking several simple precautions.

### General Knife Safety

- Always keep your knife sharp. Dull knives are more dangerous than sharp knives.
- Never run or climb while carrying a knife with an unprotected blade.
- When using a knife, cut in a direction away from your body and fingers, hands, arms, and legs.
- Use knives in well-lighted work areas.
- Never engage in horseplay with knives.
- Only use knives for their intended cutting/slicing/carving purpose. Do not use knives for prying, screwing, hammering, or pounding.
- Never throw a knife.
- Do not attempt to catch a dropped knife. Let it fall and then pick it up.
- Never use a knife on live electrical cords or equipment like appliances.
- Always pass a knife handle first to another person.
- Focus on the task at hand when using a knife. Stop using the knife if you want to look up.
- Always use a cutting board when slicing food.
- When using a chef's knife to slice smaller food items (carrots or celery), hold the knife handle with your last three fingers and grasp the blade with your index finger and thumb. Place the knife tip on the cutting board and slice downward using a continuous rocking motion. Use your other hand to stabilize the food being cut and guide the knife. Protect your fingers by keeping them curled and your thumb by tucking it behind your curled fingers.
- When using a chef's knife to slice larger food items (potatoes or onions), hold the knife as described above. Start the cut with the tip end of the knife and force the knife down and forward across the food until the knife heel encounters the cutting board. Use your other hand to hold the food while protecting your fingers and thumb as described above.
- When not being used, keep pocket knife blades folded and straight-blade knives in sheaths or holding racks.
- If you suffer a cut or puncture wound, tell your group leader, parent, or guardian. Wash the wound with soap and water and cover with a clean bandage. Seek medical attention if the wound is large/deep or appears to be infected.





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#36

## GENERAL KITCHEN SAFETY

*Clover Safe notes are intended primarily for 4-H volunteers and members nine years and older.*



Information available from the U.S. Consumer Product Safety Commission indicates more than 400,000 people were treated in hospitals for kitchen-related injuries during 2006. Typical injuries were cuts from knives and other sharp edges, burns from stoves, ovens, and hot pots and pans, contusions from inadvertently bumping or slipping and falling into appliances, cabinets, and counters, and strains from lifting or moving heavy appliances or other objects. General kitchen safety also includes taking precautions to prevent fires and utilizing proper food handling and preparation practices to prevent food poisoning or disease transmission.

### Tips for Preventing Physical Injuries

- Always handle knives carefully and use them for their intended purposes. See Clover Safe #20 for further knife safety information.
- Clean up floor spills promptly to prevent slips and falls.
- Use oven mitts to handle heated dishes, pots, and pans. Keep hot objects away from counter edges.
- Do not use electric appliances near or in a sink, on wet counters, or with wet hands.
- Use your legs to lift heavy loads. Never attempt to lift or move a load that exceeds your strength capacity.

### Tips for Preventing Kitchen Fires

- Have an ABC-rated fire extinguisher located in the kitchen and know how to use it.
- Keep combustible materials such as paper and cloth towels, napkins, recipe cards, clothing, and curtains away from stove burners.
- A prudent safety practice is to tie back long hair when using a stove.
- When lighting a gas stove burner, strike the match first and then slowly turn on the burner knob. If a gas stove pilot light goes out, turn off all the stove burners and wait for the gas to disperse before relighting the pilot light.
- Never leave food cooking on a stove unattended.
- Do not overload any electrical outlet, including those located in kitchens.
- Always follow recipe time and temperature cooking instructions when using a stove, standard oven, or microwave oven.

### Tips for Preventing Food Poisoning or Disease Transmission

- Always begin your food preparation activities by washing your hands with soap and water.
- Keep food either hot or cold. The temperature of a refrigerator should be 40°F or less.
- Wash fruits and vegetables before slicing, cutting, or processing.
- Clean counter tops and cutting boards prior to starting food preparation activities. Wash can tops before opening.
- After handling and preparing raw meat, wash the preparation surface and your hands with soap and water.
- Follow food recipes precisely and completely. Do not take food preparation short cuts.
- Discard food that is not fresh.
- Promptly refrigerate left over food. Heated food should be refrigerated within two hours of cooking.
- See the University of California Cooperative Extension brochure entitled "Make It Safe - Keep It Safe, FIGHT BAC! Keep Food Safe From Bacteria" for additional information about food preparation and handling safety. This brochure is available at county Cooperative Extension offices and online at: <http://ucce.ucdavis.edu/files/filelibrary/5810/42038.pdf>



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#48

## SAFE CANNING PRACTICES

*Clover Safe notes are intended primarily for 4-H volunteers and members nine years and older.*



*Photograph Courtesy of the  
University of California 4-H Archives*

A successful canning operation involves: (1) using heat to thoroughly destroy microorganisms that naturally occur in foods and on food container surfaces and (2) preventing reintroduction of microorganisms by completely sealing the sterilized food and container interior/lid bottom from the atmosphere. Implementing careful and thorough food preparation and processing techniques produces a safe and successful canning operation that will result in healthy and tasty food products for the consumers' enjoyment.

### Safe Canning Practices

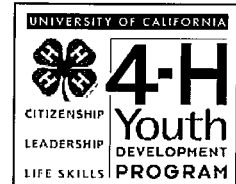
- Before starting, inspect the pressure cooker to assure the gauge is operating properly, gaskets and seals are intact, and the cooker lid engages properly when closed.
- Inspect all canning jars to assure they have been thoroughly washed and rinsed and there are no rim nicks or cracks. Do not use any jars that do not pass your inspection.
- Inspect all lids and screw bands to assure they are new, clean, and free of rust. Do not use any lids and screw bands that do not pass your inspection.
- Use the pressure cooker canning method for low acid foods such as vegetables (except for tomatoes), meats, seafood, and mixes of food that incorporate some low acid foods.
- Use the boiling bath canning method for acid foods such as fruits, tomatoes, pickles, relish, sauerkraut, and other foods where vinegar has been added.
- For best flavor and nutrition results, foods should be canned within 12 hours of harvest.
- Choose high quality foods for canning that are free of diseases, defects, bruises, and discoloration.
- Always wash food before peeling, slicing, cutting, and/or beginning the canning process.
- Carefully follow instructions for heating (or sterilizing) jars, lids, and screw bands. Likewise, carefully follow recipes for cooking the food before starting the canning process.
- Use a canning rack to hold jars when inside, jar-lifting tongs to remove heated jars from, and a lid wand to remove heated lids from the boiling water-bath container during the sterilization step.
- Leave the recommended recipe headspace between the bottom of the lid and top of the food when filling canning jars. Clean the jar rim with a dampened paper towel. Fit the screw band over the lid and tighten according to the manufacturer's directions.
- When using a boiling bath for canning, follow the recommended time for jars to undergo boiling.
- When using a pressure cooker for canning, carefully heat cooker to maintain correct pressure. When finished, allow the cooker to cool to the touch and thereafter, completely depressurize the cooker by uncovering the vent port or opening the petcock. Lift the lid away from your face to avoid steam burns.
- At the completion of canning, remove jars of food from the canner with lifting tongs and place on a towel or cooling rack. Do not move jars until thoroughly cooled.
- If you are injured while canning, notify your project leader, parent, or guardian. Seek medical attention if the injury is serious.
- When finished, clean the canning work area and put cleaned kitchen cookware and utensils away.
- Store canned food jars for no longer than one year. Label the jars so you can identify the contents and the date they were canned.

*Portions of the information given herein are modified from the document "Complete Guide to Home Canning," Agriculture Information Bulletin No. 539 UDSA (revised 1994). Also available online at <http://www.uga.edu/nchfp/how/general.html>.*



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#55

## SAFE PREPARATION AND HANDLING OF FRESH FRUIT AND VEGETABLES

*Clover Safe notes are intended primarily for 4-H volunteers and members nine years and older.*



Information available from the Centers for Disease Control and Prevention (CDC) indicates an estimated 76 million cases of foodborne disease occur each year in the United States. Although most of these cases cause mild illness that lasts a day or two, the CDC also estimates there are 325,00 cases that require hospitalization and 5,000 deaths related to foodborne illnesses annually.

Foodborne disease is caused by the consumption of disease-causing microorganisms such as certain bacteria, viruses, and parasites. Fresh fruits and vegetables can become contaminated by fertilizers or with disease-causing microorganisms through contact with soils, water, harvesting equipment, raw sewage or fecal matter or other infected foods or food handlers. Foodborne disease from fresh fruits and vegetables can be prevented by following several simple food preparation and handling methods.

### Safe Preparation and Handling of Fresh Fruit and Vegetables

- Do not buy fresh fruit and vegetables that are bruised, moldy, gashed, or otherwise damaged.
- Keep fresh fruits and vegetables separate from meat, poultry, and fish in your shopping cart, checkout bag, and refrigerator.
- When purchasing cut fresh fruit or vegetables such as salad packages or melons, make sure they are properly packaged and refrigerated in the store. Keep cut fresh fruit or vegetables refrigerated at home and stored in sealed plastic bags or air-tight containers.
- Always thoroughly wash your hands with warm water and soap for at least one-half minute before and after you handle fresh fruit or vegetables.
- Always wash all surfaces and utensils with hot water and soap before and after fresh fruit and vegetables touch surfaces or utensils. Surfaces include cutting boards and counter tops and utensils include knives, peelers, and graters. Sanitize surfaces and utensils by wiping or rinsing them after being washed with a mixture of one teaspoon chlorine in one quart of water.
- Never place fresh fruit or vegetables on the same cutting board where raw meat, poultry, or fish have been unless the board has been thoroughly washed with hot water and soap and sanitized with the chlorine and water mixture.
- Rinse fresh fruit and vegetables with running water, including those having skins or rinds, such as oranges, that are not eaten.
- Fruit and vegetables with firm skins, such as potatoes and carrots, should be rubbed or scrubbed with a clean vegetable brush while being rinsed under running water. Gently use your hands to rub dirt from soft fruits and vegetables, such as peaches and tomatoes, while rinsing under running water.
- After cleaning and rinsing fresh fruit and vegetables, dry them with a clean cloth or paper towel.
- Within two hours, refrigerate all fresh fruit and vegetables that have been cut, peeled, or cooked.
- If fresh fruit and vegetables come in contact with raw meat, poultry, or fish, they must be cooked before eating.
- Each County Cooperative Extension Office has one staff member available for food safety training.

Additional food safety information is available in the University of California Cooperative Extension brochure entitled "Make It Safe - Keep It Safe, FIGHT BAC! Keep Food Safe From Bacteria." The brochure may be accessed online at: <http://groups.ucanr.org/ehs/files/42038.pdf>.

Portions of this Clover Safe incorporate information modified from the Partnership for Food Safety Education, Safe Handling of Fresh Produce web site at: <http://www.fightbac.org/content/view/203>.

June 2008

Additional EH&S information may be accessed at the ANR Web Site at: <http://safety.ucanr.org>



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#92

## THE IMPORTANCE OF WASHING YOUR HANDS

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Hand washing is one of the most effective methods for preventing infections and the spread of disease. Hands may be contaminated by germs that can be transferred to cause illnesses such as the common cold, influenza, infectious diarrhea, hepatitis A, giardiasis, and enterovirus. Proper hand washing removes pathogens from the surface of your hands and helps prevent the transfer of infection- and disease-causing germs. This Clover Safe note provides information about when to wash your hands and proper hand-washing techniques.

### When to Wash Hands

- After using the toilet or changing a diaper.
- Before and after eating food.
- Before preparing food and after touching any uncooked meats.
- After blowing your nose, coughing, or sneezing into your hands.
- Before brushing your teeth.
- After touching an animal or handling animal toys, leashes, halters, saddles, or waste, including bedding materials.
- After handling garbage.
- Before and after treating an open wound.
- Before putting in or removing contact lenses.
- Whenever your hands are dirty from performing a task.
- After your hands have been exposed to untreated and potentially contaminated water from streams, ponds, etc.

### Proper Hand-Washing Techniques

- Always wet your hands with clean, warm, running water followed by the application of soap, whether in the form of a liquid, powder, or bar.
- Rub your hands together to produce plentiful lather and scrub all of your hands, including between the fingers and under nails.
- Continue rubbing your hands together for at least 20 seconds or for the time it takes to sing the "A, B, Cs."
- Thoroughly rinse your hands under running water. Avoid allowing rinse water to run down your forearms to the elbows.
- Dry your hands using a single use towel or air dryer.
- If possible, turn off the faucet with a paper towel.
- Dispose of paper towels in the trash receptacle.
- Only use a hand sanitizer when hand washing is not an option. When using a hand sanitizer:
  - Make sure the sanitizer includes at least 60% alcohol as an ingredient.
  - Place the sanitizer in one hand in the amount given on the label.
  - Begin rubbing both hands together while completely coating the surface of each hand with the sanitizer.
  - Continue rubbing your hands together until your hands and fingers are dry.

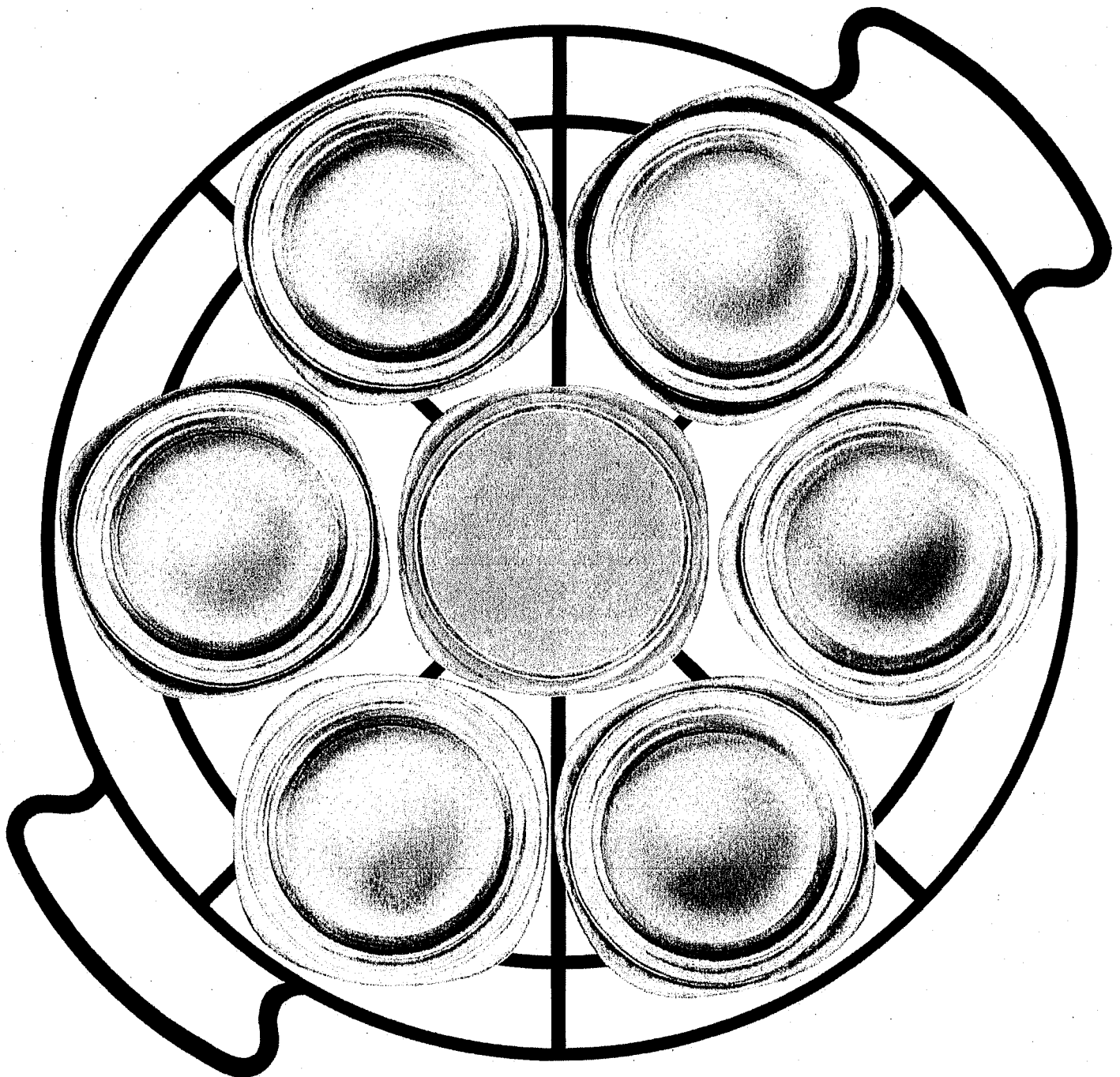


United States  
Department of  
Agriculture

National Institute  
of Food  
and Agriculture

Complete Guide to  
**Home Canning**

Guide 1  
**Principles of  
Home Canning**







# Guide 1

## Principles of Home Canning

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## Why can foods?

Canning can be a safe and economical way to preserve quality food at home. Disregarding the value of your labor, canning homegrown food may save you half the cost of buying commercially canned food. Canning favorite and special products to be enjoyed by family and friends is a fulfilling experience and a source of pride for many people.

Many vegetables begin losing some of their vitamins when harvested. Nearly half the vitamins may be lost within a few days unless the fresh produce is cooled or preserved. Within 1 to 2 weeks, even refrigerated produce loses half or more of some of its vitamins. The heating process during canning destroys from one-third to one-half of vitamins A and C, thiamin, and riboflavin. Once canned, additional losses of these sensitive vitamins are from 5 to 20 percent each year. The amounts of other vitamins, however, are only slightly lower in canned compared with fresh food. If vegetables are handled properly and canned promptly after harvest, they can be more nutritious than fresh produce sold in local stores.

The advantages of home canning are lost when you start with poor quality fresh foods; when jars fail to seal properly; when food spoils; and when flavors, texture, color, and nutrients deteriorate during prolonged storage.

The information and guides that follow explain many of these problems and recommend ways to minimize them.

## How canning preserves foods

The high percentage of water in most fresh foods makes them very perishable. They spoil or lose their quality for several reasons:

- growth of undesirable microorganisms—bacteria, molds, and yeasts,
- activity of food enzymes,
- reactions with oxygen,
- moisture loss.

Microorganisms live and multiply quickly on the surfaces of fresh food and on the inside of bruised, insect-damaged, and diseased food. Oxygen and enzymes are present throughout fresh food tissues.

Proper canning practices include:

- carefully selecting and washing fresh food,
- peeling some fresh foods,
- hot packing many foods,
- adding acids (lemon juice or vinegar) to some foods,
- using acceptable jars and self-sealing lids,
- processing jars in a boiling-water or pressure canner for the correct period of time.

Collectively, these practices remove oxygen; destroy enzymes; prevent the growth of undesirable bacteria, yeasts, and molds; and help form a high vacuum in jars. Good vacuums form tight seals which keep liquid in and air and microorganisms out.

## Ensuring safe canned foods

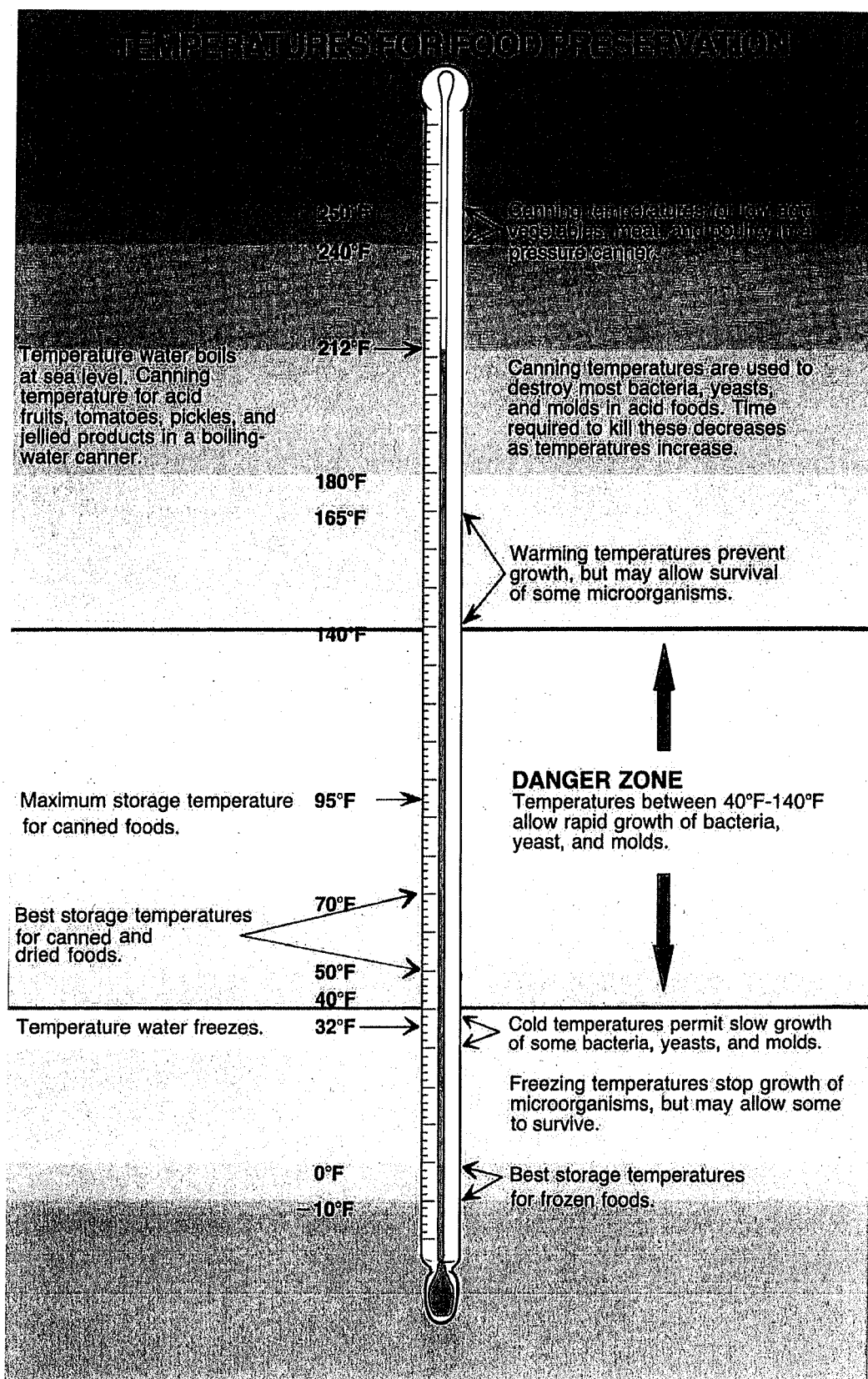
Growth of the bacterium *Clostridium botulinum* in canned food may cause botulism—a deadly form of food poisoning. These bacteria exist either as spores or as vegetative cells. The spores, which are comparable to plant seeds, can survive harmlessly in soil and water for many years. When ideal conditions exist for growth, the spores produce vegetative cells which multiply rapidly and may produce a deadly toxin within 3 to 4 days of growth in an environment consisting of:

- a moist, low-acid food
- a temperature between 40° and 120°F
- less than 2 percent oxygen.

Botulinum spores are on most fresh food surfaces. Because they grow only in the absence of air, they are harmless on fresh foods.

Most bacteria, yeasts, and molds are difficult to remove from food surfaces. Washing fresh food reduces their numbers only slightly. Peeling root crops, underground stem crops, and tomatoes reduces their numbers greatly. Blanching also helps, but the vital controls are the method of canning and making sure the recommended research-based process times, found in these guides, are used.

The processing times in these guides ensure destruction of the largest expected number of heat-resistant microorganisms in home-canned foods. Properly sterilized canned food will be free of spoilage if lids seal and jars are stored below 95°F. Storing jars at 50° to 70°F enhances retention of quality.



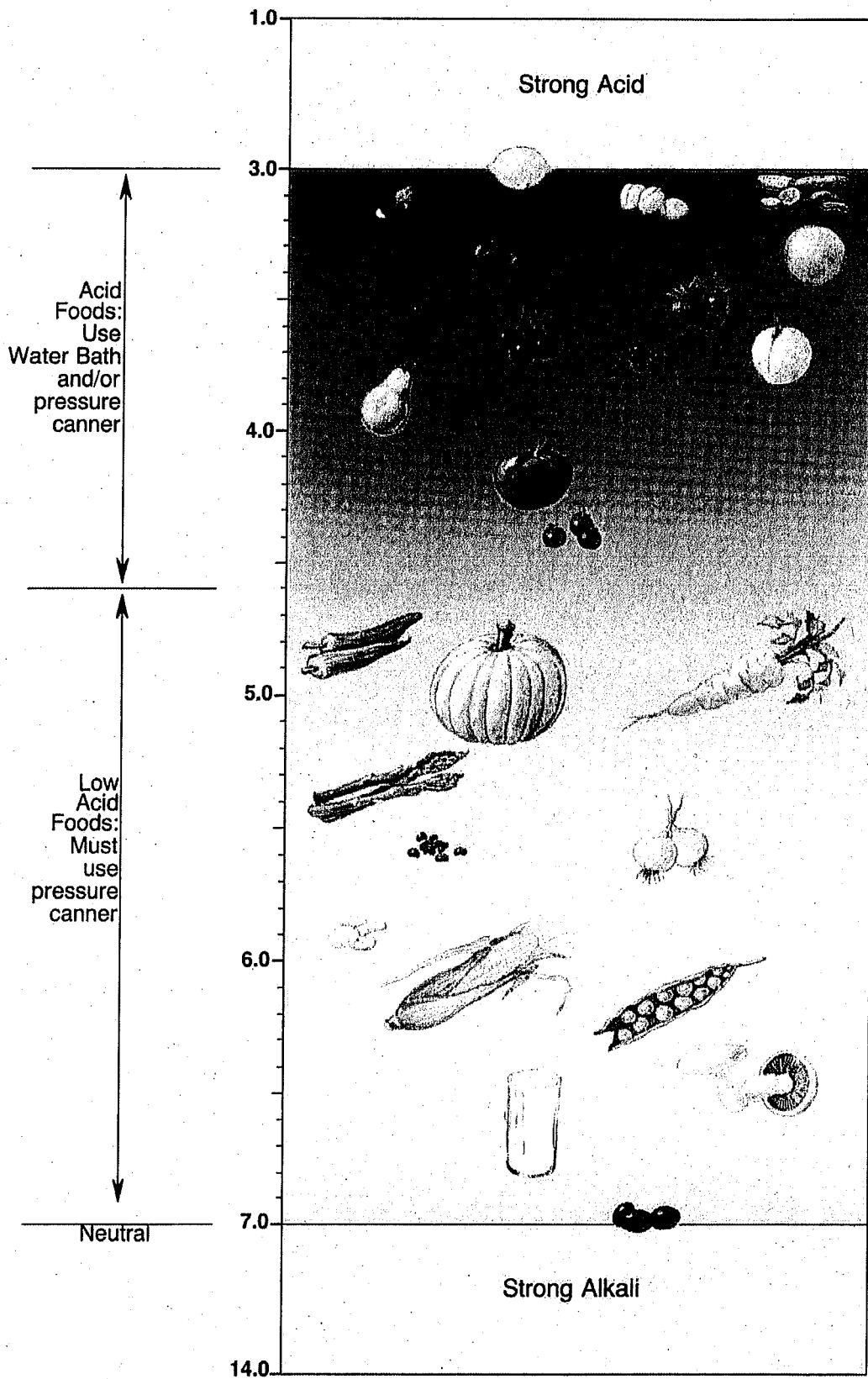
### *Food acidity and processing methods*

Whether food should be processed in a pressure canner or boiling-water canner to control botulinum bacteria depends on the acidity of the food. Acidity may be natural, as in most fruits, or added, as in pickled food. *Low-acid* canned foods are not acidic enough to prevent the growth of these bacteria. *Acid* foods contain enough acid to block their growth, or destroy them more rapidly when heated. The term "pH" is a measure of acidity; the lower its value, the more acid the food. The acidity level in foods can be increased by adding lemon juice, citric acid, or vinegar.

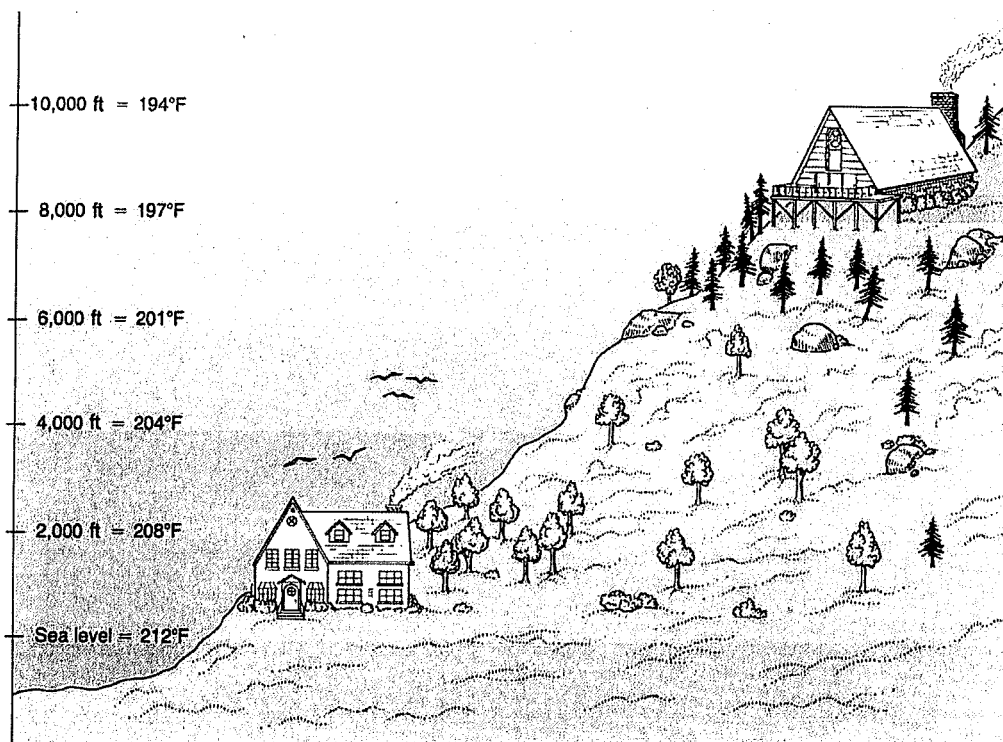
Low-acid foods have pH values higher than 4.6. They include red meats, seafood, poultry, milk, and all fresh vegetables except for most tomatoes. Most mixtures of low-acid and acid foods also have pH values above 4.6 unless their recipes include enough lemon juice, citric acid, or vinegar to make them acid foods. Acid foods have a pH of 4.6 or lower. They include fruits, pickles, sauerkraut, jams, jellies, marmalades, and fruit butters.

Although tomatoes usually are considered an acid food, some are now known to have pH values slightly above 4.6. Figs also have pH values slightly above 4.6. Therefore, if they are to be canned as acid foods, these products must be acidified to a pH of 4.6 or lower with lemon juice or citric acid. Properly acidified tomatoes and figs are acid foods and can be safely processed in a boiling-water canner.

Botulinum spores are very hard to destroy at boiling-water temperatures; the higher the canner temperature, the more easily they are destroyed. Therefore, all low-acid foods should be sterilized at temperatures of 240° to 250°F, attainable with pressure canners operated at 10 to 15 PSIG. PSIG means pounds per square inch of pressure as measured by gauge. The more familiar "PSI" designation is used hereafter in this publication. At temperatures of 240° to 250°F, the time needed to destroy bacteria in low-acid canned food ranges from 20 to 100 minutes. The exact time depends on the kind of food being canned, the way it is packed into jars, and the size of jars. The time needed to safely process low-acid foods in a boiling-water canner ranges from 7 to 11 hours; the time needed to process acid foods in boiling water varies from 5 to 85 minutes.







### *Process adjustments at high altitudes*

Using the process time for canning food at sea level may result in spoilage if you live at altitudes of 1,000 feet or more. Water boils at lower temperatures as altitude increases. Lower boiling temperatures are less effective for killing bacteria. Increasing the process time or canner pressure compensates for lower boiling temperatures. Therefore, when you use the guides, select the proper processing time or canner pressure for the altitude where you live. If you do not know the altitude, contact your local county Extension agent. An alternative source of information would be the local district conservationist with the Soil Conservation Service.

### *Equipment and methods not recommended*

Open-kettle canning and the processing of freshly filled jars in conventional ovens, microwave ovens, and dishwashers are not recommended, because these practices do not prevent all risks of spoilage. Steam canners are not currently recommended because processing times for use with current models are still being researched. It is not recommended that pressure processes in excess of 15 PSI be applied when using new pressure canning equipment. So-called canning powders are useless as preservatives and do not replace the need for proper heat processing. Jars with wire bails and glass caps make attractive antiques or storage containers for dry food ingredients but are not recommended for use in canning. Neither one-piece zinc porcelain-lined caps nor zinc caps that use flat rubber rings for sealing jars are recommended any longer.

## Ensuring high-quality canned foods

Begin with good-quality fresh foods suitable for canning. Quality varies among varieties of fruits and vegetables. Many county Extension offices can recommend varieties best suited for canning. Examine food carefully for freshness and wholesomeness. Discard diseased and moldy food. Trim small diseased lesions or spots from food.

Can fruits and vegetables picked from your garden or purchased from nearby producers when the products are at their peak of quality—within 6 to 12 hours after harvest for most vegetables. For best quality, apricots, nectarines, peaches, pears, and plums should be ripened 1 or more days between harvest and canning. If you must delay the canning of other fresh produce, keep it in a shady, cool place.

Fresh home-slaughtered red meats and poultry should be chilled and canned without delay. Do not can meat from sickly or diseased animals. Ice fish and seafoods after harvest, eviscerate immediately, and can them within 2 days.

### *Maintaining color and flavor in canned food*

To maintain good natural color and flavor in stored canned food, you must:

- Remove oxygen from food tissues and jars,
- Quickly destroy the food enzymes,
- Obtain high jar vacuums and airtight jar seals.

Follow these guidelines to ensure that your canned foods retain optimum colors and flavors during processing and storage:

- Use only high-quality foods which are at the proper maturity and are free of diseases and bruises.
- Use the hot-pack method, especially with acid foods to be processed in boiling water.
- Don't unnecessarily expose prepared foods to air. Can them as soon as possible.
- While preparing a canner load of jars, keep peeled, halved, quartered, sliced, or diced apples, apricots, nectarines, peaches, and pears in a solution of 3 grams (3,000 milligrams) ascorbic acid to 1 gallon of cold water. This procedure is also useful in maintaining the natural color of mushrooms and potatoes, and for preventing stem-end discoloration in cherries and grapes. You can get ascorbic acid in several forms:

*Pure powdered form*—seasonally available among canners' supplies in supermarkets. One level teaspoon of pure powder weighs about 3 grams. Use 1 teaspoon per gallon of water as a treatment solution.

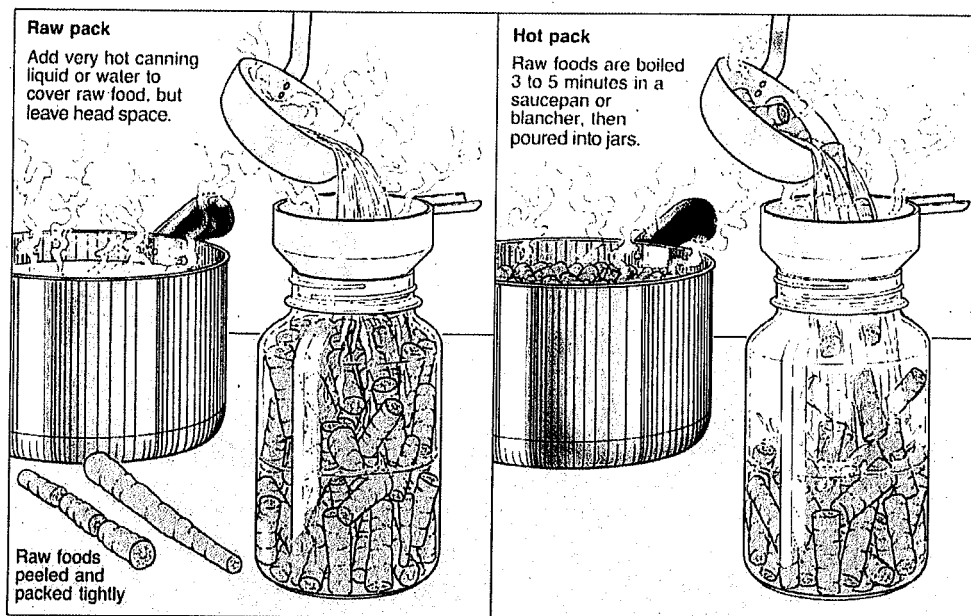
*Vitamin C tablets*—economical and available year-round in many stores. Buy 500-milligram tablets; crush and dissolve six tablets per gallon of water as a treatment solution.

*Commercially prepared mixes of ascorbic and citric acid*—seasonally available among canners' supplies in supermarkets. Sometimes citric acid powder is sold in supermarkets, but it is less effective in controlling discoloration. If you choose to use these products, follow the manufacturer's directions.

- Fill hot foods into jars and adjust headspace as specified in recipes.
- Tighten screw bands securely, but if you are especially strong, not as tightly as possible.
- Process and cool jars.
- Store the jars in a relatively cool, dark place, preferably between 50° and 70°F.
- Can no more food than you will use within a year.

### *Advantages of hot-packing*

Many fresh foods contain from 10 percent to more than 30 percent air. How long canned food retains high quality depends on how much air is removed from food before jars are sealed.



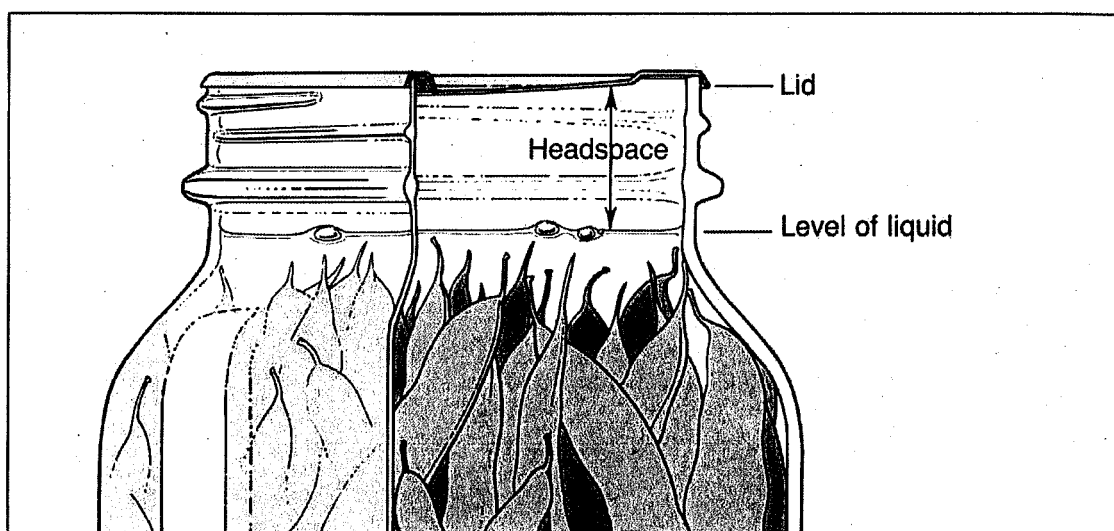
Raw-packing is the practice of filling jars tightly with freshly prepared, but unheated food. Such foods, especially fruit, will float in the jars. The entrapped air in and around the food may cause discoloration within 2 to 3 months of storage. Raw-packing is more suitable for vegetables processed in a pressure canner.

Hot-packing is the practice of heating freshly prepared food to boiling, simmering it 2 to 5 minutes, and promptly filling jars loosely with the boiled food. Whether food has been hot-packed or raw-packed, the juice, syrup, or water to be added to the foods should also be heated to boiling before adding it to the jars. This practice helps to remove air from food tissues, shrinks food, helps keep the food from floating in the jars, increases vacuum in sealed jars, and improves shelf life. Preshrinking food permits filling more food into each jar.

Hot-packing is the best way to remove air and is the preferred pack style for foods processed in a boiling-water canner. At first, the color of hot-packed foods may appear no better than that of raw-packed foods, but within a short storage period, both color and flavor of hot-packed foods will be superior.

### Controlling headspace

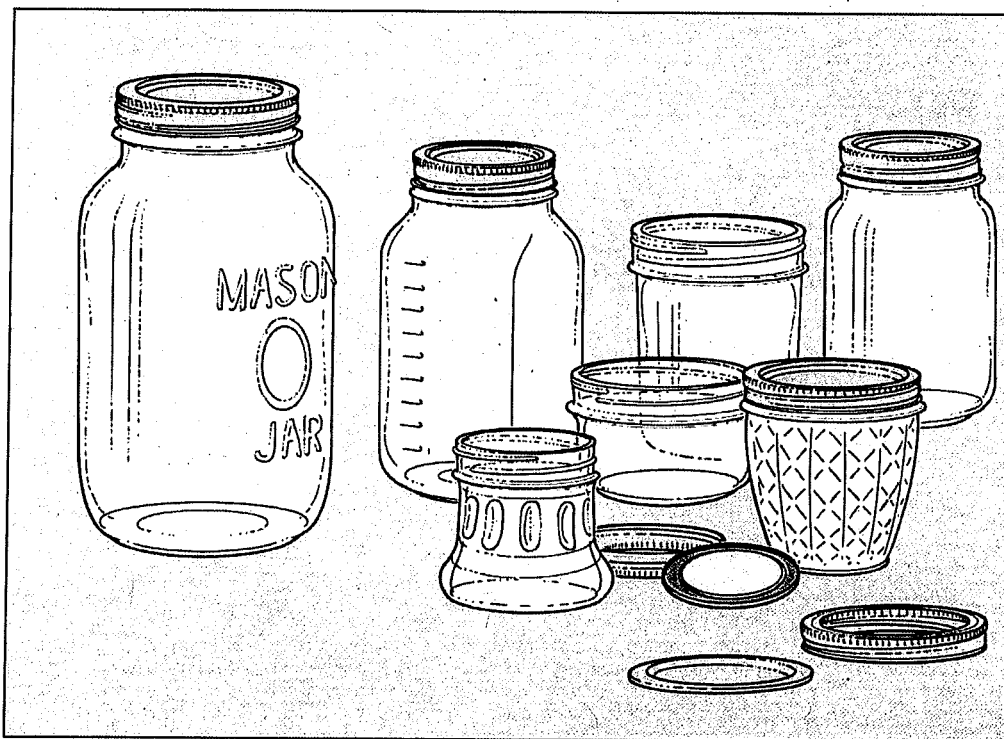
The unfilled space above the food in a jar and below its lid is termed headspace. Directions for canning specify leaving 1/4-inch for jams and jellies, 1/2-inch for fruits and tomatoes to be processed in boiling water, and from 1- to 1-1/4-inches in low acid foods to be processed in a pressure canner. This space is needed for expansion of food as jars are processed, and for forming vacuums in cooled jars. The extent of expansion is determined by the air content in the food and by the processing temperature. Air expands greatly when heated to high temperatures; the higher the temperature, the greater the expansion. Foods expand less than air when heated.



### Jars and lids

Food may be canned in glass jars or metal containers. Metal containers can be used only once. They require special sealing equipment and are much more costly than jars.

Regular and wide-mouth Mason-type, threaded, home-canning jars with self-sealing lids are the best choice. They are available in 1/2 pint, pint, 1-1/2 pint, quart, and 1/2 gallon sizes. The standard jar mouth opening is about 2-3/8 inches. Wide-mouth jars have openings of about 3 inches, making them more easily filled and emptied. Half-gallon jars may be used for canning very acid juices. Regular-mouth decorator jelly jars are available in 8 and 12 ounce sizes. With careful use and handling, Mason jars may be reused many times, requiring only new lids each time. When jars and lids are used properly, jar seals and vacuums are excellent and jar breakage is rare.



Most commercial pint- and quart-size mayonnaise or salad dressing jars may be used with new two-piece lids for canning acid foods. However, you should expect more seal failures and jar breakage. These jars have a narrower sealing surface and are tempered less than Mason jars, and may be weakened by repeated contact with metal spoons or knives used in dispensing mayonnaise or salad dressing. Seemingly insignificant scratches in glass may cause cracking and breakage while processing jars in a canner. Mayonnaise-type jars are not recommended for use with foods to be processed in a pressure canner because of excessive jar breakage. Other commercial jars with mouths that cannot be sealed with two-piece canning lids are not recommended for use in canning any food at home.

#### *Jar cleaning and preparation*

Before every use, wash empty jars in hot water with detergent and rinse well by hand, or wash in a dishwasher. Unrinsed detergent residues may cause unnatural flavors and colors. Jars should be kept hot until ready to fill with food. Submerge the clean empty jars in enough water to cover them in a large stockpot or boiling water canner. Bring the water to a simmer (180°F) and keep the jars in the simmering water until it is time to fill them with food. A dishwasher may be used for preheating jars if they are washed and dried on a complete regular cycle. Keep the jars in the closed dishwasher until needed for filling.

These washing and preheating methods do not sterilize jars. Some used jars may have a white film on the exterior surface caused by mineral deposits. This scale or hard-water film on jars is easily removed by soaking jars several hours in a solution containing 1 cup of vinegar (5 percent acidity) per gallon of water prior to washing and preheating the jars.

#### *Sterilization of empty jars*

All jams, jellies, and pickled products processed less than 10 minutes should be filled into sterile empty jars. To sterilize empty jars after washing in detergent and rinsing thoroughly, submerge

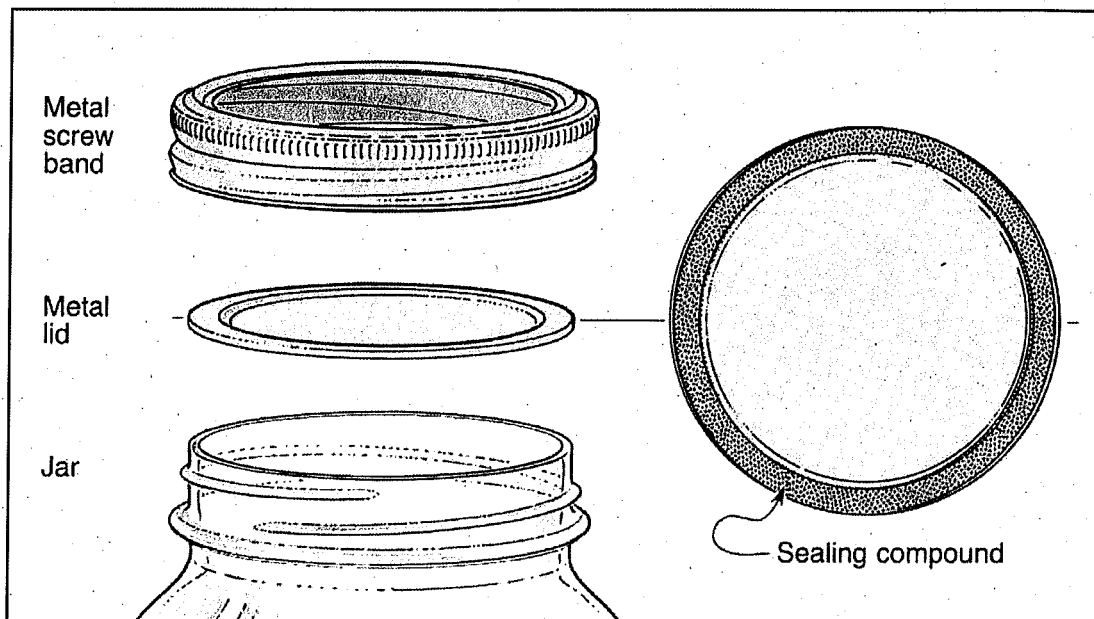
them, right side up, in a boiling-water canner with the rack in the bottom. Fill the canner with enough warm water so it is 1 inch above the tops of the jars. Bring the water to a boil, and boil 10 minutes at altitudes of less than 1,000 ft. At higher elevations, boil 1 additional minute for each additional 1,000 ft elevation. Reduce the heat under the canner, and keep the jars in the hot water until it is time to fill them. Remove and drain hot sterilized jars one at a time, saving the hot water in the canner for processing filled jars. Fill the sterilized jars with food, add lids, and tighten screw bands.

Empty jars used for vegetables, meats, and fruits to be processed in a pressure canner need not be presterilized. It is also unnecessary to presterilize jars for fruits, tomatoes, and pickled or fermented foods that will be processed 10 minutes or longer in a boiling-water canner.

#### *Lid selection, preparation, and use*

The common self-sealing lid consists of a flat metal lid held in place by a metal screw band during processing. The flat lid is crimped around its bottom edge to form a trough, which is filled with a colored gasket compound. When jars are processed, the lid gasket softens and flows slightly to cover the jar-sealing surface, yet allows air to escape from the jar. The gasket then forms an airtight seal as the jar cools. Gaskets in unused lids work well for at least 5 years from date of manufacture. The gasket compound in older unused lids may fail to seal on jars.

Buy only the quantity of lids you will use in a year. To ensure a good seal, carefully follow the manufacturer's directions in preparing lids for use. Examine all metal lids carefully. Do not use old, dented, or deformed lids, or lids with gaps or other defects in the sealing gasket.



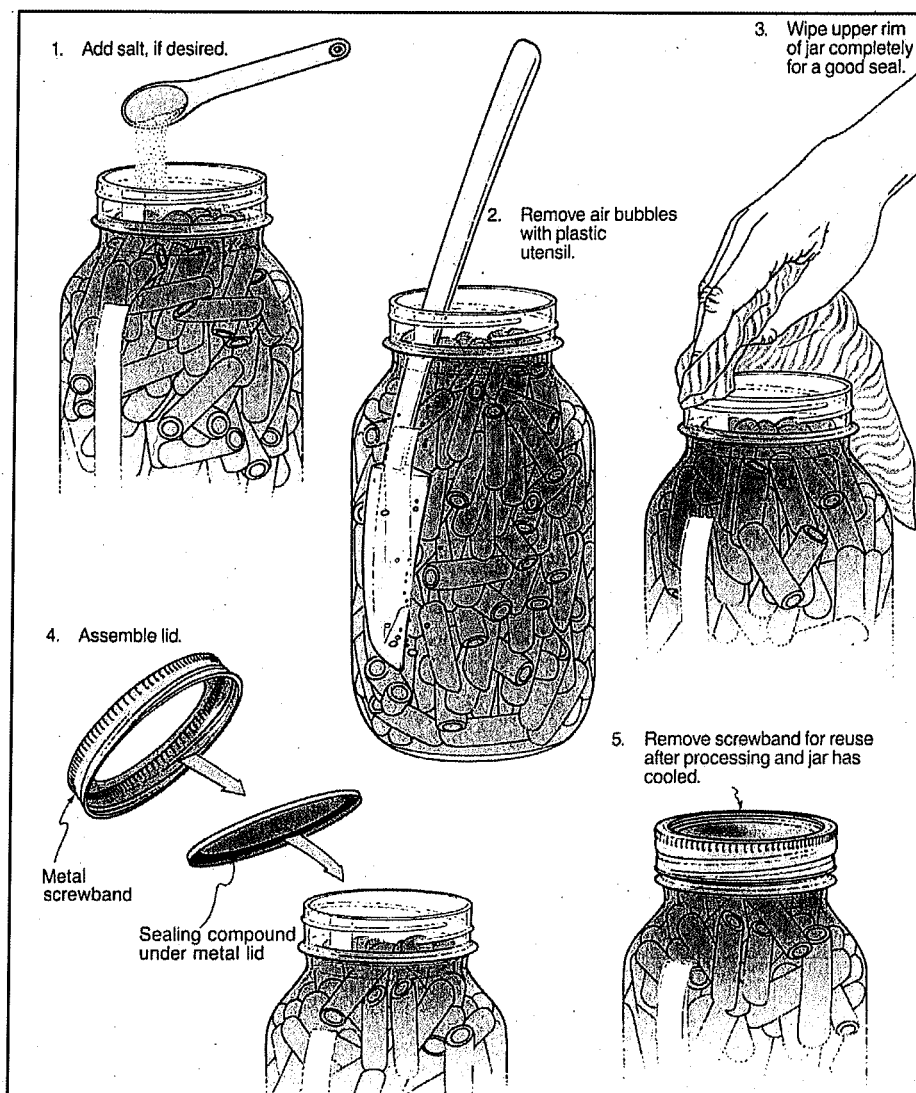
When directions say to fill jars and adjust lids, use the following procedures: After filling jars with food and adding covering liquid, release air bubbles by inserting a flat plastic (not metal) spatula between the food and the jar. Slowly turn the jar and move the spatula up and down to allow air bubbles to escape. (It is not necessary to release air bubbles when filling jams, jellies or all liquid foods such as juices.) Adjust the headspace and then clean the jar rim (sealing surface) with a

dampened paper towel. Place the preheated lid, gasket down, onto the cleaned jar-sealing surface. Uncleaned jar-sealing surfaces may cause seal failures. Then fit the metal screw band over the flat lid. Follow the manufacturer's guidelines enclosed with or on the box for tightening the jar lids properly.

**Do not retighten lids after processing jars.** As jars cool, the contents in the jar contract, pulling the self-sealing lid firmly against the jar to form a high vacuum.

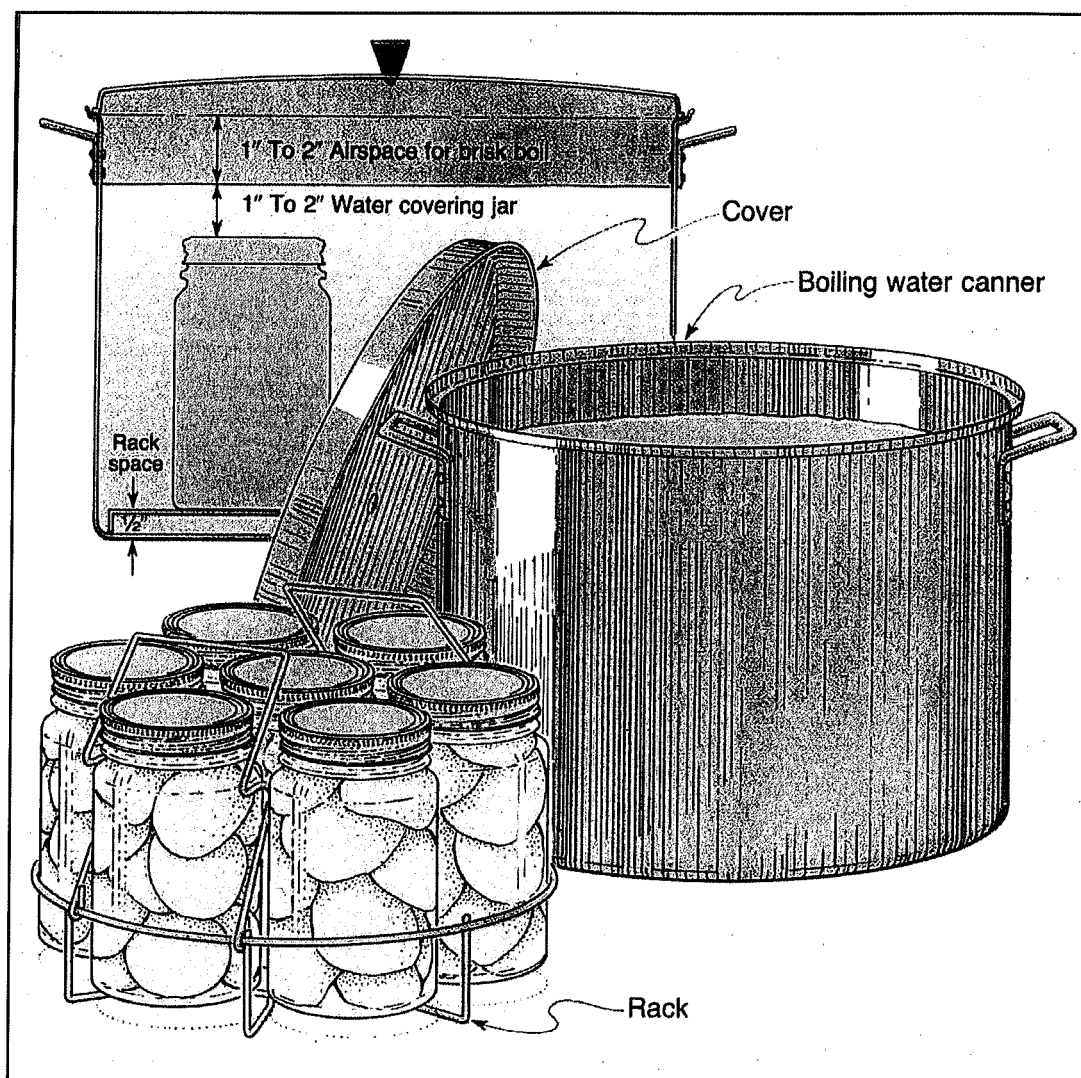
- If rings are too loose, liquid may escape from jars during processing, and seals may fail.
- If rings are too tight, air cannot vent during processing, and food will discolor during storage. Over tightening also may cause lids to buckle and jars to break, especially with raw-packed, pressure-processed food.

Screw bands are not needed on stored jars. They can be removed easily after jars are cooled. When removed, washed, dried, and stored in a dry area, screw bands may be used many times. If left on stored jars, they become difficult to remove, often rust, and may not work properly again.



## Recommended canners

Equipment for heat-processing home-canned food is of two main types—boiling water canners and pressure canners. Most are designed to hold seven quart jars or eight to nine pints. Small pressure canners hold four-quart jars; some large pressure canners hold 18 pint jars in two layers, but hold only seven quart jars. Pressure saucepans with smaller volume capacities are not recommended for use in canning. Small capacity pressure canners are treated in a similar manner as standard larger canners, and should be vented using the typical venting procedures.



Low-acid foods must be processed in a pressure canner to be free of botulism risks. Although pressure canners may also be used for processing acid foods, boiling water canners are recommended for this purpose because they are faster. A pressure canner would require from 55 to 100 minutes to process a load of jars; while the total time for processing most acid foods in boiling water varies from 25 to 60 minutes. A boiling-water canner loaded with filled jars requires about 20 to 30 minutes of heating before its water begins to boil. A loaded pressure canner requires about 12 to 15 minutes of heating before it begins to vent; another 10 minutes to vent the canner; another 5 minutes to pressurize the canner; another 8 to 10 minutes to process the acid food; and, finally, another 20 to 60 minutes to cool the canner before removing jars.



### *Boiling-water canners*

These canners are made of aluminum or porcelain-covered steel. They have removable perforated racks and fitted lids. The canner must be deep enough so that at least 1 inch of briskly boiling water will be over the tops of jars during processing. Some boiling-water canners do not have flat bottoms. A flat bottom must be used on an electric range. Either a flat or ridged bottom can be used on a gas burner. To ensure uniform processing of all jars with an electric range, the canner should be no more than 4 inches wider in diameter than the element on which it is heated.

### *Using boiling-water canners*

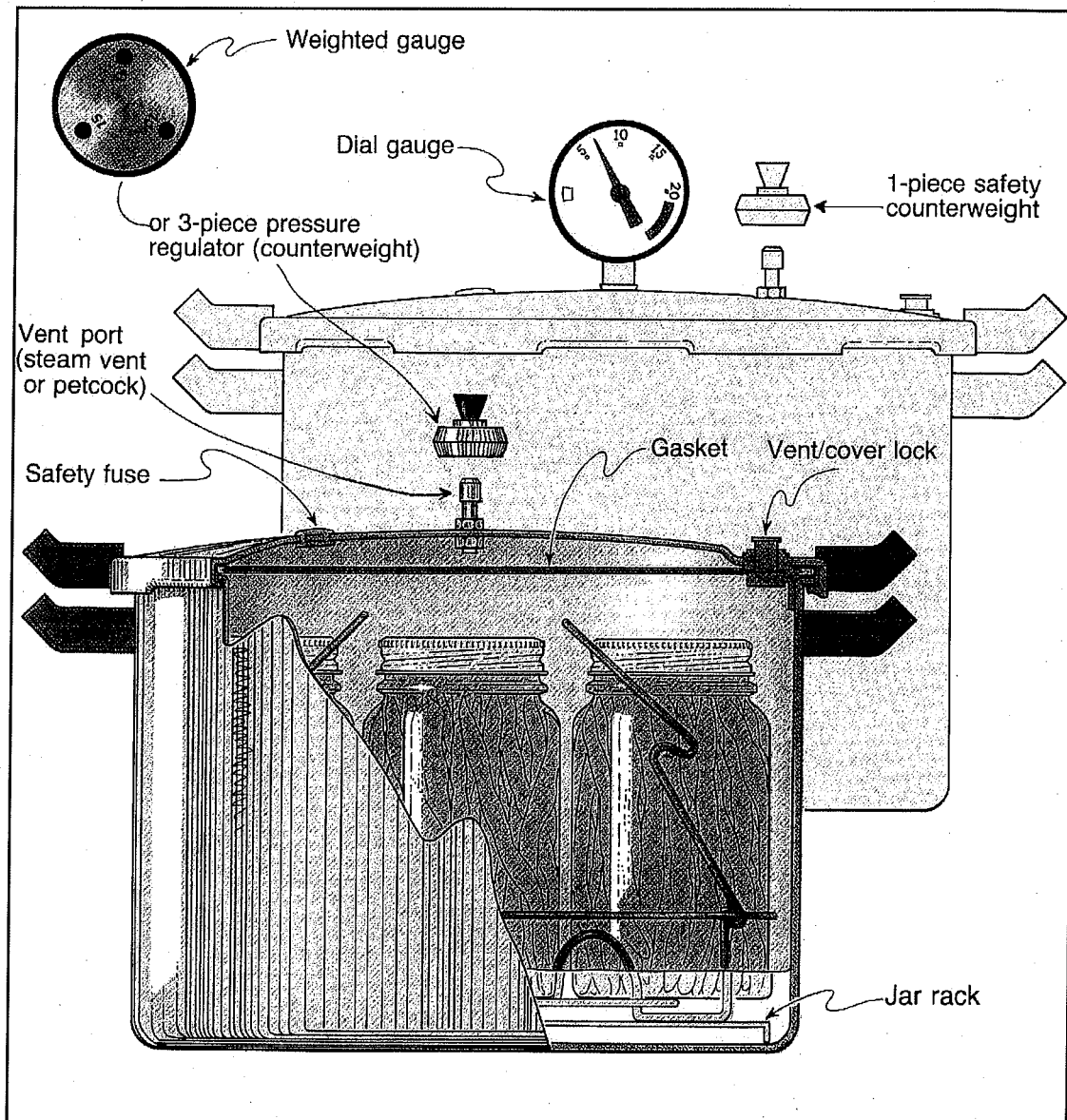
Follow these steps for successful boiling-water canning:

1. Before you start preparing your food, fill the canner halfway with clean water. This is approximately the level needed for a canner load of pint jars. For other sizes and numbers of jars, the amount of water in the canner will need to be adjusted so it will be 1 to 2 inches over the top of the filled jars.
2. Preheat water to 140°F for raw-packed foods and to 180°F for hot-packed foods. Food preparation can begin while this water is preheating.
3. Load filled jars, fitted with lids, into the canner rack and use the handles to lower the rack into the water; or fill the canner with the rack in the bottom, one jar at a time, using a jar lifter. When using a jar lifter, make sure it is securely positioned below the neck of the jar (below the screw band of the lid). Keep the jar upright at all times. Tilting the jar could cause food to spill into the sealing area of the lid.
4. Add more boiling water, if needed, so the water level is at least 1 inch above jar tops. For process times over 30 minutes, the water level should be at least 2 inches above the tops of the jars.
5. Turn heat to its highest position, cover the canner with its lid, and heat until the water in the canner boils vigorously.
6. Set a timer for the total minutes required for processing the food.
7. Keep the canner covered and maintain a boil throughout the process schedule. The heat setting may be lowered a little as long as a complete boil is maintained for the entire process time. If the water stops boiling at any time during the process, bring the water back to a vigorous boil and begin the timing of the process over, from the beginning.
8. Add more boiling water, if needed, to keep the water level above the jars.
9. When jars have been boiled for the recommended time, turn off the heat and remove the canner lid. Wait 5 minutes before removing jars.
10. Using a jar lifter, remove the jars and place them on a towel, leaving at least 1-inch spaces between the jars during cooling. Let jars sit undisturbed to cool at room temperature for 12 to 24 hours.

### Pressure canners

Pressure canners for use in the home have been extensively redesigned in recent years. Models made before the 1970's were heavy-walled kettles with clamp-on or turn-on lids. They were fitted with a dial gauge, a vent port in the form of a petcock or counterweight, and a safety fuse. Modern pressure canners are lightweight, thin walled kettles; most have turn-on lids. They have a jar rack, gasket, dial or weighted gauge, an automatic vent/cover lock, a vent port (steam vent) to be closed with a counterweight or weighted gauge, and a safety fuse.

Pressure does not destroy microorganisms, but high temperatures applied for an adequate period of time do kill microorganisms. The success of destroying all microorganisms capable of growing in canned food is based on the temperature obtained in pure steam, free of air, at sea level. At sea level, a canner operated at a gauge pressure of 10.5 lbs provides an internal temperature of 240°F.



Two serious errors in temperatures obtained in pressure canners occur because:

1. **Internal canner temperatures are lower at higher altitudes.** To correct this error, canners must be operated at the increased pressures specified in this publication for appropriate altitude ranges.
2. **Air trapped in a canner lowers the temperature obtained at 5, 10, or 15 pounds of pressure and results in under processing.** The highest volume of air trapped in a canner occurs in processing raw-packed foods in dial-gauge canners. These canners do not vent air during processing. To be safe, all types of pressure canners must be vented 10 minutes before they are pressurized.

To vent a canner, leave the vent port uncovered on newer models or manually open petcocks on some older models. Heating the filled canner with its lid locked into place boils water and generates steam that escapes through the petcock or vent port. When steam first escapes, set a timer for 10 minutes. After venting 10 minutes, close the petcock or place the counterweight or weighted gauge over the vent port to pressurize the canner.

Weighted-gauge models exhaust tiny amounts of air and steam each time their gauge rocks or jiggles during processing. They control pressure precisely and need neither watching during processing nor checking for accuracy. The sound of the weight rocking or jiggling indicates that the canner is maintaining the recommended pressure. The single disadvantage of weighted-gauge canners is that they cannot correct precisely for higher altitudes. At altitudes above 1,000 feet, they must be operated at canner pressures of 10 instead of 5, or 15 instead of 10, PSI.

Check dial gauges for accuracy before use each year. Gauges that read high cause under-processing and may result in unsafe food. Low readings cause over-processing. Pressure adjustments can be made if the gauge reads up to 2 pounds high or low. Replace gauges that differ by more than 2 pounds. Every pound of pressure is very important to the temperature needed inside the canner for producing safe food, so accurate gauges and adjustments are essential when a gauge reads higher than it should. If a gauge is reading lower than it should, adjustments may be made to avoid overprocessing, but are not essential to safety. Gauges may be checked at many county Cooperative Extension offices or contact the pressure canner manufacturer for other options.

Handle canner lid gaskets carefully and clean them according to the manufacturer's directions. Nicked or dried gaskets will allow steam leaks during pressurization of canners. Keep gaskets clean between uses. Gaskets on older model canners may require a light coat of vegetable oil once per year. Gaskets on newer model canners are pre-lubricated and do not benefit from oiling. Check your canner's instructions if there is doubt that the particular gasket you use has been pre-lubricated.

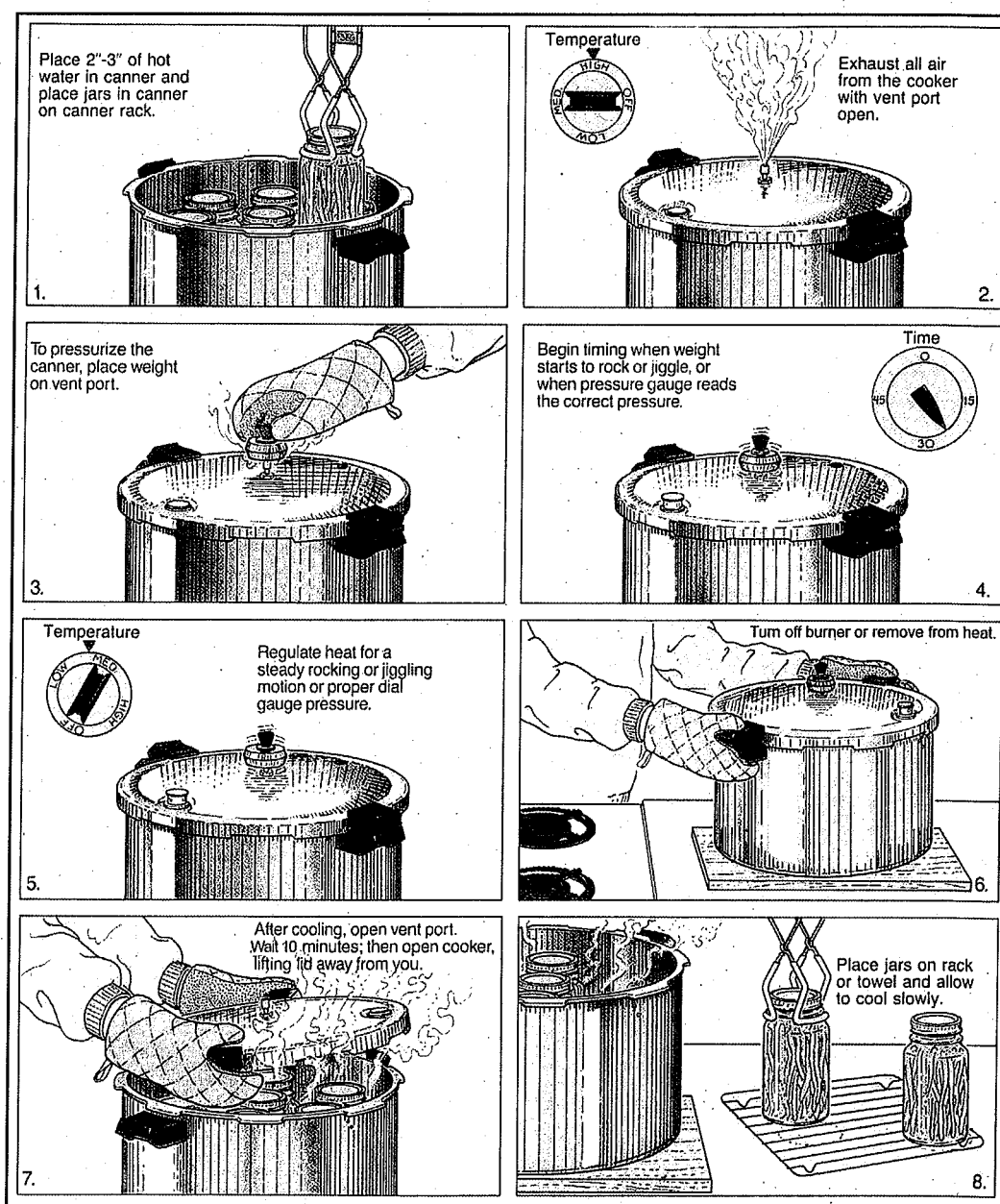
Lid safety fuses are thin metal inserts or rubber plugs designed to relieve excessive pressure from the canner. Do not pick at or scratch fuses while cleaning lids. Use only canners that have the Underwriter's Laboratory (UL) approval to ensure their safety.

Replacement gauges and other parts for canners are often available at stores offering canning equipment or from canner manufacturers. When ordering parts, give your canner model number and describe the parts needed.

## Using pressure canners

Follow these steps for successful pressure canning:

1. Put 2 to 3 inches of hot water in the canner. Some specific products in this Guide require that you start with even more water in the canner. Always follow the directions with USDA processes for specific foods if they require more water added to the canner. Place filled jars on the rack, using a jar lifter. When using a jar lifter, make sure it is securely positioned below the neck of the jar (below the screw band of the lid). Keep the jar upright at all times. Tilting the jar could cause food to spill into the sealing area of the lid. Fasten canner lid securely.
2. Leave weight off vent port or open petcock. Heat at the highest setting until steam flows freely from the open petcock or vent port.



3. While maintaining the high heat setting, let the steam flow (exhaust) continuously for 10 minutes, and then place the weight on the vent port or close the petcock. The canner will pressurize during the next 3 to 5 minutes.
4. Start timing the process when the pressure reading on the dial gauge indicates that the recommended pressure has been reached, or when the weighted gauge begins to jiggle or rock as the canner manufacturer describes.
5. Regulate heat under the canner to maintain a steady pressure at or slightly above the correct gauge pressure. Quick and large pressure variations during processing may cause unnecessary liquid losses from jars. Follow the canner manufacturer's directions for how a weighted gauge should indicate it is maintaining the desired pressure.

**IMPORTANT:** If at any time pressure goes below the recommended amount, bring the canner back to pressure and begin the timing of the process over, from the beginning (using the total original process time). This is important for the safety of the food.

6. When the timed process is completed, turn off the heat, remove the canner from heat if possible, and let the canner depressurize. **Do not force-cool the canner.** Forced cooling may result in unsafe food or food spoilage. Cooling the canner with cold running water or opening the vent port before the canner is fully depressurized will cause loss of liquid from jars and seal failures. Force-cooling may also warp the canner lid of older model canners, causing steam leaks. Depressurization of older models without dial gauges should be timed. Standard-size heavy-walled canners require about 30 minutes when loaded with pints and 45 minutes with quarts. Newer thin-walled canners cool more rapidly and are equipped with vent locks. These canners are depressurized when their vent lock piston drops to a normal position.
7. After the canner is depressurized, remove the weight from the vent port or open the petcock. Wait 10 minutes, unfasten the lid, and remove it carefully. Lift the lid away from you so that the steam does not burn your face.
8. Remove jars with a jar lifter, and place them on a towel, leaving at least 1-inch spaces between the jars during cooling. Let jars sit undisturbed to cool at room temperature for 12 to 24 hours.

### Selecting the correct processing time

When canning in boiling water, more processing time is needed for most raw-packed foods and for quart jars than is needed for hot-packed foods and pint jars.

To destroy microorganisms in acid foods processed in a boiling-water canner, you must:

- Process jars for the correct number of minutes in boiling water.
- Cool the jars at room temperature.

The food may spoil if you fail to add process time for lower boiling-water temperatures at altitudes above 1,000 feet, process for fewer minutes than specified, or cool jars in cold water.

To destroy microorganisms in low-acid foods processed with a pressure canner, you must:

- Process the jars using the correct time and pressure specified for your altitude.
- Allow canner to cool at room temperature until it is completely depressurized.

The food may spoil if you fail to select the proper process times for specific altitudes, fail to exhaust canners properly, process at lower pressure than specified, process for fewer minutes than specified, or cool the canner with water.

### Using tables for determining proper process times

This set of guides includes processing times with altitude adjustments for each product. Process times for 1/2-pint and pint jars are the same, as are times for 1-1/2 pint and quart jars. For some products, you have a choice of processing at 5, 10, or 15 PSI. In these cases, choose the canner pressure you wish to use and match it with your pack style (raw or hot) and jar size to find the correct process time. The following examples show how to select the proper process for each type of canner. Process times are given in separate tables for sterilizing jars in boiling-water, dial-gauge, and weighted-gauge pressure canners.

#### Example A: Boiling-water Canner

Suppose you are canning peaches as a hot-pack in quarts at 2,500 ft above sea level, using a *boiling-water canner*. First, select the process table for boiling-water canner. The example for peaches is given in **Table for Example A** below. From that table, select the process time given for (1) the style of pack (hot), (2) the jar size (quarts), and (3) the altitude where you live (2,500 ft). You should have selected a process time of 30 minutes.

Table for Example A Recommended process time for Peaches in a boiling-water canner					
Style of Pack	Jar Size	Process Time at Altitudes of			
		0–1,000 ft	1,001–3,000 ft	3,001–6,000 ft	Above 6,000 ft
Hot	Pints	20 min	25 min	30 min	35 min
	Quarts	25	30	35	40
Raw	Pints	25	30	35	40
	Quarts	30	35	40	45

### Example B: Dial-gauge Pressure Canner

Suppose you are canning peaches as a hot-pack in quarts at 2,500 ft above sea level, using a *dial-gauge pressure canner*. First, select the process table for dial-gauge pressure canner. The example for peaches is given in **Table for Example B** below. From that table, select the process pressure (PSI) given for (1) the style of pack (hot), (2) the jar size (quarts), (3) the process time (10 minutes), (4) the altitude where you live (2,500 ft). You should have selected a pressure of 7 lbs for the 10 minutes process time.

<b>Table for Example B</b> Recommended process time for Peaches in a dial-gauge pressure canner						
Style of Pack	Jar Size	Process Time	Canner Pressure (PSI) at Altitudes of			
			0– 2,000 ft	2,001– 4,000 ft	4,001– 6,000 ft	6,001– 8,000 ft
Hot and Raw	Pints or Quarts	10 min	6 lb	7 lb	8 lb	9 lb

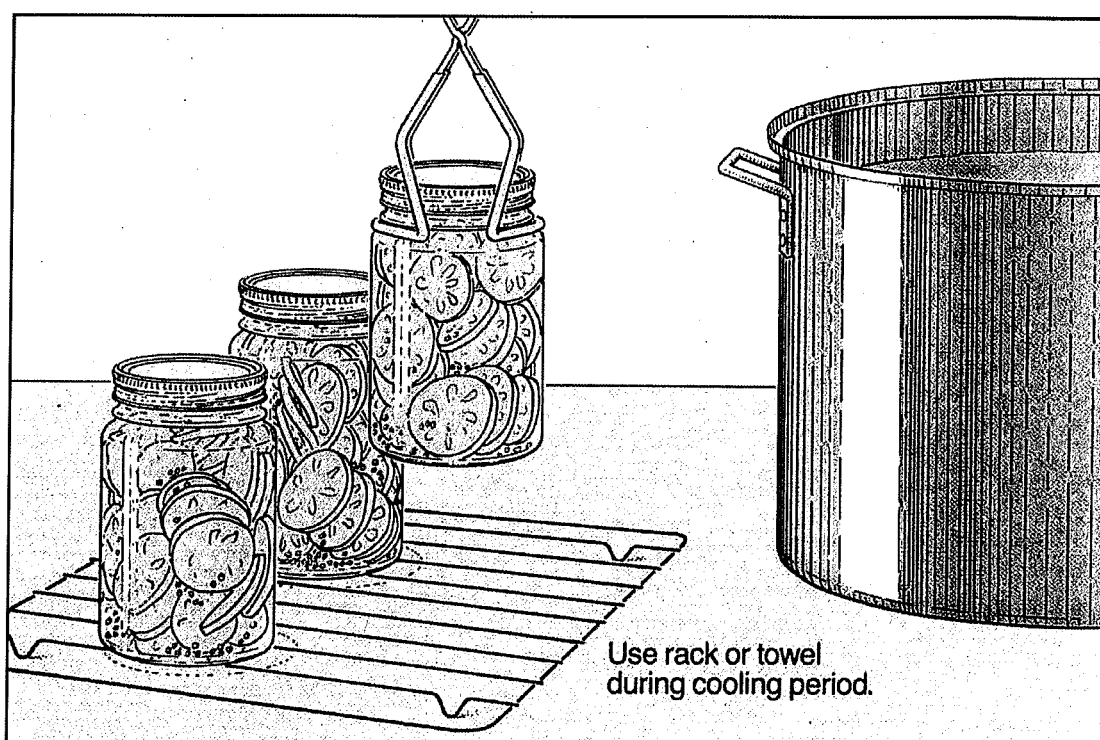
### Example C: Weighted-gauge Pressure Canner

Suppose you are canning peaches as a hot-pack in quarts at 2,500 ft above sea level, using a *weighted-gauge pressure canner*. First, select the process table for weighted-gauge pressure canner. The example for peaches is given in **Table for Example C** below. From that table, select the process pressure (PSI) given for (1) the style of pack (hot), (2) the jar size (quarts), (3) the process time (10 minutes), and (4) the altitude where you live (2,500 ft). You should have selected a pressure of 10 lbs for the 10 minutes process time.

<b>Table for Example C</b> Recommended process time for Peaches in a weighted-gauge pressure canner				
Style of Pack	Jar Size	Process Time	Canner Pressure (PSI) at Altitudes of	
			0– 1,000 ft	Above 1,000 ft
Hot and Raw	Pints or Quarts	10 min	5 lb	10 lb

## Cooling jars

When you remove hot jars from a canner, do not retighten their jar lids. Retightening of hot lids may cut through the gasket and cause seal failures. Cool the jars at room temperature for 12 to 24 hours. Jars may be cooled on racks or towels to minimize heat damage to counters. The food level and liquid volume of raw-packed jars will be noticeably lower after cooling. Air is exhausted during processing and food shrinks. If a jar loses excessive liquid during processing, do not open it to add more liquid. Check for sealed lids as described below.

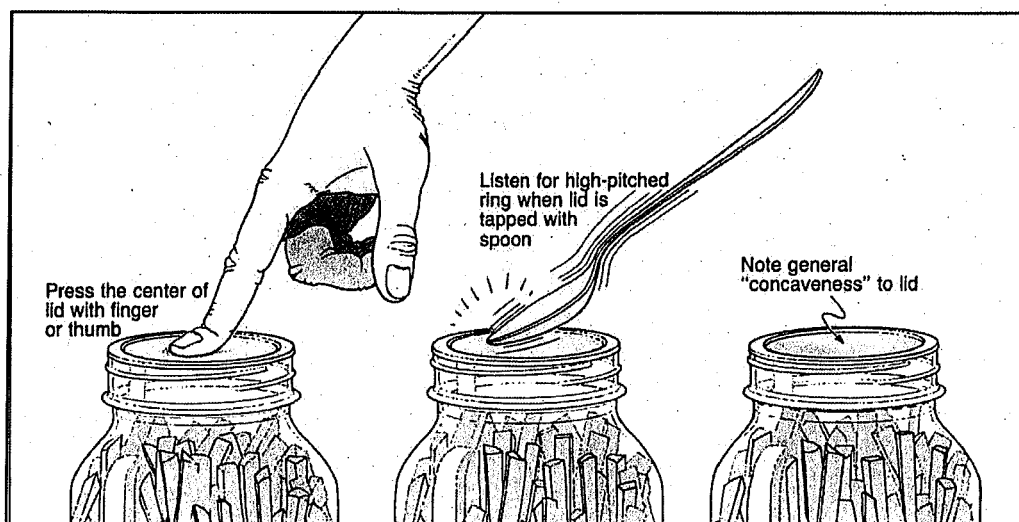


## Testing jar seals

After cooling jars for 12 to 24 hours, remove the screw bands and test seals with one of the following options:

- Option 1.* Press the middle of the lid with a finger or thumb. If the lid springs up when you release your finger, the lid is unsealed.
- Option 2.* Tap the lid with the bottom of a teaspoon. If it makes a dull sound, the lid is not sealed. If food is in contact with the underside of the lid, it will also cause a dull sound. If the jar is sealed correctly, it will make a ringing, high-pitched sound.
- Option 3.* Hold the jar at eye level and look across the lid. The lid should be concave (curved down slightly in the center). If center of the lid is either flat or bulging, it may not be sealed.





### Reprocessing unsealed jars

If a lid fails to seal on a jar, remove the lid and check the jar-sealing surface for tiny nicks. If necessary, change the jar, add a new, properly prepared lid, and reprocess within 24 hours using the same processing time. Headspace in unsealed jars may be adjusted to 1-1/2 inches and jars could be frozen instead of reprocessed. Foods in single unsealed jars could be stored in the refrigerator and consumed within several days.

### Storing canned foods

If lids are tightly vacuum sealed on cooled jars, remove screw bands, wash the lid and jar to remove food residue; then rinse and dry jars. Label and date the jars and store them in a clean, cool, dark, dry place. Do not store jars above 95°F or near hot pipes, a range, a furnace, under a sink, in an uninsulated attic, or in direct sunlight. Under these conditions, food will lose quality in a few weeks or months and may spoil. Dampness may corrode metal lids, break seals, and allow recontamination and spoilage.

Accidental freezing of canned foods will not cause spoilage unless jars become unsealed and recontaminated. However, freezing and thawing may soften food. If jars must be stored where they may freeze, wrap them in newspapers, place them in heavy cartons, and cover with more newspapers and blankets.

### Identifying and handling spoiled canned food

**Do not taste food from a jar with an unsealed lid or food that shows signs of spoilage.**

You can more easily detect some types of spoilage in jars stored without screw bands. Growth of spoilage bacteria and yeast produces gas which pressurizes the food, swells lids, and breaks jar seals. As each stored jar is selected for use, examine its lid for tightness and vacuum. Lids with concave centers have good seals.

Next, while holding the jar upright at eye level, rotate the jar and examine its outside surface for streaks of dried food originating at the top of the jar. Look at the contents for rising air bubbles and unnatural color.

While opening the jar, smell for unnatural odors and look for spurting liquid and cotton-like mold growth (white, blue, black, or green) on the top food surface and underside of lid.

Spoiled low-acid foods, including tomatoes, may exhibit different kinds of spoilage evidence or very little evidence. Therefore, all suspect containers of spoiled low-acid foods, including tomatoes, should be treated as having produced botulinum toxin and handled carefully in one of two ways:

- If the suspect glass jars or swollen metal cans are still sealed, place them in a heavy garbage bag. Close and place the bag in a regular trash container or dispose in a nearby landfill.
- If the suspect glass jars or cans are unsealed, open, or leaking, they should be detoxified before disposal.

**Detoxification process:** Wear disposable rubber or heavy plastic gloves. Carefully place the suspect containers and lids on their sides in an 8-quart volume or larger stock pot, pan, or boiling-water canner. Wash your hands with gloves thoroughly. Carefully add water to the pot and avoid splashing the water. The water should completely cover the containers with a minimum of a 1-inch level above the containers. Place a lid on the pot and heat the water to boiling. Boil 30 minutes to ensure detoxifying the food and all container components. Cool and discard the containers, their lids, and food in the trash or dispose in a nearby landfill.

**Cleaning up the area:** Contact with botulinum toxin can be fatal whether it is ingested or enters through the skin. Take care to avoid contact with suspect foods or liquids. Wear rubber or heavy plastic gloves when handling suspect foods or cleaning up contaminated work surfaces and equipment. A fresh solution of 1 part unscented liquid household chlorine bleach (5 to 6% sodium hypochlorite) to 5 parts clean water should be used to treat work surfaces, equipment, or other items, including can openers and clothing, that may have come in contact with suspect foods or liquids. Spray or wet contaminated surfaces with the bleach solution and let stand for 30 minutes. Wearing gloves, wipe up treated spills with paper towels being careful to minimize the spread of contamination. Dispose of these paper towels by placing them in a plastic bag before putting them in the trash. Next, apply the bleach solution to all surfaces and equipment again, and let stand for 30 minutes and rinse. As a last step, thoroughly wash all detoxified counters, containers, equipment, clothing, etc. Discard gloves when cleaning process is complete. (Note: Bleach is an irritant itself and should not be inhaled or allowed to come in contact with the skin.)

## Preparing pickled and fermented foods

The many varieties of pickled and fermented foods are classified by ingredients and method of preparation.

Regular dill pickles and sauerkraut are fermented and cured for about 3 weeks. Refrigerator dills are fermented for about 1 week. During curing, colors and flavors change and acidity increases. Fresh-pack or quick-process pickles are not fermented; some are brined several hours or overnight, then drained and covered with vinegar and seasonings. Fruit pickles usually are prepared by heating fruit in a seasoned syrup acidified with either lemon juice or vinegar. Relishes are made from chopped fruits and vegetables that are cooked with seasonings and vinegar.

Be sure to remove and discard a 1/16-inch slice from the blossom end of fresh cucumbers. Blossoms may contain an enzyme which causes excessive softening of pickles.

**Caution: The level of acidity in a pickled product is as important to its safety as it is to taste and texture.**

- **Do not alter vinegar, food, or water proportions in a recipe or use a vinegar with unknown acidity.**
- **Use only recipes with tested proportions of ingredients.**
- **There must be a minimum, uniform level of acid throughout the mixed product to prevent the growth of botulinum bacteria.**

### *Ingredients*

Select fresh, firm fruits or vegetables free of spoilage. Measure or weigh amounts carefully, because the proportion of fresh food to other ingredients will affect flavor and, in many instances, safety.

Use canning or pickling salt. Noncaking material added to other salts may make the brine cloudy. Since flake salt varies in density, it is not recommended for making pickled and fermented foods. White granulated and brown sugars are most often used. Corn syrup and honey, unless called for in reliable recipes, may produce undesirable flavors. White distilled and cider vinegars of 5 percent acidity (50 grain) are recommended. White vinegar is usually preferred when light color is desirable, as is the case with fruits and cauliflower.

### *Pickles with reduced salt content*

Recipes for pickles with reduced sodium content are provided in Guide 6.

In the making of fresh-pack pickles, cucumbers are acidified quickly with vinegar. Use only tested recipes formulated to produce the proper acidity. While these pickles may be prepared safely with reduced or no salt, their quality may be noticeably lower. Both texture and flavor may be slightly, but noticeably, different than expected. You may wish to make small quantities first to determine if you like them.

However, the salt used in making fermented sauerkraut and brined pickles not only provides characteristic flavor but also is vital to safety and texture. In fermented foods, salt favors the growth of desirable bacteria while inhibiting the growth of others. **Caution: Do not attempt to make sauerkraut or fermented pickles by cutting back on the salt required.**

### *Firming agents*

Alum may be safely used to firm fermented pickles. However, it is unnecessary and is not included in the recipes in this publication. Alum does not improve the firmness of quick-process pickles. The calcium in lime definitely improves pickle firmness. Food-grade lime may be used as a lime-water solution for soaking fresh cucumbers 12 to 24 hours before pickling them. Excess lime absorbed by the cucumbers must be removed to make safe pickles. To remove excess lime, drain the lime-water solution, rinse, and then resoak the cucumbers in fresh water for 1 hour. Repeat the

rinsing and soaking steps two more times. To further improve pickle firmness, you may process cucumber pickles for 30 minutes in water at 180°F. This process also prevents spoilage, **but the water temperature should not fall below 180°F**. Use a candy or jelly thermometer to check the water temperature.

### *Preventing spoilage*

Pickle products are subject to spoilage from microorganisms, particularly yeasts and molds, as well as enzymes that may affect flavor, color, and texture. Processing the pickles in a boiling-water canner will prevent both of these problems. Standard canning jars and self-sealing lids are recommended. Processing times and procedures will vary according to food acidity and the size of food pieces.

## **Preparing butters, jams, jellies, and marmalades**

Sweet spreads are a class of foods with many textures, flavors, and colors. They all consist of fruits preserved mostly by means of sugar and they are thickened or jellied to some extent. Fruit jelly is a semi-solid mixture of fruit juice and sugar that is clear and firm enough to hold its shape. Other spreads are made from crushed or ground fruit.

Jam also will hold its shape, but it is less firm than jelly. Jam is made from crushed or chopped fruits and sugar. Jams made from a mixture of fruits are usually called conserves, especially when they include citrus fruits, nuts, raisins, or coconut. Preserves are made of small, whole fruits or uniform-size pieces of fruits in a clear, thick, slightly jellied syrup. Marmalades are soft fruit jellies with small pieces of fruit or citrus peel evenly suspended in a transparent jelly. Fruit butters are made from fruit pulp cooked with sugar until thickened to a spreadable consistency.

### *Ingredients*

For proper texture, jellied fruit products require the correct combination of fruit, pectin, acid, and sugar. The fruit gives each spread its unique flavor and color. It also supplies the water to dissolve the rest of the necessary ingredients and furnishes some or all of the pectin and acid. Good-quality, flavorful fruits make the best jellied products.

Pectins are substances in fruits that form a gel if they are in the right combination with acid and sugar. All fruits contain some pectin. Apples, crab apples, gooseberries, and some plums and grapes usually contain enough natural pectin to form a gel. Other fruits, such as strawberries, cherries, and blueberries, contain little pectin and must be combined with other fruits high in pectin or with commercial pectin products to obtain gels. Because fully ripened fruit has less pectin, one-fourth of the fruit used in making jellies without added pectin should be underripe.

**Caution: Commercially frozen and canned juices may be low in natural pectins and make soft textured spreads.**

The proper level of acidity is critical to gel formation. If there is too little acid, the gel will never set; if there is too much acid, the gel will lose liquid (weep). For fruits low in acid, add lemon juice or other acid ingredients as directed. Commercial pectin products contain acids which help to ensure gelling.

Sugar serves as a preserving agent, contributes flavor, and aids in gelling. Cane and beet sugar are the usual sources of sugar for jelly or jam. Corn syrup and honey may be used to replace part of the sugar in recipes, but too much will mask the fruit flavor and alter the gel structure. Use tested recipes for replacing sugar with honey and corn syrup. Do not try to reduce the amount of sugar in traditional recipes. Too little sugar prevents gelling and may allow yeasts and molds to grow.

### *Jams and jellies with reduced sugar*

Jellies and jams that contain modified pectin, gelatin, or gums may be made with noncaloric sweeteners. Jams with less sugar than usual also may be made with concentrated fruit pulp, which contains less liquid and less sugar. See Guide 7 for recipes.

Two types of modified pectin are available for home use. One gels with one-third less sugar. The other is a low-methoxyl pectin which requires a source of calcium for gelling. To prevent spoilage, jars of these products may need to be processed longer in a boiling-water canner. Recipes and processing times provided with each modified pectin product must be followed carefully. The proportions of acids and fruits should not be altered, as spoilage may result. Acceptably gelled refrigerator fruit spreads also may be made with gelatin and sugar substitutes. Such products spoil at room temperature, must be refrigerated, and should be eaten within 1 month.

### *Preventing spoilage*

Even though sugar helps preserve jellies and jams, molds can grow on the surface of these products. Research now indicates that the mold which people usually scrape off the surface of jellies may not be as harmless as it seems. Mycotoxins have been found in some jars of jelly having surface mold growth. Mycotoxins are known to cause cancer in animals; their effects on humans are still being researched. Because of possible mold contamination, paraffin or wax seals are no longer recommended for any sweet spread, including jellies. To prevent growth of molds and loss of good flavor or color, fill products hot into sterile Mason jars, leaving 1/4-inch headspace, seal with self-sealing lids, and process 5 minutes in a boiling-water canner. Correct process time at higher elevations by adding 1 additional minute per 1,000 ft above sea level. If unsterile jars are used, the filled jars should be processed 10 minutes. Use of sterile jars is preferred, especially when fruits are low in pectin, since the added 5-minute process time may cause weak gels. To sterilize empty jars, see page 1-14.

### *Methods of making jams and jellies*

The two basic methods of making jams and jellies are described in Guide 7. The standard method, which does not require added pectin, works best with fruits naturally high in pectin. The other method, which requires the use of commercial liquid or powdered pectin, is much quicker. The gelling ability of various pectins differs. To make uniformly gelled products, be sure to add the quantities of commercial pectins to specific fruits as instructed on each package. Overcooking may break down pectin and prevent proper gelling. When using either method, make one batch at a time, according to the recipe. Increasing the quantities often results in soft gels. Stir constantly while cooking to prevent burning. Recipes are developed for specific jar sizes. If jellies are filled into larger jars, excessively soft products may result.

## Canned foods for special diets

The cost of commercially canned special diet food often prompts interest in preparing these products at home. Some low-sugar and low-salt foods may be easily and safely canned at home. However, the color, flavor, and texture of these foods may be different than expected and be less acceptable.

### *Canning without sugar*

In canning regular fruits without sugar, it is very important to select fully ripe but firm fruits of the best quality. Prepare these as described for hot-packs in Guide 2, but use water or regular unsweetened fruit juices instead of sugar syrup. Juice made from the fruit being canned is best. Blends of unsweetened apple, pineapple, and white grape juice are also good for filling over solid fruit pieces. Adjust headspaces and lids and use the processing recommendations given for regular fruits. Splenda® is the only sugar substitute currently in the marketplace that can be added to covering liquids before canning fruits. Other sugar substitutes, if desired, should be added when serving.

### *Canning without salt (reduced sodium)*

To can tomatoes, vegetables, meats, poultry, and seafood, use the procedures given in Guides 3 through 5, but omit the salt. In these products, salt seasons the food but is not necessary to ensure its safety. Add salt substitutes, if desired, when serving.

## Canning fruit-based baby foods

You may prepare any chunk-style or pureed fruit with or without sugar, using the procedure for preparing each fruit as given in Guide 2. Pack in half-pint, preferably, or pint jars and use the following processing times.

Recommended process time for fruit-based baby foods in a boiling-water canner				
Style of Pack	Jar Size	Process Time at Altitudes of		
		0–1,000 ft	1,001–6,000 ft	Above 6,000 ft
Hot	Pints	20 min	25 min	30 min

**Caution: Do not attempt to can pureed vegetables, red meats, or poultry meats, because proper processing times for pureed foods have not been determined for home use.**

Instead, can and store these foods using the standard processing procedures; puree or blend them at serving time. Heat the blended foods to boiling, simmer for 10 minutes, cool, and serve. Store unused portions in the refrigerator and use within 2 days for best quality.

## How much should you can?

The amount of food to preserve for your family, either by canning or freezing, should be based on individual choices. The following table can serve as a worksheet to plan how much food you should can for use within a year.

**Suggested Preservation Plan for Canned and Frozen Foods**

		Servings/week <sup>a</sup>			My family needs					
Kind of Food	Serving Size	Per Person		My Family <sup>b</sup>	Cups/ Week <sup>c</sup>	Qts/ Week <sup>d</sup>	Weeks served/yr <sup>a</sup>	Quarts/year		
		Suggest	Actual					Total <sup>e</sup>	Canned <sup>a</sup>	Frozen <sup>a</sup>
Example: Family of 4										
Fruits	1/2 cup	12	12	48	24	6	36	216	72	144
My Plan:										
Fruits— apples, berries, peaches, plums, pears, tomatoes	1/2 cup	12								
Juices— apple, berry, grape, tomato	1 cup	7								
Vegetables— beets, beans, carrots, corn, peas, pumpkin, squash	1/2 cup	16								
Meat & Seafood— red meat, poultry, shellfish, fish	1/2 cup	14								
Soups	1 cup	2								
Pickles & Relishes— ketchup, fruit pickles, vegetable pickles, relish, etc.	—	1/2 cup								
Fruit Spreads— honey, jellies, jam, syrops, preserves, etc.	—	1/2 cup								
Sauces— tomato, etc.	1/2 cup	2								

<sup>a</sup> Your family should make these decisions.

<sup>b</sup> Servings/week for my family = actual weekly servings/person multiplied by number of family members who eat that food.

<sup>c</sup> Cups/week = servings/week multiplied by recommended serving size.

<sup>d</sup> Quarts/week = cups/week divided by 4.

<sup>e</sup> Total quarts/year = quarts/week multiplied by weeks served/year.

## Glossary of Terms

<b>Acid foods</b>	Foods which contain enough acid to result in a pH of 4.6 or lower. Includes all fruits except figs; most tomatoes; fermented and pickled vegetables; relishes; and jams, jellies, and marmalades. Acid foods may be processed in boiling water.
<b>Altitude</b>	The vertical elevation of a location above sea level.
<b>Ascorbic acid</b>	The chemical name for vitamin C. Lemon juice contains large quantities of ascorbic acid and is commonly used to prevent browning of peeled, light-colored fruits and vegetables.
<b>Bacteria</b>	A large group of one-celled microorganisms widely distributed in nature. See microorganism.
<b>Blancher</b>	A 6- to 8-quart lidded pot designed with a fitted perforated basket to hold food in boiling water, or with a fitted rack to steam foods. Useful for loosening skins on fruits to be peeled, or for heating foods to be hot packed.
<b>Boiling-water canner</b>	A large standard-sized lidded kettle with jar rack, designed for heat-processing 7 quarts or 8 to 9 pints in boiling water.
<b>Botulism</b>	An illness caused by eating toxin produced by growth of <i>Clostridium botulinum</i> bacteria in moist, low-acid food, containing less than 2 percent oxygen, and stored between 40° and 120°F. Proper heat processing destroys this bacterium in canned food. Freezer temperatures inhibit its growth in frozen food. Low moisture controls its growth in dried food. High oxygen controls its growth in fresh foods.
<b>Canning</b>	A method of preserving food in air-tight vacuum-sealed containers and heat processing sufficiently to enable storing the food at normal home temperatures.
<b>Canning salt</b>	Also called pickling salt. It is regular table salt without the anticaking or iodine additives.
<b>Citric acid</b>	A form of acid that can be added to canned foods. It increases the acidity of low-acid foods and may improve the flavor and color.
<b>Cold pack</b>	Canning procedure in which jars are filled with raw food. "Raw pack" is the preferred term for describing this practice. "Cold pack" is often used incorrectly to refer to foods that are open-kettle canned or jars that are heat-processed in boiling water.



<b>Enzymes</b>	Proteins in food which accelerate many flavor, color, texture, and nutritional changes, especially when food is cut, sliced, crushed, bruised, and exposed to air. Proper blanching or hot-packing practices destroy enzymes and improve food quality.
<b>Exhausting</b>	Removal of air from within and around food and from jars and canners. Blanching exhausts air from live food tissues. Exhausting or venting of pressure canners is necessary to prevent a risk of botulism in low-acid canned foods.
<b>Fermentation</b>	Changes in food caused by intentional growth of bacteria, yeast, or mold. Native bacteria ferment natural sugars to lactic acid, a major flavoring and preservative in sauerkraut and in naturally fermented dills. Alcohol, vinegar, and some dairy products are also fermented foods.
<b>Headspace</b>	The unfilled space above food or liquid in jars. Allows for food expansion as jars are heated, and for forming vacuums as jars cool.
<b>Heat processing</b>	Treatment of jars with sufficient heat to enable storing food at normal home temperatures.
<b>Hermetic seal</b>	An absolutely airtight container seal which prevents reentry of air or microorganisms into packaged foods.
<b>Hot pack</b>	Heating of raw food in boiling water or steam and filling it hot into jars.
<b>Low-acid foods</b>	Foods which contain very little acid and have a pH above 4.6. The acidity in these foods is insufficient to prevent the growth of the bacterium <i>Clostridium botulinum</i> . Vegetables, some tomatoes, figs, all meats, fish, seafoods, and some dairy foods are low acid. To control all risks of botulism, jars of these foods must be (1) heat processed in a pressure canner, or (2) acidified to a pH of 4.6 or lower before processing in boiling water.
<b>Microorganisms</b>	Independent organisms of microscopic size, including bacteria, yeast, and mold. When alive in a suitable environment, they grow rapidly and may divide or reproduce every 10 to 30 minutes. Therefore, they reach high populations very quickly. Undesirable microorganisms cause disease and food spoilage. Microorganisms are sometimes intentionally added to ferment foods, make antibiotics, and for other reasons.
<b>Mold</b>	A fungus-type microorganism whose growth on food is usually visible and colorful. Molds may grow on many foods, including acid foods like jams and jellies and canned fruits. Recommended heat processing and sealing practices prevent their growth on these foods.
<b>Mycotoxins</b>	Toxins produced by the growth of some molds on foods.

<b>Open-kettle canning</b>	A non-recommended canning method. Food is supposedly adequately heat processed in a covered kettle, and then filled hot and sealed in sterile jars. Foods canned this way have low vacuums or too much air, which permits rapid loss of quality in foods. Moreover, these foods often spoil because they become recontaminated while the jars are being filled.
<b>Pasteurization</b>	Heating of a specific food enough to destroy the most heat-resistant pathogenic or disease-causing microorganism known to be associated with that food.
<b>pH</b>	A measure of acidity or alkalinity. Values range from 0 to 14. A food is neutral when its pH is 7.0, lower values are increasingly more acid; higher values are increasingly more alkaline.
<b>Pickling</b>	The practice of adding enough vinegar or lemon juice to a low-acid food to lower its pH to 4.6 or lower. Properly pickled foods may be safely heat processed in boiling water.
<b>Pressure Canner</b>	A specifically designed metal kettle with a lockable lid used for heat processing low-acid food. These canners have jar racks, one or more safety devices, systems for exhausting air, and a way to measure or control pressure. Canners with 16- to 23- quart capacity are common. The minimum volume of canner that can be used is one that will hold 4 quart jars sitting upright on the rack. Use of pressure saucepans with smaller capacities is not recommended.
<b>Raw pack</b>	The practice of filling jars with raw, unheated food. Acceptable for canning low-acid foods, but allows more rapid quality losses in acid foods heat processed in boiling water.
<b>Spice bag</b>	A closeable fabric bag used to extract spice flavors in pickling solution.
<b>Style of pack</b>	Form of canned food, such as whole, sliced, piece, juice, or sauce. The term may also be used to reveal whether food is filled raw or hot into jars.
<b>Vacuum</b>	The state of negative pressure. Reflects how thoroughly air is removed from within a jar of processed food—the higher the vacuum, the less air left in the jar.
<b>Yeasts</b>	A group of microorganisms which reproduce by budding. They are used in fermenting some foods and in leavening breads.

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# 4-H Food Preservation

## *Junior Level*

The Junior age division of food preservation is for members ages 9 to 11 (as of September 1 of the 4-H year, which begins October 1). This division focuses on beginning food preservation skills. As a junior 4-H member, you learn basic procedures and try different methods.

Here are some of the things you can learn about in the 4-H Food Preservation project as a junior 4-H member:

- Boiling water (water bath) canning, including:
  - ☐ canned fruits or berries
  - ☐ canned pie filling
  - ☐ fruit sauces or salsas
  - ☐ cooked jams and jellies using commercial pectin
  - ☐ canned tomatoes and tomato products such as tomato sauce, juice, ketchup, or salsa
  - ☐ quick pickles and relishes from cucumbers and other vegetables or fruits
- Freezing fruits and vegetables
- Drying fruits, fruit leather, vegetables, and herbs
- Using preserved foods in recipes
- Selecting and using food preservation equipment
- Labeling preserved food correctly
- Keeping food safe to eat

You will learn how to do some of these things at your project meetings and some things you will learn about and practice at home. Choose from the following activities to do at home or develop your own activities. Your leader, parents, or another adult



can help you with these activities. **Choose at least two new activities each year.**

Examples of activities might include:

- Can a variety of fruits, tomatoes, or pickles using a boiling water canner. Try different kinds of berries and fruits as well as a variety of techniques, such as fruit sauces; tomato sauce, juice, or ketchup; fruit or tomato salsa; and quick pickles and relishes from cucumbers, other vegetables, and fruits.
- Freeze containers of fruit. Try different berries and fruit.
- Prepare jam with added pectin, uncooked, cooked, or both ways.

Revised by Nancy Kershaw, Extension 4-H youth development, Tillamook County, and Lynette Black, associate professor, Extension 4-H youth development, both at Oregon State University. Original information prepared by Barbara J. Sawyer, Extension specialist emeritus, 4-H youth development; updated by Barbara V. Boltes, former Extension specialist, 4-H youth development; and revised by Elaine Schrupf, former Extension 4-H youth development specialist, all of Oregon State University.



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Revised February 2017

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- Make fruit leather. Try different kinds of fruit or combinations.
- Dry a variety of fruits or vegetables.
- Prepare a dish from a recipe using preserved tomatoes or canned fruit.

You'll also have a chance to share what you've learned with others. This might be at your club meetings or in some other way. Some ways to share include:

- Preparing meals or snacks for your family and friends using foods you have preserved
- Showing other people how to do something you have learned in the project
- Making a gift package for someone using foods you have preserved
- Participating in the fair by giving a presentation, entering a food preparation contest, or entering an exhibit. If you want to exhibit at the fair, check the requirements with your 4-H leader or in the current 4-H State Fair Premium Book on the 4-H website (<http://oregon.4h.oregonstate.edu/special-events/state-fair>).

Your leader will have other ideas about how your club might share with others and be active in the county and state 4-H program. Plan to attend all your club meetings and participate fully.

At some of your club meetings, your leader will give you handouts (like this one) or bulletins for you to take home. These will tell you about some of the things you'll need to know as you learn how to can, freeze, and dry foods.

Plan to keep them together in a notebook so you can find them when you need them. Exhibits for county and state fair are required to be made from recipes and instructions from approved sources located at <http://extension.oregonstate.edu/fch/food-preservation>.

## A Note for Parents

The 4-H food preservation project is designed so that members will have opportunities for a variety of

experiences. 4-H members enrolled in the 4-H food preservation project will:

- Learn principles of safe food preservation
- Practice food preservation techniques in canning, freezing, and drying
- Use preserved foods creatively in meals and snacks
- Share what they have learned in meaningful ways

Some of the specific skills to be learned are listed in the note to members. Your child will need special help from you or another family member or friend to learn some of these skills; safety will be an important consideration as members work with heavy jars, hot liquids, and a variety of equipment. For food safety, it is also important that members use the most current processing temperatures and times as recommended by Oregon State University or the United States Department of Agriculture. Leaders have information for locating the most current recommendations. Current recommendations can also be found at the National Center for Food Preservation at <http://nchfp.uga.edu/> or the OSU Extension Service, food preservation web page <http://extension.oregonstate.edu/fch/food-preservation>.

Here are some other ways you can help:

- Show interest and enthusiasm in your child's work
- Encourage your child when he or she succeeds and even more when things are not going well
- Provide transportation to local meetings and county activities in which your child and other club members are interested
- Support your local 4-H leaders—offer your services to assist and let them know you appreciate their efforts

The 4-H Food Preservation project offers your child a variety of experiences—we hope he or she finds the project interesting and fun.

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Revised July 2002. Revised October 2004. Revised February 2017

# 4-H Food Preservation

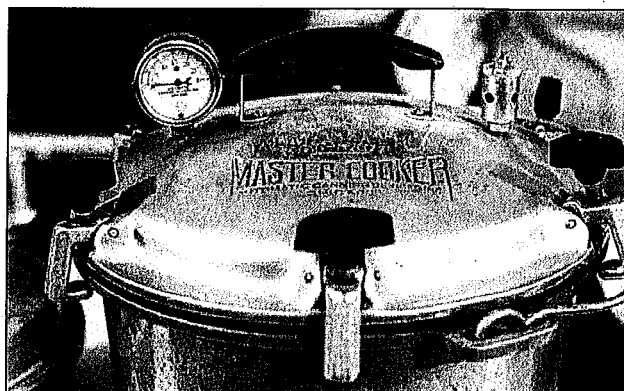
## *Intermediate/Senior Level*

The Intermediate and Senior age divisions of food preservation are for members ages 12 to 17 years old (as of September 1 of the 4-H year, which begins October 1). This division expands 4-H members' skills in food preservation and adds the use of the pressure canner. Members in these age divisions are encouraged to continue to practice and expand the skills introduced in the junior age division, including boiling water canning, drying fruits and vegetables, and freezing fruits. Members beginning in the 4-H food preservation project as intermediates or seniors are encouraged to begin with boiling water canning processes and then move on to skills introduced in the intermediate and senior level.

Here are some of the possibilities for intermediate and senior age division members in 4-H food preservation. Members in these age divisions may also continue to learn and improve on skills introduced in the junior division.

- Pressure canning a variety of foods, including:
  - ☐ Vegetables or tomatoes using a pressure canner
  - ☐ Meat, poultry, fish, or combination dishes
- Fermenting pickles or sauerkraut
- Freezing vegetables
- Making jerky
- Using preserved foods in meals
- Developing a family food preservation plan
- Evaluating preserved foods

You don't need to learn all this in one year. It's best to spend multiple years exploring all the opportunities for home food preservation as you learn the procedures and try different methods or foods to preserve. Your leader, parents, or another adult



can help you. **Choose two or more** of the activities listed below to work on during project meetings or at home each year.

- Make fruit juice. Try different kinds of fruits.
- Make a syrup from fruit juice you have extracted.
- Make jam or jelly without commercial pectin or jelly using juice you extracted.
- Make fermented pickles or sauerkraut.
- Can vegetables or tomatoes using a pressure canner. Try different vegetables.
- Can meat, fish, poultry, or combination foods in a pressure canner.
- Freeze vegetables. Try different kinds of vegetables.

Revised by Nancy Kershaw, Extension 4-H and family and community health, and Lynette Black, associate professor, Extension 4-H youth development, both of Oregon State University. Original information prepared by Barbara J. Sawyer, Extension specialist emeritus, 4-H youth development; updated by Barbara V. Boltes, former Extension specialist, 4-H youth development; and revised by Elaine Schrupf, former Extension 4-H youth development specialist, all of Oregon State University.



4H 93330  
Revised February 2017

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- Make dried meat or poultry jerky.
- Make a family food preservation plan.
- Serve three or more preserved foods.
- Continue to label your products clearly and fully.
- Use the standards to evaluate your preserved foods for quality and safety.

Part of the project includes sharing what you have learned with other people. Some ways of sharing are:

- Preparing meals or snacks for families and friends, using foods you have preserved
- Giving presentations at project meetings, shopping areas, farmer's markets, or outdoor cookery group meetings
- Making displays for store windows, libraries, or schools
- Making a gift package for someone using some of the foods you have preserved
- Becoming a junior leader or helping younger members learn about food preservation
- Participating in the fair by giving a presentation or entering a food preparation contest or exhibit. If you want to exhibit at the fair, check the requirements with your 4-H leader or in the current 4-H State Fair Premium Book on the 4-H website: <http://oregon.4h.oregonstate.edu/state-fair>.

At some of your meetings, your leader will give you handouts and other resource materials for you to take home or print from an approved, reliable source, such as the OSU Extension Service or the United States Department of Agriculture. Current research-tested, food-preservation methods can be found at the National Center for Food Preservation, <http://nchfp.uga.edu/> or the OSU Extension Service, Food Preservation web page, <http://extension.oregonstate.edu/fch/food-preservation>. These will help you learn how to can, freeze, and dry foods. For safety reasons, it is very important to always use up-to-date methods, including processing times and

temperatures. Your leader will be able to provide you with current information that has been scientifically tested. Keep these materials together so you can find them when you need them. Add your handouts and bulletins to a notebook and be very cautious of recipe sources that have not been tested. Exhibits for county and state fairs are required to be made from recipes and instructions from approved sources located at <http://extension.oregonstate.edu/fch/food-preservation>.

## A Note for Parents

The 4-H Food Preservation project is designed so members will have opportunities for a variety of experiences. 4-H members enrolled in the food preservation project will:

- Learn principles of safe food preservation
- Practice food preservation techniques in canning, freezing, and drying
- Use preserved food creatively in meals and snacks
- Share what they have learned in meaningful ways

Some of the specific skills to be learned are listed in the note to members. Your 4-H member may need special help from you or another family member or friend to learn some of these skills. Safety is a critical factor as members work with heavy jars, hot liquids, and pressure canners. For food safety, it is also important that members use the most current processing temperatures and times as recommended by Oregon State University or the United States Department of Agriculture. Leaders have information for locating the most current recommendations.

You can also help by showing interest and enthusiasm in your child's work. Encourage your child when he or she succeeds, and even more when things are not going well. Provide transportation to local meetings. Participate in county activities in which your child and other members are interested and support your local 4-H leaders.

# 4-H Food Preservation

## *Leader's Guide*

The 4-H Food Preservation project gives 4-H members the opportunity to express creativity, practice decision making, and learn skills that will be useful throughout their lives. As a 4-H Food Preservation project leader, you set the stage to help members:

- Learn principles of safe food preservation
- Practice food preservation techniques in canning, freezing, and drying
- Use preserved food creatively in meals and snacks
- Share what they learn in meaningful ways

The project has two levels: Junior and Intermediate/Senior. The Junior level is for members from 9 to 11 years old and focuses on beginning food preservation skills. The Intermediate/Senior level is for members 12 to 18 years old and expands on the 4-H member's skills in food preservation. Members are encouraged to repeat techniques until they learn the skills. They may spend several years in each level to fully explore the skills and options before moving on. Members beginning food preservation at the Intermediate or Senior age are encouraged to begin with the Junior-level skills before moving on to the skills introduced at Intermediate/Senior level. Please refer to member publications 4-H Food Preservation: Junior Level (4-H 93310), and 4-H Food Preservation: Intermediate/Senior Level (4-H 93320), for more information.

### **The role of parents**

Members at all levels need to practice techniques at club meetings. Many learning experiences take place at home as well. For some activities, safety is



an important consideration as members are working with heavy jars and canners, hot liquids, and a variety of equipment. Therefore, it is important that parents understand their role as supervisors of food preservation activities. Be sure parents receive the member handouts that discuss expectations of them and goals of the project.

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Revised by Jeanne Brandt, professor, Extension family and community health, and Lynette Black, associate professor, Extension 4-H youth development, both of Oregon State University. Original information prepared by Barbara J. Sawyer, Extension specialist emeritus, 4-H youth development; updated by Barbara V. Boltes, former Extension specialist, 4-H youth development; and revised by Elaine Schrupf, former Extension 4-H youth development specialist, all of Oregon State University.



4H 9331L Revised February 2017

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Invite parents to the first meeting, and talk about the goals of the project; what members will be doing; and the number, length, time, and place of project meetings. Consider asking parents to help with club meeting activities, tours, or field trips.

## **Put It Up! Food Preservation for Youth Curriculum**

The Oregon 4-H program has adopted the *Put it Up! Food Preservation for Youth* curriculum from the National Center for Home Food Preservation. The *Put It Up!* curriculum is a series of lessons that help youth explore and understand the science of safe food preservation. Though the hands-on food preservation activities are designed for middle school ages, they are appropriate for fourth- to 12th-graders. This curriculum is available for Oregon 4-H leaders to use at no charge thanks to funding from the United States Department of Agriculture National Institute of Food and Agriculture.

The series is composed of six different food preservation methods:

- boiling water canning
- making jam
- pickling
- freezing
- drying
- pressure canning

Each method is divided into a beginning hands-on activity and an advanced hands-on activity.

In addition to step-by-step procedures, reflection questions, and ideas for experimentation, each method also includes additional activities: a science-based, fill-in-the-blank challenge, a history-based word search, a glossary, a resource list, a knowledge test, and more. These activities could be used to prepare for hands-on activities while waiting for foods to process or as an alternative to a hands-on activity at some meetings. They will help 4-H'ers understand the science of food preservation.

To access pdf files of the free curriculum, click the link at the bottom of this website: <http://nchfp.uga.edu/putitup.html>. Once you submit the request form, you will receive a username, password, and web page address with the curriculum files. Please do not share the username/password/website with



others. In order to continue to be able to offer the curriculum at no cost, the National Center for Home Food Preservation must gather information about who is using it and how it is being used. Others who wish to use the curriculum should register themselves. There is no limit on the number of people who can access this curriculum.

## **Recommendations for using *Put It Up!* Food Preservation for Youth with Oregon 4-H clubs**

Additional suggestions to accompany the *Put It Up!* curriculum include:

### **Method 1: Boiling Water Canning**

1. *Beginning Boiling Water Canning Activity: Crushed Tomatoes.* For the first product, instead of crushed tomatoes (steps 15 and 16, page Beg. 6) you may prefer to follow instructions for canning whole or halved tomatoes in *Canning Tomatoes and Tomato Products* (PNW 300) available at <https://catalog.extension.oregonstate.edu/pnw300>
2. *Advanced Boiling Water Canning Activity: Choice Salsa.* Instead of the recipe example in the lesson (step 19, page Adv. 6) you may prefer to use a recipe selected from *Salsa Recipes for Canning* (PNW 395) available at <https://catalog.extension.oregonstate.edu/pnw395>

### **Method 2: Making Jam**

1. We suggest using powdered pectin meant for reduced sugar rather than the recipe provided in the *Advanced Jam Making Activity* in the lesson. There are several brands available on the market. Using the recipe and instructions



on the pectin package is recommended in Oregon 4-H fair entry requirements. There will be instructions for many types of fruit in the recipe pamphlet. This is a good opportunity to use fruit you may have in your freezer.

### Method 3: Pickling

1. *Beginning Pickle Making Activity: Refrigerator Pickles* is a fresh pickle using a commercial spice mix that is stored in the refrigerator and meant to be consumed within 3 months. This would not be an option for a fair entry.
2. *Advanced Pickle Making Activity: Dill Pickles* is a basic dill pickle recipe. The spices, dill, and garlic are optional and are placed in each jar, making it possible for every jar to be unique. This would allow each 4-H'er to make his or her own jar of pickles from one recipe.
3. Other vegetables can be pickled using the same method as cucumbers. Find additional options for approved recipes in *Pickling Vegetables* (PNW 355) at <https://catalog.extension.oregonstate.edu/pnw355>

### Method 4: Freezing

1. *Advanced Freezing Activity: Corn-on-the-cob* suggests that members only freeze corn blanched and frozen on the cob. For an activity that allows a comparison of freezing methods, we suggest members freeze some cobs without blanching and freeze some corn after it has been cut off the cob for a comparison of outcomes and to determine which method is preferred.

### Method 5: Drying

1. *Beginning Drying Activity: Fruit* suggests drying grapes and blueberries but many other fruits are available and will dry well. Look for additional suggestions *Drying Fruits and Vegetables* (PNW 397) at <https://catalog.extension.oregonstate.edu/pnw397>.

### Method 6: Pressure Canning

1. *Advanced Pressure Canning Activity: Tomato Veggie Soup* gives quantities for suggested vegetables for the soup. Any mixture of the listed vegetables would be safe. Note that the jars are to be filled half full of solids and the rest of the way with the liquid before processing.

The *Put It Up!* curriculum also includes a leader's guide titled *Food Preservation for Youth* that focuses on specific ways to use the youth modules. This leader's guide also incorporates math and science education, which allows you to help your members meet the performance expectations of the Next Generation Science Standards.

## Oregon 4-H Fair Guidelines for Food Preservation Exhibits

The Oregon 4-H food preservation exhibit classes for county and state fairs contain preservation techniques not in the *Put it Up!* curriculum. These classes include dried meat and fermentation. For these techniques and additional information, there are several resources available that leaders will find helpful:

- Food Preservation publications from Oregon State University Extension Service <https://catalog.extension.oregonstate.edu/topic/nutrition-and-foods/food-preservation-and-storage>
- *Principles of Home Canning, USDA Complete Guide to Home Canning* [http://nchfp.uga.edu/publications/publications\\_usda.html](http://nchfp.uga.edu/publications/publications_usda.html)
- *So Easy to Preserve*, National Center for Home Food Preservation [http://nchfp.uga.edu/publications/publications\\_uga.html](http://nchfp.uga.edu/publications/publications_uga.html)

Exhibits for county and state fairs are required to be made from recipes and instructions from these approved sources. The recipes in *Put it Up!* are from

these sources and are acceptable for county fair entries.

## Teaching techniques

As a 4-H leader, you are a teacher. If you use a variety of teaching techniques, you can stimulate and maintain interest in the project. Some of these techniques are:

### Demonstrations

A demonstration is showing by doing. You and other adults will demonstrate techniques to club members, and members might be expected to share what they have learned by demonstrating techniques to others. Plan to ask every club member to give an informal "mini-demonstration" to the club showing a skill they have learned. Doing this also gives each member an opportunity to practice speaking in front of a group.

### Supervised practice sessions

Subject matter can be taught most effectively by having members practice techniques that the leader has demonstrated. To reinforce their learning, it is important for members to see and sample products soon after completing the preservation process. Since the preservation process is often too long to complete during a meeting, you might need to examine and evaluate some products at the next meeting. You might occasionally find it worthwhile to preserve a product ahead of time. That way, a finished product can be seen and sampled by members as they preserve the same product. This immediate feedback helps keep the members' interest.

### Field trips

Field trips can be enjoyable learning experiences. Possibilities include visits to stores or stands that sell fresh produce, stores that sell equipment for preserving food, and facilities that package or process fruits, vegetable, or meats.

### Experiments

The *Put It Up!* curriculum includes experiments as a way to help youth understand why specific food preservation techniques are used. Experiments help members explore the whys and hows of food preservation. Additional experiment suggestions are included later in this publication.

### Other

There may be other learning opportunities available in your area, such as foods and nutrition participation days, food preservation judging or meal contests, educational displays, OSU Master Food Preserver clinics, or special community activities.

### Experiments

Experiments are a great way for youth to understand why specific techniques are used when preserving foods. Experiments also help solidify foundational scientific concepts. Here are some additional experiments that could be incorporated into club meetings.

#### Packing light-colored fruit for freezing

Purpose: To evaluate the effect of packing method on the color of frozen fruit

Reference: *Freezing Fruits and Vegetables* (PNW 214)

Prepare 2 pounds of a light-colored fruit (apples, peaches, or pears) for freezing. Divide the fruit into three batches and pack each batch a different way, as follows:

1. Syrup pack: Add ascorbic acid or a commercial anti-browning mixture
2. Dry sugar pack: Add ascorbic acid or a commercial anti-browning mixture
3. Dry pack: Do not add sugar and do not add ascorbic acid

Pack into separate freezer containers, seal, label, and freeze.

After 3 to 4 weeks, thaw and compare the color of the batches. Is the color light (like the original color), slightly brown, or very brown? Is there a difference in the sweetness?

Color of product	
Syrup pack	
Dry sugar pack	
Dry pack	

#### Discussion questions:

- Are there differences in the color? Why?
- Are any of the batches too brown to serve?

- How could you use fruits packed in syrup?  
Fruits packed in sugar?

### Science "Why"

Enzymes cause light-colored fruits to turn brown when they are exposed to the air. Fruits that have been treated with an anti-browning compound (such as ascorbic acid) hold their color better.

Personal preference will determine whether untreated fruit (i.e., no anti-browning compound) is too brown to serve.

Fruits packed in syrup could be served as a dessert. Fruits packed in sugar might be used for a pie.

### Blanching vegetables for freezing

Purpose: To evaluate the effect of blanching on the color, texture, and flavor of frozen vegetables

Reference: *Freezing Fruits and Vegetables* (PNW 214)

Prepare 1 pound of Chinese or other edible pod peas for freezing. (The experimental results are more clear-cut when this vegetable is used.) Wash the peas, then remove stems, blossom ends, and strings. Leave whole.

Divide the peas into two batches. Blanch one batch 2½ to 3 minutes; cool immediately. Do not blanch the second batch.

Pack into separate freezer containers; seal, label, and freeze.

After 1 to 2 weeks, thaw, cook, and compare the color, texture, and flavor.

Is the color natural or off-color? Is the flavor typical or "hay-like?" Are the peas tough or tender?

	Color	Flavor	Texture
Blanched			
Unblanched			

### Discussion question

Were there differences in the color, flavor, and texture? Why?

### Science "Why"

Vegetables are blanched before freezing to stop the action of enzymes that cause changes in the color, texture, and flavor. Vegetables that are not blanched before freezing often turn off-color, become tough, and develop a "hay-like" flavor.

### Pretreating light-colored fruit for drying

Purpose: To evaluate the effects of pretreating on the color of dried fruit

Reference: *Drying Fruits and Vegetables* (PNW 397)

Prepare 2 to 3 pounds of a light-colored fruit (apples, peaches, pears) for drying.

Divide the fruit into several batches. Leave one batch untreated. Pretreat each of the other batches a different way. Choose among:

- Ascorbic acid dip
- Citric acid dip
- Salt dip
- Syrup blanching

Label each batch and dry as directed.

After drying, compare the results. Is the color light (like the original color), slightly brown, or very brown? (Members might also reconstitute the fruit and compare the flavor and texture.)

	Type of pretreatment	Color of product
Example		

### Discussion questions

Which method was the most effective way to prevent browning? The least effective?

Is it always necessary to pretreat light-colored fruit before drying?

### Science "Why"

Enzymes cause light-colored fruits to turn brown when exposed to air. Pretreating by dipping or blanching before drying helps prevent browning. The method that you choose to prevent browning will depend on the fruit you are drying, the ingredients you have available, and your own personal preferences. If you don't mind brown dried fruit, you may decide not to pretreat your light-colored fruit at all.

### Ways to Share

Encourage club members to share their skills with others and show what they have learned. Member materials include suggestions for each of the project levels. They may include:

- Giving presentations at project meetings, shopping areas, service clubs, farmer's markets,



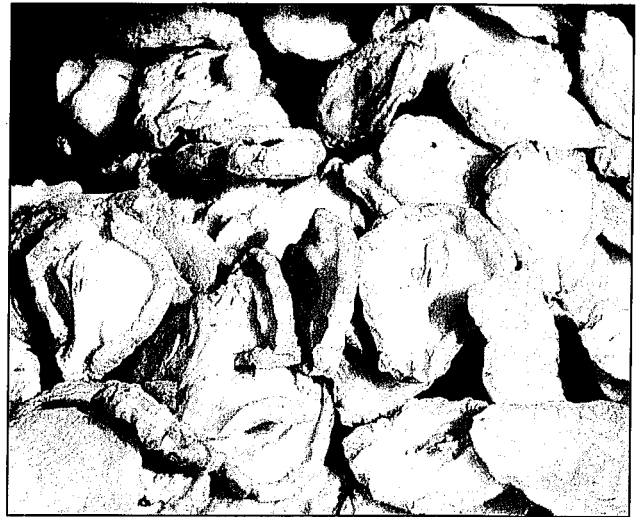
and outdoor cookery or backpacking group meetings

- Making displays for store windows, libraries, and schools
- Preparing meals or snacks for families and friends, using preserved foods
- Making a preserved foods gift package for someone
- Becoming a junior or teen leader or otherwise helping younger members learn food preservation techniques
- Participating in fairs or contests such as an individual educational display, a club educational exhibit, a presentation, a foods contest, or an individual exhibit

Help members check exhibit requirements in the fair exhibitor handbook as they plan their exhibits or other participation. You'll find more information on preparing presentations and displays on the OSU Extension 4-H website.

Topics to share through presentations and displays can be based on any of the skills or information a club member is learning. Topic examples include:

- Choosing containers for freezing
- Using canned or frozen fruits in recipes
- Selecting fruit to preserve
- Selecting and using a boiling water canner
- Selecting pectin for jam or jelly
- Making quick pickles or relish
- Important information on a label
- Making fruit leather
- Pretreating fruit for drying
- Reconstituting and using dried fruit
- Pretreating vegetables for freezing
- Pickling methods
- Steps in making juice
- Selecting and using a pressure canner



- Choosing a food preservation method for meat, poultry, or fish
- Preparing a meal for one or two using preserved foods
- Planning a backpacking meal of dried foods
- Preparing and freezing a convenience food
- Preparing a quick meal using preserved foods
- Storage and shelf life of preserved foods
- Comparing the costs, quality, and flavor of home-canned foods with store-bought foods

## Reflection

Self-evaluation is perhaps the most effective because it measures self-development. You can help members informally evaluate their own accomplishments by having them ask themselves the following: What did they learn, how did they share what they learned with others, and what do they plan to learn or do next? The *Put It Up!* curriculum includes a Time to Reflect worksheet in each module. Feeling good about their accomplishments can often be a better indicator of success than blue ribbons.

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Revised July 1991. Revised January 2010. Revised February 2017



\$1.00  
4-H 93111  
Reprinted February 2006

# GLOSSARY OF FOOD TERMS

*E. Husted*

**T**ested recipes and good measuring techniques help ensure good results when cooking and baking. It's also important to understand the terms used in the instructions of a recipe. Each term has a specific meaning. Understanding these terms and using the correct procedure contribute to the success of the food product. The terms describe techniques to use when working with the ingredients. Some of the most common terms are listed below to help you as you prepare food and learn about food preparation.

## **BAKE**

To cook in an oven or oven-type appliance. Covered or uncovered containers may be used. When applied to meats in uncovered containers, the method generally is called roasting. Common oven temperatures are:

250°F to 275°F	Very slow oven
300°F to 325°F	Slow oven
350°F to 375°F	Moderate oven
400°F to 425°F	Hot oven
450°F to 475°F	Very hot oven
500°F to 525°F	Extremely hot oven

## **BARBECUE**

To roast slowly on a gridiron or spit, over coals, or under free flame or oven electric unit, usually basting with a highly seasoned sauce. Popularly applied to foods cooked in or served with barbecue sauce.

## **BASTE**

To moisten meat or other foods while cooking, in order to add flavor and to prevent drying of the surface. The liquid usually is melted fat, meat drippings, fruit juice, sauce, or water.

## **BATTER**

A mixture of flour and liquid, usually combined with other ingredients, as in baked products. The mixture is of such consistency that it may be stirred with a spoon and is thin enough to pour or drop from a spoon.

## **BEAT**

To make a mixture smooth by introducing air with a brisk, regular motion that lifts the mixture over and over, or with a rotary motion as with an egg beater or electric mixer.

## **BLANCH**

(Precook.) To preheat in boiling water or steam.  
(1) Process used to deactivate enzymes and shrink some foods for canning, freezing, or drying. Vegetables are blanched in boiling water or steam, and fruits in boiling fruit juice, syrup, water, or steam.  
(2) Process used to aid in removal of skins from nuts, fruits, and some vegetables.

## **BLEND**

To mix two or more ingredients thoroughly.

**BOIL**

To cook in water or a liquid consisting mostly of water in which bubbles rise continually and break on the surface. The boiling temperature of water at sea level is 212°F or 100°C.

**BRAISE**

To cook meat or poultry slowly in a covered utensil in a small amount of liquid or in steam. (Meat may or may not be browned in a small amount of fat before braising.)

**BREAD**

To coat with crumbs of bread or other food; or to coat with crumbs, then with diluted, slightly beaten egg or evaporated milk, and again with crumbs.

**BROIL**

To cook by direct heat.

**CARAMELIZE**

To heat sugar or foods containing sugar until a brown color and characteristic flavor develop.

**CHOP**

To cut into pieces with a knife or other sharp tool.

**CREAM**

To soften a solid fat such as shortening or butter with a fork or other utensil, either before or while mixing with another food, usually sugar.

**CUT**

To divide food materials with a knife or scissors.

**CUT IN**

To distribute solid fat in dry ingredients by chopping with knives or pastry blender until finely divided.

**DICE**

To cut into small cubes.

**DREDGE**

To cover or coat with flour or other fine substances such as bread crumbs or corn meal.

**FOLD**

To combine by using two motions, one which cuts vertically through the mixture, the other which turns over by sliding the implement across the bottom of the mixing bowl.

**FRY**

To cook in fat. Applied especially to (1) cooking in a small amount of fat, also called sauté or pan-fry; (2) cooking in a deep layer of fat, also called deep-fat frying.

**GRILL**

To cook by direct heat. Also a utensil or appliance used for such cooking.

**GRIND**

To reduce to particles by cutting or crushing.

**JULIENNE**

To cut into slivers resembling matchsticks.

**KNEAD**

To manipulate with a pressing motion accompanied by folding and stretching.

**MARINATE**

To let food stand in a marinade which is a liquid, usually an oil-acid mixture such as French dressing.

**MINCE**

To cut or chop into very small pieces.

**MIX**

To combine ingredients in any way that effects a distribution.

**PAN-BROIL**

To cook uncovered on a hot surface, usually in a fry pan. Fat is poured off as it accumulates.

**PAN-FRY**

To cook in a small amount of fat. (See **Fry** and **Sauté**.)

**PANNING**

Method of cooking vegetables in their own juices in a tightly covered pan. A small amount of fat is used to moisten the pan before juices escape.

**PARBOIL**

To boil until partially cooked. Usually cooking is completed by another method.

**PARE**

To cut off the outside covering.

**PEEL**

To strip off the outside covering.

**POACH**

To cook in a hot liquid, using precautions to retain shape. The temperature used varies with the food.

**RECONSTITUTE**

To restore concentrated foods such as dry milk or frozen orange juice to their normal state by adding water.

**REHYDRATION**

To soak, cook, or use other procedures with dehydrated foods to restore water lost during drying.

**ROAST**

To cook uncovered in hot air. Meat usually is roasted in an oven or over coals, ceramic briquettes, gas flame, or electric coils. The term also applies to foods such as corn or potatoes cooked in hot ashes, under coals, or on heated stones or metal.

**SAUTÉ**

To brown or cook in a small amount of fat. (See **Fry**.)

**SCALD**

(1) To heat milk to just below the boiling point, when tiny bubbles form at the edge. (2) To dip certain foods in boiling water. (See **Blanch**.)

**SCALLOP**

To bake food (usually cut in pieces) with a sauce or other liquid. The food and sauce may be mixed together or arranged in alternate layers in a baking dish, with or without a topping of crumbs.

**SEAR**

To brown the surface of meat by a short application of intense heat.

**SIMMER**

To cook in a liquid just below the boiling point, at temperatures of 185 to 210°F (85 to 99°C). Bubbles form slowly and collapse below the surface.

**STEAM**

To cook in steam with or without pressure. The steam may be applied directly to the food, as in a steamer or pressure cooker.

**STEEP**

To allow a substance to stand in liquid below the boiling point for the purpose of extracting flavor, color, or other qualities.

**STEW**

To simmer food in a small amount of liquid.

**STIR**

To mix food materials with a circular motion for the purpose of blending or securing uniform consistency.

**TOAST**

To brown by means of dry heat.

**WARM**

A temperature of 105 to 115°F (40 to 46°C) for liquid or food.

**WHIP**

To beat rapidly to incorporate air and increase volume. Generally applied to cream, eggs, and gelatin dishes.



# 4-H Food Preservation Record

Name \_\_\_\_\_ Girl \_\_\_\_\_ Boy \_\_\_\_\_ Age \_\_\_\_\_ Year born \_\_\_\_\_  
(first) (last)

Club Name \_\_\_\_\_ Leader \_\_\_\_\_ County \_\_\_\_\_

Year in 4-H \_\_\_\_\_ Year in this project \_\_\_\_\_ Date project started \_\_\_\_\_ Date project closed \_\_\_\_\_  
(mo/day/year) (mo/day/year)

*A record is part of your 4-H project. Keep your record neat, clean, and up-to-date. If you need help, ask your parents or leader. If you need more space, attach another sheet of paper.*

## Things I Hope to Do and Learn This Year

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## New Ways I Used What I Preserved in Meals or Snacks

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## Ways I Shared What I Learned

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## What I Did in Food Preservation

*Check all that apply.*

- |   |  |
|---|--|
| <input type="checkbox"/> Boiling Water Canning (fruit, tomato)                      | <input type="checkbox"/> Pressure Canning (meat, poultry, fish, vegetable, tomato) |
| <input type="checkbox"/> Drying (fruit, vegetable, meat, herbs, leathers, other)    | <input type="checkbox"/> Pickling (fermented, quick, relish, fruit)                |
| <input type="checkbox"/> Jams, Jellies, and Preserves (regular, low sugar, freezer) | <input type="checkbox"/> Freezing (fruit, vegetable, meal, main dish)              |

## New Skills I Learned in Food Preservation

List and explain some new skills from the methods you checked above.

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## Amounts of Food Preserved

Date	Food	Amount	Method of Preserving <i>Include raw or hot pack; type of dehydrator; type of pressure gauge, pressure and altitude</i>	Processing Time

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## **I'm a 4-H Project Leader: Now What Do I Do?**

### **How do I know who is in my project?**

- Your club organizational leader will provide you with the names, addresses and phone numbers of the members enrolled in the project for which you are the leader.
- If you are working on the county level, contact the UCCE for the list of project members.
- The organizational leader may indicate to you if any of the youth have special needs. At your first project meeting, note any other youth that may have special needs.
- You may wish to consult with the parent or your 4-H Youth Development Agent as to how to work with a special needs child.

### **How often should I hold project meetings?**

It is recommended you hold 4-6 meetings that each last 1½ to 2 hours in length. Some projects require more meetings or a longer meeting time to accomplish your goals. Some projects, such as leathercraft, may lend themselves to individual project work as members progress on their projects. In this case, you should hold several introductory meetings for all members and then set up a schedule of time for them to sign up for individual help.

### **When do I start?**

Get started as soon as possible! Members' interest in a project is most keen when they are signing up for a project and when they get their project books.

### **How do I cover the cost of project meetings?**

- There is a wide variety of means for covering the cost of project meetings. Some methods used include:
- Each member pays for their share of the expenses or provides a portion of the supplies.
- The club agrees to cover expenses using funds from their treasury. Approval in advance is needed for this.
- Members and leaders can solicit donations/supplies from area businesses.
- Sometimes funds from sources outside your club may be available to cover your project meeting costs.

### **How do I establish a project meeting schedule?**

First, determine when you are available to work with project members. Then determine an initial project meeting date by consulting with your project members.

Publicize the date using one of the following means:

- County and/or club newsletter
- Club meeting or leader association meetings
- Postcards or phone calls to project members

You may not be able to schedule an initial meeting that everyone can attend. Establish a time to meet with those unable to attend before you hold your second project meeting.

### **Where do I hold project meetings?**

Typically project meetings are held at project leader homes, schools, or community buildings. For more information on facility adaptability and liability concerns contact your 4-H Youth Development Agent.

### **What safety precautions do we need to consider?**

Consider the type of safety issues your particular project involves. Request and secure necessary safety items such as ear protection, eye protection and head protection.

### **How do I let others in my club or other clubs know I am a project leader?**

Prior to enrollment ask for time on your club's meeting agenda to let families in your club know you're a project leader and to share some things the kids could do in the project if they enrolled in it. When the project materials are handed out, take the opportunity to inform or remind members that you are their project leader and set an initial meeting date with the group. If no one in your club is in your project, you may wish to offer your services to a neighboring club. Talk to your club organizational leader or county 4-H Youth Development agent about this opportunity.

### **How do I prepare for the first meeting?**

You may want to establish a 4-H resource box where you keep your project materials and any additional resources you will be using. Take time to become familiar with your project literature and talk to others who were project leaders for this project to find out what activities the members enjoyed.

### **What should I do at the initial project meeting?**

- At the initial project meeting, here are some ideas of what you might want to cover:
- Find out what the members want to learn and accomplish in the project. The project literature is an excellent source of ideas.
- Review the safety practices that members will need to follow.



- Do an introductory activity related to the project so the members get to know one another
- Have a small project the members can complete and take home
- Talk about how the project meeting supplies will be paid for. Experienced leaders have found it easiest to charge a small fee to cover the cost of the expenses.
- Assess when members are available for additional meetings. You may wish to ask the parents or members to bring along their calendars of family activities.
- Encourage parents to participate in project meetings, especially the initial meeting.

### **What does a typical project meeting look like after the initial orientation?**

Use the experiential learning model (found in the introductory pages of your Helper's Guide) to plan your project meeting. The project helper's guide will provide suggestions for designing a project meeting. Here are some suggestions for each section of the model:

#### **Do**

- Plan an activity to focus the project members on what they'll be doing today. Work on the project for that meeting.

#### **Reflect**

- Review the process completed
- Discuss what worked and didn't work.
- Talk about how any problems that arose were solved.
- Assist members in documenting their project work for inclusion in their record books/portfolios.

#### **Apply**

- Ask the project member the following questions:
- What else have you seen that is similar to this?
- How can you apply what you learned today to other situations?

### **What resources are available to help me?**

- 4-H Project Literature – You will receive project literature through your 4-H club or the UW-Extension office. Typically there is a helper's guide and member literature for three to four levels.
- Other People in my Club & County – There are a number of people in your county who would be willing to share project ideas and tips with you.

These include:

- Project leaders in other clubs
  - County Staff
  - Older youth who have been involved in the project
- 
- **Media Collection & Public Libraries** – Additional resources can be obtained from the Cooperative Extension Media Collection. They have videos, skillathons, displays and resource packages available to support a variety of projects. There is a user fee per item you or your club will be responsible for. You can view their catalog at their website <http://www.uwex.edu/ces/media/>. Check with your local public library to find out what resources they may have or that you can obtain through inter-library loan.
  - **4-H Website** – Wisconsin 4-H is continually adding more information and activities to their website. Visit this site at [www.uwex.edu/ces/4h/onlinepro/](http://www.uwex.edu/ces/4h/onlinepro/). You may wish to check out websites from other state 4-H programs also.
  - **Volunteer Leaders Conferences** – Review each issue of your county's newsletter to learn about training sessions for project leaders offered by your county, district or at statewide events. Sessions focusing on new project literature are typically offered at the State 4-H Volunteer Leader Conference held every other year. Periodically statewide conferences focusing on specific project areas are offered in addition to sessions at the volunteer conferences. You can also exchange ideas with other leaders at statewide Field Day.
  - **Field Trips** – Youth always enjoy the opportunity to see firsthand how things are done and how they work. Consider taking your project group on a field trip or tour of a local business or company to enhance their project experience. An example would be taking your dairy members to a cheese factory or your foods group to a local bakery.
  - **Local Experts** – Bring in a local "expert" to share their ideas and experiences with your group. One example would be asking a Master Gardener to share information on choosing perennial or trimming shrubs at one of your project meetings.
  - **Magazines** – Many leaders have found creative ideas to supplement those in the project literature in magazines they have or those at the public library.

### **How can I incorporate activities not included in the project guide?**

We encourage you to use the ideas in the project literature as they have been successfully used with youth. If you have some additional activities you would like to incorporate, consider the following criteria:

- Of interest to kids
- Developmentally appropriate
- Incorporate the experiential learning model
- Youth and adults are involved in determining what will be done
- Enhances the development of member life and project skills
- Research based source of content utilized

### **What is the relationship between project work and the county fair?**

The County Fair is an opportunity for an independent evaluation of life and project skills a member learned through completing a project. County fair entries typically match the activities included in the project literature and may include other activities that are being emphasized in your county. One of your roles is to help maintain the focus of members and parents on the goal of 4-H, which is to develop blue ribbon kids. Talk with members about what they learned about each of their fair entries from the judging process. Help members celebrate their accomplishments regardless of the color of ribbon each project member received at the fair. This may be done through individual encouragement or at a meeting following the fair. While entering and displaying a project at the County Fair is the traditional method of public affirmation, there may be other means of exhibition such as a club tour, open house, community celebrations or others.

### **Who can I go to if I need someone to help me during the project meetings?**

If you are leading beginning level project meetings, ask older members in the project to help you. This is a great leadership experience for them! Parents are another excellent source of help. Don't hesitate to ask them to stay for the meeting and be actively involved in their child's project work.