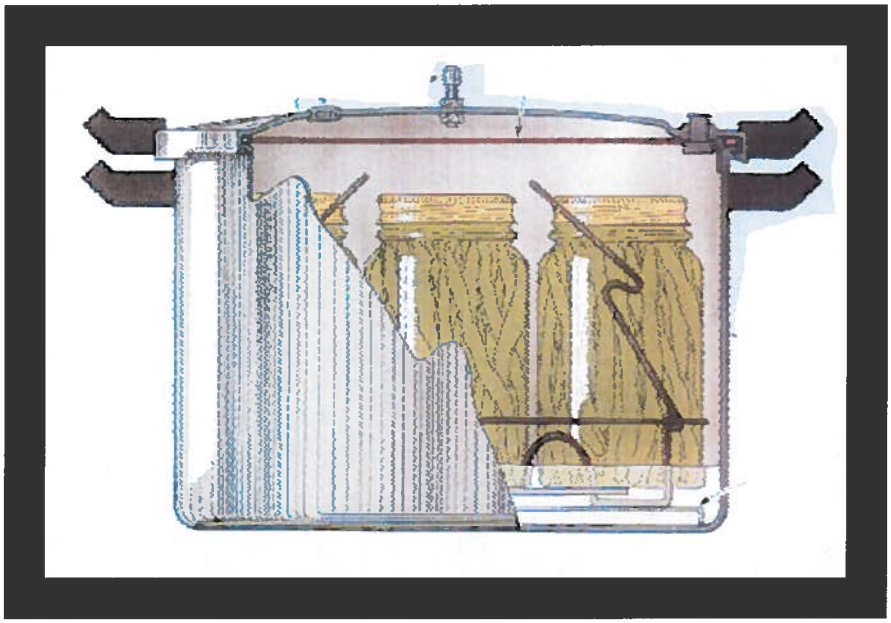
Colorado State University

Extension

MJ1043
Member's Manual



4-H Food Preservation: Pressure Canning

Contents

Notes to Project Helper

This activity guide is for youth who want to learn about home food preservation. They can't do it without your help. You play a key role in helping them learn the basic information skills and safety behind food preservation. With your help they will set goals, find resources and evaluate their own progress as they complete this manual.

Your Responsibilities

- Become familiar with the material in this book.
- Assist youth in selecting and completing food preservation projects appropriate for their skills.
- Guide youth through thinking about why something happens or why it doesn't.
- Encourage youth to complete difficult tasks to expand their skills.
- Help youth learn about their strengths and weaknesses.
- Help youth evaluate their completed activities for quality. Questions located at the end of each activity will help youth think through the steps of the project and how to apply their new skills in their everyday lives.
- Be an example with kitchen and food safety rules.

The Home Food Preservation Series

There are four manuals for youth in the *Home Food Preservation* series: *Freezing* for ages 8-18, *Drying* for ages 8-18, *Boiling Water Canning* for ages 8-18 *and Pressure Canning* for ages 14-18. The manuals may be used by anyone in these age groups regardless of their prior knowledge of home food preservation. Each manual includes an achievement program to help youth identify their goals and keep track of their accomplishments.

At the beginning of each manual you will find a list of objectives for the project. Each activity will include a short lesson followed by hands on activities and questions for further learning.

These manuals have been written using USDA food preservation guidelines. When preserving food at home, be sure to always follow current USDA canning recipes and guidelines. Contact your local Extension Office for a list of these resources.

Resources

So Easy to Preserve, University of Georgia
2011 or most current Ball Blue Book
USDA Bulletin 539 Complete Guide to Home Canning
CSU Extension 9.348 Canning Vegetables
PNW 421 Using and Caring for Your Pressure Canner

Websites

http://www.ext.colostate.edu/pubs/pubs.html#nutrition
http://nchfp.uga.edu/publications/publications_usda.html
http://www.freshpreserving.com
http://www.uga.edu/nchfp

Using Experiential Learning & Life Skills

Experiential learning is the process of "Do, Reflect, Apply." This process is used as an inquiry-based approach to learning. Rather than providing information to the participants they experience, share, process, generalize and apply what they are learning.

Do: Experience the activity, perform, do it. This could be a group activity or experience. It involves doing, it may be unfamiliar and it pushes the learner to a new level.

Reflect: Share reactions, observations. The learners talk about their experiences while doing the activity. They share their reactions and observations and freely discuss their feelings.

Apply: Generalize to connect the experience to real-world examples. Identify general trends and what are some real life examples of when they could use what they have learned.

Apply: Apply what was learned to a similar or different situation or practice. Discuss how new learning can be applied to other situations.

The Iowa State Life Skills Model helps identify the life skills that youth attain through the experiential learning process.

The Life Skills used in the manual include:

Head
- Wise Use of Resources
- Planning/Organizing
- Goal Setting
- Critical Thinking

Heart
- Communication

Hands
- Marketable Skills
- Self-Motivation

Health
- Healthy Lifestyle Choices
- Disease Prevention

My Plans

This page is intended to help you plan how to finish this manual.

- Select your Helper and write down contact information
- Set goals for each year and write them in your e-record story
- Complete at least four activities each year
- Complete a presentation or demonstration each year

Project Helper: _____
Contact Information: _____

Achievement Program

Do at least four activities located on pages 25-36 in the manual. You can also make up your own activities. Ask your project helper to initial each activity after you've completed it.

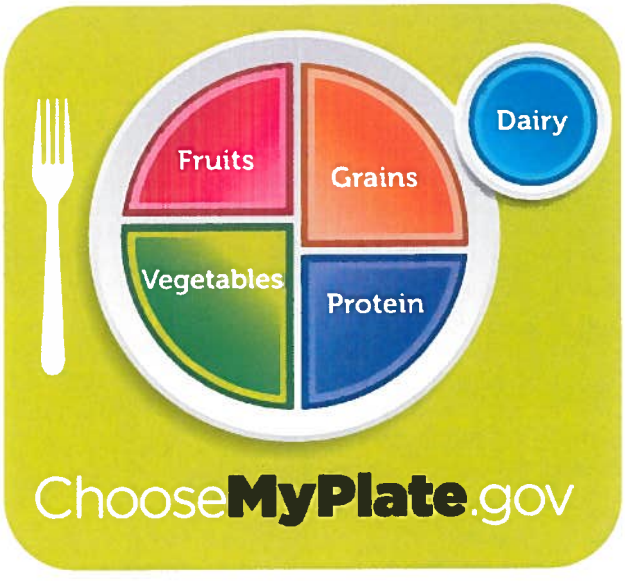
Selected Activities		
Activities	**Date Completed**	**Helper's Initials**

Exploring *Choose MyPlate*

It is important to save your bounty of foods from your garden or local area to enjoy throughout the year. Preserving food yourself means having an abundant supply of a variety of foods when the fresh products are not readily available. Unless food is preserved in some manner, it begins to spoil soon after it is harvested.

It is important to learn about the nutrients that your foods contain in order to choose the best choices for a healthy eating plan. There are many foods to choose from, but some of them are better choices than others. Making food choices for a healthy lifestyle can be as simple as using these 10 tips. Use these ideas to balance your calories, to choose foods to eat more often, and to cut back on foods to eat less often.

1. Balance calories. Find out how many calories you need for a day as a first step in managing your weight. Go to www.ChooseMyPlate.gov to find your calorie level.
2. Enjoy your food, but eat less. Take the time to fully enjoy your food as you eat it. Eating too fast or when your attention is elsewhere may lead to eating too many calories.
3. Avoid oversized portions. Use a smaller plate, bowl, and glass. Portion out foods before you eat.
4. Foods to eat more often. Eat more vegetables, fruits, whole grains, and fat-free or 1% milk and dairy products. Make these foods the basis for meals and snacks.
5. Make half your plate fruits and vegetables. Choose red, orange, and dark-green vegetables like tomatoes, sweet potatoes, and broccoli, along with other vegetables for your meals. Add fruit to meals as part of the main meal or side dishes or as dessert.
6. Switch to fat-free or low-fat (1%) milk. They have the same amount of calcium and other essential nutrients as whole milk, but fewer calories and less saturated fat.
7. Make half your grains whole grains. To eat more whole grains, substitute a whole-grain product for a refined product – such as eating whole wheat bread instead of white bread or brown rice instead of white rice.
8. Foods to eat less often. Cut back on foods high in solid fats, added sugars, and salt. They include cakes, cookies, ice cream, candies, sweetened drinks, pizza, and fatty meats like ribs, sausages, bacon, and hot dogs. Use these foods as occasional treats, not everyday foods.
9. Compare sodium in foods. Use the Nutrition Facts label to choose lower sodium versions of foods like soup, bread, and frozen meals. Select canned foods labeled "low sodium," "reduced sodium," or "no salt added."
10. Drink water instead of sugary drinks. Cut calories by drinking water or unsweetened beverages. Soda, energy drinks, and sports drinks are a major source of added sugar, and calories, in American diets.



A healthy meal starts with more vegetables and fruits and smaller portions of protein and grains. One of the benefits of preservation is that you can enjoy your fruits and vegetables all throughout the year. Think about how you can adjust the portions on your plate to get more of what you need without too many calories. And don't forget the dairy – make it the beverage with your meal or add fat-free or low-fat dairy products to your plate.

- **Grains:** Grains are used to make bread, cereal, rice and pasta. These foods are made from wheat, rye, oats and rice. Whole grains are higher in fiber than others. Look for whole wheat or other whole grains on the ingredient label. Half of the foods you eat from the grains group should be whole grains. Eat at least 3 ounces of whole-grain cereals, breads, crackers, rice, or pasta every day. Foods from the grains group have carbohydrates. Carbohydrates are fuel our bodies need.

- **Vegetables:** Vegetables provide several different vitamins and minerals your body needs. Vegetables can be dried or canned, frozen or fresh. Vitamin A is found in dark green vegetables such as broccoli and spinach; and dark yellow and orange vegetables such as carrots and sweet potatoes. Vitamin A keeps the cells in our body healthy to protect us against infections. Vitamin A also aids the growth of healthy skin, bones, and teeth. We should eat a variety of vegetables every day, including cooked dry beans and peas.

- **Fruits:** Fruits provide vitamins and minerals. Fruits can be dried or canned, frozen or fresh. Choose whole or pieces of fruit that are frozen, fresh, canned or dried. Oranges, grapefruit, strawberries and melons have Vitamin C which helps our bodies to heal and resist infections and it helps your body absorb the iron in the food you eat. It is also needed for healthy teeth, gums, and blood vessels. Deep yellow fruit like apricots and cantaloupe have Vitamin A.

- **Oils:** We do need some for good health. Get your oils from fish, nuts, and liquid oils such as corn oil, Canola oil or Olive oil. Foods that are high in fat include chips, fries, snack cakes, cookies and candy.

- **Dairy Products:** Milk gives us calcium to keep our bones and teeth strong. Milk and foods made from milk are the best sources of calcium. While you are growing, your bones need the calcium in your foods, so have three to four servings from the milk group every day.

- **Protein Foods**: Meats and Beans provide iron and protein for our body. Meats can be frozen, home canned or dried as jerky. Iron moves oxygen throughout your body in your red blood cells. Protein promotes the growth and repair of body tissues. Foods in this group include meats, poultry, fish, eggs, beans, nuts and peanut butter. When you eat a food from the protein group, it should be lean – that means it doesn't have much fat in it. Baking, broiling, or grilling are the best choices for cooking protein foods rather than frying because they do not add fat to the meat.

Choose MyPlate Worksheet

***Choose MyPlate* Worksheet:** For one day keep track of all the food you eat and how much of each food you eat. Record the food you ate and the amount on the *Choose MyPlate* Worksheet. After you have listed your choices, then list each food item in its food group; for example if you had a banana for breakfast, list it under the Fruits group, milk in the Milk group and so on. Now, add up your total for each food group. Compare your totals to the amount you should be eating for your age and gender. Answer the following questions.

- What food groups were lacking?
  _____
- Do you need to eat less of any food group?
  _____
- What changes could you have made on this day to eat better?
  _____
- List two goals for yourself to improve your eating.
  1._____
  2._____

This worksheet can be used as a selected activity for multiple years. It is a good idea to track the foods you eat on a regular basis to check and see how you are doing?

Choose MyPlate Worksheet:
For Kids

Check how you did yesterday and set a goal to aim for tomorrow. Star all the foods that were home preserved.

Write in your choices from yesterday	Food and Activity	Goal (Based on a 1800 Calorie Pattern	List Each Food Choice In Its Food Group*	Estimate Your Total
Breakfast: Lunch: Snack: Dinner: Physical Activity	**Grains** 	**6 ounces equivalents** (1 ounce equivalent is about 1 slice bread, 1 cup dry cereal, or ½ cup cooked rice, pasta or cereal		**___ounce equivalent**
	Vegetables 	**2-1/2 cups** (choose from dark green, orange, starchy, dry beans and peas, or other veggies)		**___cups**
	Fruits 	**1-1/2 cups** (choose from fresh, frozen, canned or dried) 1 ½ cups is equal to ¾ dried		**___cups**
	Dairy Products 	**3 cups** (1 cup yogurt or 1-1/2 ounce cheese = 1 cup milk)		**___cups**
	Protein Foods 	**5 ounces equivalents** (1 ounce equivalent is 1 ounce meat, chicken or turkey, or fish, 1 egg, 1 T. peanut butter, ½ ounce nuts, or ¼ cup dry beans)		**___ounce equivalent**
	Physical Activity 	At least **60 minutes** of moderate to vigorous activity a day or most days		

How did you do yesterday? ☐ Great ☐ So-So ☐ Not So Great
My food goal for tomorrow is: _____
My activity goal for tomorrow is: _____

*Some foods don't fit into any group. These "extras" may be mainly fat or sugar – limit your intake of these

Reading Food Labels

Smart eating is part of growing and staying healthy. *Choose MyPlate* helps you make good choices for a healthy, balanced diet. Pay attention to the amount of foods from each food group to help you find out if you eat enough or too much of some foods. When you completed your *Choose MyPlate* Worksheet, did you find that you were not eating all of the right foods?

It is not always easy to know what amount of food is a serving. For example, how many crackers are in a serving? How much cereal do you pour in a bowl for a serving from the Grain Group? The answers are easy if you know where to look.

Most foods in the grocery store must now have a nutrition label and list of ingredients. Look for the Nutrition Facts Label on the food package or container. This label shows the serving size, how many servings are in the package or container, and other nutritional information, such as a list of ingredients in descending order.

Serving Size: The first place to start when you look at the Nutrition Facts Label is the serving size. Just below that is the number of servings in the package or container. The Nutrition Facts Label on this chili label shows that a serving size is 1/6 of the recipe. This can of chili contains 4-5 servings.

Calories provide a measure of how much energy you get from a serving. In this can of chili there are 269 calories in one serving of the chili.

Nutrition Facts

Serving Size 1/6 of recipe 275g (275 g)
Servings per container 4-6

Amount Per Serving

Calories 269	Calories from Fat 37
	% Daily Value*
Total Fat 4g	7%
Saturated Fat 1g	3%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 277mg	12%
Total Carbohydrate 50g	17%
Dietary Fiber 12g	49%
Sugars 4g	
Protein 13g	

Vitamin A	53%	• Vitamin C	31%
Calcium	13%	• Iron	28%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

% Daily Value (%DV): The %DV is the amount of a nutrient in one serving compared to dietary recommendations. What is the %DV for Total Fat in the can of chili?
Nutritional Analysis: The nutritional analysis is like having a Nutrition Facts Label for the recipe. We should limit our intake of Total Fat, Cholesterol, and Sodium. Look for foods low in saturated fats, trans fats, and cholesterol. (5%DV or less is low, 20%DV or more is high). Most of the fats you eat should be polyunsaturated and monounsaturated fats. Keep total fat intake between 20% to 35% of calories.

Is the %DV for saturated fat high or low on the can of chili?

Sodium: The Dietary Guidelines for Americans suggest that we need to lower our sodium intake to less than 2300 milligrams per day to reduce the risk of high blood pressure. Most of the sodium we eat comes from processed foods, not from the saltshaker. When we do our home preserving, we can control the amount of sodium added to our product. That is another advantage of home preserving. One teaspoon of salt equals about 2300 milligrams of sodium. Ask yourself the following questions.

How much sodium is in the can of chili if you ate the whole container? Figure that there Were 4 servings in the can.
How much sodium is in one serving?
Is the %DV for sodium for one serving, high or low?

Sugar: Sugars are found naturally in fruits, (fructose) and fluid milk and milk products (lactose). The majority of sugars in typical American diets are sugars added to foods during processing, preparation, or at the table. The dietary Guidelines for Americans suggest that we need to reduce the intake of calories from solid fats and added sugars. In home food preservation, we can control the amount of sugar added to fruits and other products.

Be sure to get enough of Potassium, Dietary Fiber and Vitamins and Minerals. Remember that 5%DV is low and 20%DV or more is high. Is the calcium listed on the label high or low?

Going Further: You might want to collect your own label then answer the following questions. What is the food item? What is the serving size? How many calories are in the item per serving?

You may also want to collect several different brands of the same item and compare the labels. Compare cartons of fruit juice with fruit drink, or several boxes of dry cereal or energy bars.

How Much Should You Eat?

ChooseMyPlate.gov or nutrition.gov to give you amounts that you should eat to stay healthy. It depends on your age, whether you are a girl or boy, and how active you are. Kids who are more active burn more calories, so they need more calories. The following guidelines are only estimates for how much you need of each food group.

Grains: Grains are measured in ounce equivalents. Eat 5 to 6 ounces every day, and remember that at least half of these should be whole grains. An ounce equivalent equals:

1 slice of bread
½ cup of cooked cereal, such as oatmeal
½ cup of rice or pasta
1 cup of cold cereal

4- 8 year olds need 4 to 5 ounce equivalents each day
9-13 year old girls need 5 ounce equivalents each day
9-13 year old boys need 6 ounce equivalents each day
14-18 year old girls need 6 ounce equivalents each day
14-18 year old boys need 7 ounce equivalents each day

Vegetables: You need to eat dark green and orange vegetables. Vegetable servings are measured in cups. Vegetables can be canned or dried, frozen or fresh.

4- 8 year olds need 1 ½ cups of veggies each day
9-13 year old girls need 2 cups of veggies each day
9-13 year old boys need 2 ½ cups of veggies each day
14-18 year old girls need 2 ½ cups of veggies each day
14-18 year old boys need 3 cups of veggies each day

Fruits: Fruit is part of a healthy diet. Here is how much fruit you need. Fruit can be canned or dried or frozen or fresh.

4-8 year olds need 1 cup to 1 ½ cups of fruit each day
9-13 year old girls need 1 ½ cups of fruit each day
9-13 year old boys need 1 ½ cups of fruit each day

14-18 year old girls need 1 ½ cups of fruit each day
14-18 year old boys need 2 cups of fruit each day

One-fourth cup of dried fruit is equal to ½ cup fresh fruit.

Dairy Products: Calcium builds strong bones to last a lifetime, so you need to get these foods in your diet.

4-8 year olds need 1 cup to 2 cups of milk or another calcium rich food each day
9-13 year old girls need 3 cups of milk or another calcium rich food each day
9-13 year old boys need 3 cups of milk or another calcium rich food each day
14-18 year old girls need 3 cups of milk or another calcium rich food each day
14-18 year old boys need 3 cups of milk or another calcium rich food each day

Protein Foods: These foods contain iron and lots of other important nutrients. These foods, like grains, are measured in ounce equivalents. An ounce equivalent equals:

1 ounce of meat, poultry, or fish
¼ cup cooked dry beans
1 egg
1 tablespoon of peanut butter
A small handful of nuts or seeds

4-8 year olds need 3 to 4 ounce equivalents each day
9-13 year old girls need 5 ounce equivalents each day
9-13 year old boys need 5 ounce equivalents each day
14-18 year old girls need 5 ounce equivalents each day
14-18 year old boys need 6 ounce equivalents each day

Let's Plan a Menu

Planning a menu can be fun when you base it on the *Choose MyPlate.* Using the guidelines we have talked about, determine how much food you should eat daily from each of the food groups. Then divide the total amount of food you should eat each day among three meals and one or two snacks.

Make your meals fun and interesting. Try to include; a variety of foods to make the meal interesting and healthy; different colors and shapes of food that make the meal appealing when served together; different textures and flavors, some crunchy foods and some soft foods, chewy foods and liquids or maybe spicy foods and mild foods; and hot and cold foods.

Your menu should include foods from at least three or four of the five food groups at each meal.

Remember to include foods that you have made in your project. It might be dried fruits or canned fruits, frozen vegetables or salsa and canned products. You might want to include your trail mix for a snack that you did in the drying manual.

If you want another challenge, plan all the meals for a day, or a week including snacks. You might choose to rate the meals for texture color and taste. You might also want to compare the meals to

Choose MyPlate to see if you have provided the recommended number of servings for each food group.

Going Further: Organize your menus in a binder or file. You might choose to exhibit them at your fair as part of your Food Preservation project.

Types of Food Preservation

There are seven major methods of food preservation:

1. Refrigeration
    - Slows the growth of microorganisms
    - Slows action of enzymes
2. Freezing
    - Prevent growth of microorganisms
    - Slows, but does not stop enzyme action
3. Canning
    - Heat destroys the microorganisms that may be present in the food
    - Yeasts and molds are destroyed when food reaches 190F
    - Pressure canning enables the processing of canned foods at temperatures higher than boiling water, where dangerous bacteria are killed
    - Proper canning practices, removes air from the jars, leaving a vacuum
    - Molds and some yeasts are unable to grow in a vacuum
4. Sweetening and Acidifying Jellies and Jams
    - Added sugar and acid tie up free water and lowers pH
5. Pickling and Fermenting
    - Fermenting uses bacteria to produce lactic acid and lowers the pH
    - Added acid (fresh pack) controls pH with vinegar
6. Drying
    - Removes water and prevents growth of microorganisms
    - Dried foods must be packaged in oxygen and moisture proof containers
7. Salting
    - Chemically bonds water, inhibiting growth of microorganisms

Kitchen and Food Safety Basics

Kitchen Safety

Kitchens are safe! It's the people who work in the kitchens who create problems. Problems can be prevented if equipment and utensils are used properly and sharp items and hot foods and water are handled carefully. When working in the kitchen, one must be aware of safety hazards that may occur and take precautions to prevent injuries or accidents from happening by creating and maintaining a safe working environment.
The most common accidents happen in the kitchen, such as burns, cuts and falls. While cooking should be fun, you need to follow a few basic rules.

- Don't be in a hurry. Accidents happen when you're in too much of a hurry.
- Always clean up spills. Serious injury can occur when someone falls due to a wet floor.
- Never leave food unattended. Many fires develop while not paying attention to what is cooking.
- Don't use a towel in place of a hot pad. Always use potholders in both hands.
- Turn handles to the side and away from the edge of the stove.
- When cutting food, always cut away from you. Learn how to handle a knife properly.
- Never put a sharp knife or utensil in a sink of soapy water. Someone might put their hands in the sink and cut themselves on the knife.
- Don't leave a metal spoon in a pot that is boiling.
- When opening the lid on a steaming pan, always lift away from you. Steam can burn just as easily as boiling liquid.
- Don't use electrical appliances around the sink or water.
- Avoid loose clothing and flowing hair. If you have long hair, tie it back.

Food Safety

- Wipe up spills when they happen.
- Wash hands with soap under warm water for at least 20 seconds. Dry hands on a disposable paper towel or a towel designated just for hands.
- Use clean towels and dishcloths.
- Never put a spoon in your mouth, and then back in the food.
- Avoid cross contamination by using separate cutting boards for meat and fruits and vegetables.
- Keep all preparation and cooking surfaces clean.
- Thoroughly clean all dishes, equipment and utensils with hot, soapy water after use.
- Follow the 2 hour rule. Never leave prepared foods on the counter for longer than 2 hours.

Food Preservation Food Safety

- Always use a current, tested recipe. DO NOT make up recipes as they have not been tested to make sure the product is safe to store and eat.
- Make sure to adjust for altitude. Processing times or pressure must be adjusted on most recipes because they are written for people who live at sea level. Since water boils at lower

temperatures as altitude increases, it is necessary to increase processing times or pressure to ensure the food is safe.

Pressure Canner Altitude Adjustments		
Altitude in Feet	**Weighted Gauge**	**Dial Gauge**
0 to 1,000	10	11
1,001 to 2,000	15	11
2,001 to 4,000	15	12
4,001 to 6,000	15	13
6,001 to 8,000	15	14
8,001 to 10,000	15	15

- Add acid (lemon juice or citric acid) to canned tomato products as a margin of safety.
  - Lemon Juice – 1 tablespoon per pint, 2 tablespoons per quart
  - Citric acid – ¼ teaspoon per pint, ½ teaspoon per quart
- Be sure to use the correct equipment for each preservation technique.
  - Boiling water canner for acid foods
  - Pressure canner for low-acid foods
  - Dehydrator for drying
  - Freezer with plenty of space for freezing
- Preservation does not improve the quality of any food. Always use fresh, ripe, un-bruised, high quality produce for food preservation.

Basic Food Preservation Equipment

Equipment	Use	Canning	Drying	Freezing
Dry measuring cups	Used to measure dry and solid ingredients. They usually come in a nesting set of 1 cup, ½ cup, 1/3 cup, and ¼ cup.	X	X	X
Liquid measuring cups	Used to measure liquids. You can see through the cup to measure and there is headspace.	X	X	X
Measuring spoons	Used to measure small quantities of dry and liquid ingredients. Measure liquid ingredients, carefully to avoid spills.	X	X	X
Sharp knives and Cutting boards	Used to cut food to desired size. Wash knives and cutting boards after each use in warm soapy water.	X	X	X
Potholders	Used to protect hands when working with hot pans.	X	X	X
Rubber spatula	Used to scrape the side of the bowls or pans. You can use the flat side to level dry or solid ingredients when measuring.	X	X	X
Large pans	Use heavy duty pans are for cooking ingredients. Do not use aluminum pans as they break down under the required heat.	X	X	X
Long handled spoons	Used to stir. Choose spoons that are tall enough that they will not fall down into the ingredients.	X	X	X
Mixing bowls	Used to hold and combine ingredients. Made of pottery, glass, metal or plastic. Come in different sizes.	X	X	X
Funnel	Used for filling jars to keep the rims clean.	X		X
Colander	Used to drain foods after washing.	X	X	X
Timer	Use to time food preparation and processing times.	X	X	X
Food Chopper, Blender or Food Processor	Used to chop, blend, and puree items for food preservation. These optional items can cut back on preparation time. Handle them under the supervision of an adult.	X	X	X
Labels, permanent markers	Used to identify the type of food, pretreatment step and date.	X	X	X
Pressure Canner	Use heavy-gauge stainless steel or aluminum presser canners. Lid locks onto base and they have a vent pipe and safety valve. They are either fitted with a weighted or dial gauge.	X		
Jars and Lids	Used to hold preserved foods. Choose Mason type, threaded, home canning jars	X	X	X

	with 2-part lids. Recommended sizes: ½ pint, 1 ½ pint, quart and ½ gallon (only for juice).			
Jar Lifter	Use large sure-grip tongs to safely removed hot jars from canners. These tongs work with regular and wide mouth canning jars.	X		
Bubble Remover & Headspace Measurer	Used to accurately measure headspace and is tapered on the other end to remove bubbles from the jar. Only use plastic versions.	X		
Lid Wand	Used to removing lids from simmering water.	X		
Peeler	Used to remove the skin of vegetables.	X	X	X
Cheesecloth/Jelly Bag	Used to extract juice from fruit or to hold herbs when making pickles and other canning products.	X		
Scale	Used to weigh fruit and vegetables for preserving.	X		X

Throughout this manual teaspoon and tablespoon have been abbreviated as tsp. and tbsp.

Pressure Canning Basics

Objectives

- Learn how to safely preserve tomato products, vegetables, meats and combinations of meats and vegetables.
- Learn how to use home canned foods you prepared in healthy recipes.
- Learn to show others how to preserve foods by pressure canning.

Why Can Foods?

Food preservation can be a safe and economical way to preserve quality food at home. We preserve foods to prevent food spoilage and to have an abundant supply of a variety of foods when fresh produce isn't available. Individuals can control the quality of the food being preserved.

Canning Basics

Low Acid vs. High Acid Foods and Processing Methods

Foods are either processed in a pressure canner or boiling water canner to control bacteria that can be present in our foods. The most dangerous and difficult bacteria to destroy is botulism, (botulism is not the only pathogen we are concerned about, just the most dangerous). Whether food should be processed in a pressure canner or boiling water canner depends on the acidity or pH of the food. The term "pH" is a measure of acidity; the lower its value, the more acid in the food.

Low-acid canned foods are not acidic enough to prevent the growth of these bacteria. Low-acid foods have a pH value of higher than 4.6. These foods include:

- Meats (bear, beef, lamb, pork, veal and venison)
- Seafood
- Poultry
- All fresh vegetables

High-acid foods contain enough acid to block bacteria growth, or destroy them more rapidly when heated. Acid foods have a pH of 4.6 or lower. These foods include:

- Fruits
- Pickles
- Sauerkraut
- Jams
- Jellies
- Marmalades
- Fruit butters
- Salsas
- Tomatoes (after acid is added)

Botulism spores are destroyed at very high temperatures, so all low acid foods must be canned at a temperature of 240°F to 250°F which is only attainable in pressure canners. The exact time needed in the pressure canner depends on the type of food being canned, the way it is packed into the jars and the size of the jars. Use only USDA approved recipes for canning.

Canning Methods **NOT** Recommended:

- Open-kettle canning
- Oven canning
- Microwave oven canning
- Dishwasher canning
- Steam canners

Altitude Adjustments

Using processing times for canning food at sea level can result in food spoilage if you live at altitudes of 1,000 feet or higher. Water boils at lower temperatures the higher in altitude you go.

To destroy microorganisms in low-acid foods processed in a pressure canner, you must process jars at the correct pounds of pressure and cool the jars at room temperature. To adjust for altitudes above 1,000 feet in pressure canners, you need to increase the pounds of pressure used.

Foods may spoil if you fail to add to the processing pressure for elevations above 1,000 feet, process for fewer minutes than specified or cool jars in cold water.

The table below indicates the pounds of pressure to process jars for different altitudes.

Pressure Canner Altitude Adjustments		
Altitude in Feet	**Weighted Gauge**	**Dial Gauge**
0 to 1,000	10	11
1,001 to 2,000	15	11
2,001 to 4,000	15	12
4,001 to 6,000	15	13
6,001 to 8,000	15	14
8,001 to 10,000	15	15

Hot Packing vs. Raw (Cold) Packing

Hot packing is the practice of heating prepared food to boiling, simmering for 2 to 5 minutes and promptly filling jars loosely with the hot food. It is the best way to remove air from food. Also, the color and flavor of hot packed foods will last longer than raw packed foods.

Raw (cold) packing is the practice of filling jars tightly with freshly prepared, but unheated food. Some foods processed this way may float. The air that was not released before processing can cause food to discolor within 2 to 3 months. Raw-packing is more suitable for vegetables processed in a pressure canner.

With both practices the food is covered with boiling juice, syrup or water. This practice will help to remove air – shrinking food, helps keep food from floating, increases the vacuum seal and improves shelf life.

Getting Ready to Pressure Can – General Information

Selecting and Using a Pressure Canner

Make sure to use a pressure canner that has a jar rack, 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. **If using a dial gauge canner, be sure to have the gauge and gasket checked each year before using.** Check with the local extension office for testing locations.

If using a weighted gauge canner, they will exhaust tiny amounts of air or steam each time their gauge rocks or jiggles during processing. The sound of weight rocking or jiggling indicates that the canner is maintaining pressure. To know how many times your gauge should rock or jiggle per minute, consult your owner's manual or contact the manufacturer.

Selecting Produce

Produce needs to be canned at its peak of quality – within hours of harvest. Examine produce carefully for freshness and wholesomeness. Discard small pieces that are damaged or moldy. Trim small diseased spots from large produce. Apricots, nectarines, peaches, pears and plums will have more flavor if they have been ripened for one or more days between harvest and canning. If you delay canning, store produce in a shady, cool place.

Selecting Meats

Can meats and poultry from healthy, disease free animals. The meats should be chilled and canned without delay. Ice seafood after harvest and can it within two days.

Washing and Peeling

Rinse, don't soak produce in cold water. For dirty garden produce, first rinse with outside hose, then rinse one to three times in the kitchen sink.

Preparing Jars

Check all jars to make sure that they are free of cracks or chips, especially on the rim of the jar, which is the sealing surface. If the sealing surface is damaged you may not get a good seal and the jar could break. Before every use, wash jars in hot water with detergent and rinse well. This may be done in a dishwasher. Jars should be hot when filling to prevent jar breakage.

Headspace

The unfilled space above the food in the jar and below the lid is called headspace. All approved recipes will tell you how much headspace is required for that product. This space is needed for expansion of the food during processing and for forming the vacuum seal. Too little headspace may cause food to expand and bubble from the jar during processing. Too much headspace may cause the food at the top to discolor in storage.

Filling a Jar

Using a funnel, fill jars with food and add liquid to cover the food. Release air bubbles using a bubble remover by moving it up and down around the edges and in the center of the jar to allow air bubbles to escape. Adjust the headspace and then clean the jar rim (sealing surface) with a dampened paper towel. Place the preheated lid, onto the cleaned jar-sealing surface. Then fit the metal screw band over the flat lid.

Tightening Screw Bands

Use your thumb and two fingertips to turn the screw band very gently until you feel the slightest resistance. Then reposition, and tighten another 1½ inches.

- 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 may also cause lids to buckle and jars to break, especially with raw-packed, pressure-processed food.

Checking for a Seal in Processed Jars

1. Press the middle of the lid with a finger. If the lid springs up when you release your finger, the lid is unsealed.
2. Tap the lid with the bottom of a teaspoon. If there is a dull sound the lid is not sealed. If the 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.
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 lid is either flat or bulging, it may not be sealed.

Storing Canned Food

Do you leave screw bands on processed jars? Screw bands are not necessary for storage. When stored properly screw bands can be used for years. If they are left on, they can become difficult to remove, often rust and many do not work properly. After jars have cooled, remove screw bands, wash with warm soapy water, dry and store for future use.

Labeling

Labeling is very important for canned foods. Below is a list of information that should be on the labels for each jar that you can.

- List the name of product
- List the date canned
- List the ingredients
- Processing information (i.e. raw-hot pack, processing time, altitude adjustment)
- Source of recipe (i.e. Ball Blue Book, USDA Canning Guide, So Easy To Preserve, 4-H project manual)
- List any other information you may want to know about the canned product

How To Process in Pressure Canner

Step 1: Put canner rack inside canner base. Add 2-3 inches of water. Heat water to a simmer.	**Step 6:** After gauge indicates recommended pounds of pressure have been reached, adjust heat to maintain pressure for the duration of processing and set timer for USDA recommended time. *
Step 2: Prepare recipe according to USDA directions.	**Step 7:** After processing period is complete, turn off heat. Allow the canner to cool naturally.
Step 3: Fill jars to appropriate headspace and adjust lids and screw bands. Place jars on canner rack immediately after each jar is filled. When canner is filled, lock canner lid securely in place.	**Step 8:** When canner has depressurized and the gauge reads zero, remove the weight or open the petcock. Wait 10 minutes and unlock lid and remove lid from canner. *
Step 4: Leave weight off vent pipe or open petcock. Set heat to medium-high until steam flows evenly from the vent pipe or petcock.	**Step 9:** Remove jars from canner and place upright on a dry towel (Make sure there is 1 inch of space of space around jars for air to circulate).
Step 5: Vent canner for 10 minutes. Once vented, place weight on vent pipe or close petcock. *	**Step 10:** Allow jars to naturally cool for 12 to 24 hours before checking for a seal.

* Canners must be vented for 10 minutes before brought to pressure. Vent canner by leaving the vent port uncovered or manually open petcocks. Start timing the 10 minutes when you can visually see steam coming from the port. If this is not done, air trapped in the canner lowers the temperatures obtained at 5, 10 or 15 pounds pressure and results in under processing.

* If canner drops below recommended pressure for altitude, bring canner back up to pressure and start processing time over.

* When removing canner lid after processing is finished and pressure has returned to zero, be sure to lift the lid away from the face. The steam in the canner is very hot and could cause burns.

Activities

Let's Can Vegetables

1. Raw Pack vs. Hot Pack a Vegetable

Select a vegetable from the chart below. Prepare the vegetable by washing, draining, peeling if necessary and cutting into uniform pieces. Process this vegetable as a raw pack and a hot pack according to chart instructions, remembering to adjust pressure for altitude.

Canning Method: Vegetables must be processed in a pressure canner. Begin counting time after canner has vented for 10 minutes and the canner has been brought up to pressure. The canner must maintain pressure for the entire processing time. If canner goes below pressure, you must bring the canner back up to pressure and begin the processing time over.

Headspace: Leave 1 inch headspace for both the vegetable and the liquid, unless stated otherwise in chart below.

Salt: If desired, 1 teaspoon salt can be added per quart.

Canning Low-Acid Vegetables

		PROCESS TIME (Min.) AT 240° F (10 pounds pressure for weighted gauge; 11 pounds pressure for dial gauge. Adjust for altitude)	
VEGETABLE	**PREPARATION**	**Pts.**	**Qts.**
Asparagus	Wash. Trim off tough scales, and break off ends. Wash again. Cut into 1-inch pieces or leave whole.		
	Hot pack. Cover with boiling water; boil 2-3 minutes. Loosely pack in jars. Add salt, if desired. Cover with boiling cooking liquid. If liquid is gritty, use freshly boiled water.	30	40
	Raw Pack. Pack tightly without crushing. Add salt, if desired. Cover with boiling water.	30	40
Beans, green, Wax, snap	Wash, trim ends, cut into 1-inch pieces or leave whole.		
	Hot pack. Cover with boiling water; boil 5 minutes. Pack loosely; add salt, if desired. Cover with boiling cooking liquid.	20	25
	Raw Pack. Pack tightly; add salt, if desired. Cover with boiling water.	20	25

		PROCESS TIME (Min.) AT 240° F (10 pounds pressure for weighted gauge; 11 pounds pressure for dial gauge. Adjust for altitude)	
VEGETABLE	**PREPARATION**	**Pts.**	**Qts.**
Beans, fresh lima	Select young, tender beans. Shell and wash.		
	Hot pack. Cover with boiling water; return to boil. Loosely pack, leaving 1-inch headspace. Add salt, if desired. Cover with boiling water.	40	50
	Raw pack. Loosely pack to these headspaces: Small beans: 1 inch for pints; 1 ½ inch for quarts Large beans: 1 inch for pints; 1 ¼ inch for quarts Do not press down or shake jar. Add salt, if desired. Cover with boiling water.	40	50
Beets	Sort for size; cut off tops leaving 1 inch stem and root. Cover with boiling water; boil 15-25 minutes until skins slip. Skin, trim. Leave baby beets whole. Cut medium or large beets into ½ inch cubes or slices. Halve or quarter very large slices. Pack; add salt, if desired. Cover with boiling water.	30	35
Carrots	Wash, peel, rewash and slice or dice.		
	Hot pack. Cover with boiling water, bring to boil and simmer for 5 minutes. Pack; add salt, if desired. Cover with boiling cooking liquid.	25	30
	Raw Pack. Pack tightly. Add salt, if desired, and boiling water.	25	30
Chile peppers	Wash, remove cores and seeds. Slash two or four slits in each pepper and either blanch in boiling water or blister outer skin with heat (see footnote). Peel peppers. Pack loosely; add salt, if desired. Cover with boiling water. Pack in half-pint or pint jars only. Process time for half-pints is the same as pints.	35	Do not can in quart jars
	Green chile may be blistered in a hot oven or broiler (400°F) for 6-8 minutes or over a gas or electric burner covered with a heavy wire mesh or on an outdoor charcoal grill (place chiles 5-6 inch above coals). Be sure heat source is very hot. Turn chiles often to prevent scorching and to allow even blistering. Cool before peeling. For easier peeling, place in a pan and cover with a damp towel for a few minutes. Handling chile can burn hands. Wear rubber gloves and keep hands away from eyes.	35	Do not can in quart jars

		PROCESS TIME (Min.) AT 240° F (10 pounds pressure for weighted gauge; 11 pounds pressure for dial gauge. Adjust for altitude)	
VEGETABLE	**PREPARATION**	**Pts.**	**Qts.**
Corn, cream style	Husk, silk, and wash ears. Blanch ears 4 minutes in boiling water. Cut corn at half-kernel depth and then scrape remaining corn from cob with table knife. ***Hot pack.*** Add 1 pint boiling water for each quart of corn; heat to boiling. Pack in pint jars only (larger jars cannot be used because heat penetrates this thick food very slowly). Add salt, if desired.	85	Do not can in quart jars
Corn, whole kernel	Husk, silk, and wash ears. Blanch 3 minutes in boiling water. Cut kernels from cob at three-fourths kernel depth. Caution: Do not scrape cob. ***Hot pack.*** Add 1 cup hot water for each quart of corn; heat to boiling and simmer 5 minutes. Pack, cover with boiling cooking liquid. Add salt, if desired. ***Raw Pack.*** Pack without shaking or pressing down. Add salt, if desired, and boiling water.	55 55	85 85
Mushrooms	Trim stems, discolored spots. Soak in cold water 10 minutes to remove clinging soil, and then wash in clear water. Leave small mushrooms whole; cut large ones into halves or quarters. Cover with water in saucepan and boil 5 minutes. Pack hot; add salt, if desired. For better color, add 1/8 tsp. crystalline ascorbic acid per pint. Cover mushrooms with fresh boiling water. Pack in pint or half-pint jars only. Process time for half-pints is the same as for pints. **Caution:** Do not can wild mushrooms.	45	Do not can in quart jars
Peas, green	Shell and wash ***Hot pack.*** Cover with boiling water; boil 2 minutes. Pack loosely. Add salt, if desired. Cover with boiling liquid. ***Raw Pack.*** Pack without shaking or pressing down. Add salt, if desired. Cover with boiling water.	40 40	40 40
Peas, snow, sugar, snap, pod	Not recommended for canning because of poor quality results.		

		PROCESS TIME (Min.) AT 240° F (10 pounds pressure for weighted gauge; 11 pounds pressure for dial gauge. Adjust for altitude)	
VEGETABLE	**PREPARATION**	**Pts.**	**Qts.**
Potatoes, white	***Cubed.*** Wash, peel, cut into ½ inch cubes. To prevent darkening, place in ascorbic acid solution (1 tsp. ascorbic acid per gallon water). Drain. Cook 2 minutes in boiling water. Drain, Pack; add salt, if desired. Cover with fresh hot water. ***Whole.*** Use mature potatoes, small to medium size. Wash, peel, boil 10 minutes and drain. Pack; add salt, if desired. Cover with fresh hot water.	35 35	40 40
Pumpkin and winter squash, cubed	Wash, remove seeds, peel. Cut into 1 inch slices. Add just enough water to cover; boil 2 minutes; fill hot jars with slices, add salt if desired. Cover with boiling liquid. Caution: do not mash or puree before canning.	55	90
Spinach, other greens	Use fresh, tender greens. Wash; remove tough stems, midribs. Place about 1 lb. in blancher basket or cheesecloth bag; steam 3-5 minutes, or until well wilted. Pack loosely. Add salt, if desired (1/4 tsp. to pints, ½ tsp. to quarts). Cover with fresh boiling water.	70	90

Source: Hillers, Val. 2001. Canning Vegetables. PNW 172. Pullman, WA: Washington State University Extension.

Journaling

What vegetables did you choose to can? _____

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What challenges did you have with this activity? _____

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What other observations do you have about this activity? _____

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2. Mixed Vegetables

Vegetables may be canned individually such as in activity 1, or as a mixed vegetable. When making mixed vegetables, you may change the suggested proportions or substitute other favorite vegetables except leafy green, dried beans, cream-style corn, squash and sweet potatoes.

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

Yield: 7 quarts

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

Except for zucchini, wash and prepare vegetables as described previously for each vegetable. Wash, trim and slice or cube zucchini; combine all vegetables in a large pot or kettle, and add enough water to cover pieces. Add 1 teaspoon of salt per quart to the jar, if desired. Boil 5 minutes and fill hot jars with hot pieces and liquid, leaving 1 inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a dampened clean paper towel. Adjust lids and process.

Recommended process time for Mixed Vegetables in a dial gauge pressure canner						
			Canner Pressure (PSI) at Altitudes of			
Style of Pack	**Jar Size**	**Process Time**	**0-2,000 ft.**	**2,001-4,000 ft.**	**4,001-6,000 ft.**	**6,001-8,000 ft.**
Hot	Pint	75 min	11 lb.	12 lb.	13 lb.	14 lb.
	Quarts	90 min	11 lb.	12 lb.	13 lb.	14 lb.

Recommended process time for Mixed Vegetables in a weighted gauge pressure canner				
			Canner Pressure (PSI) at Altitudes of	
Style of Pack	**Jar Size**	**Process Time**	**0-1,000 ft.**	**Above 1,000 ft.**
Hot	Pints	75 min	10 lb.	15 lb.
	Quarts	90 min	10 lb.	15 lb.

Source: USDA Complete Guide to Home Canning

Journaling

What challenges did you have with this activity? _____

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What other observations do you have about this activity? _____

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3. Spaghetti Sauce Without Meat

30 lbs. tomatoes
1 cup chopped onions
5 cloves garlic, minced
1 cup chopped celery or green peppers
1 lb. fresh mushrooms, sliced (optional)
4 ½ tsp. salt
2 tbsp. oregano
4 tbsp. minced parsley
2 tsp. black pepper
¼ cup brown sugar
¼ cup vegetable oil

Yield: About 9 pints

Wash tomatoes and dip in boiling water for 30 to 60 seconds or until skins split. Dip in cold water and slip off skins. Remove cores and quarter tomatoes. Boil 20 minutes, uncovered, in large saucepan. Put through food mill or sieve. Sauté onions, garlic, celery or peppers, and mushrooms (if desired) in vegetable oil until tender. Combine sautéed vegetables and tomatoes and add

remainder of spices, salt and sugar. Bring to a boil. Simmer, uncovered, until thick enough for serving. At this time the initial volume will have been reduced by nearly one-half. Stir frequently to avoid burning. Fill hot jars, leaving 1-inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a dampened clean paper towel. Adjust lids and process.

Recommended process time for Spaghetti Sauce without Meat in a dial gauge pressure canner						
			Canner Pressure (PSI) at Altitudes of			
Style of Pack	**Jar Size**	**Process Time**	**0-2,000 ft.**	**2,001-4,000 ft.**	**4,001-6,000 ft.**	**6,001-8,000 ft.**
Hot	Pint	20 min	11 lb.	12 lb.	13 lb.	14 lb.
	Quarts	25 min	11 lb.	12 lb.	13 lb.	14 lb.

Recommended process time for Spaghetti Sauce without Meat in a weighted gauge pressure canner				
			Canner Pressure (PSI) at Altitudes of	
Style of Pack	**Jar Size**	**Process Time**	**0-1,000 ft.**	**Above 1,000 ft.**
Hot	Pints	20 min	10 lb.	15 lb.
	Quarts	25 min	10 lb.	15 lb.

Source: USDA Complete Guide to Home Canning

Journaling

What challenges did you have with this activity? _____

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What other observations do you have about this activity? _____

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Let's Can Dry Beans

4. Beans or Peas – Shelled, Dried – All Varieties

Quantity: An average of 5 pounds is needed per canner load of 7 quarts; an average of 3 ¼ pounds is needed per canner load of 9 pints – an average of ¾ pound per quart.
Quality: Select mature, dry seeds. Sort out and discard discolored seeds.

Procedure: Place dried beans or peas in a large pot and cover with water. Soak 12 to 18 hours in a cool place. Drain water. To quickly hydrate beans, you may cover sorted and washed beans with boiling water in a saucepan. Boil 2 minutes, remove from heat, soak 1 hour and drain. Cover beans soaked by either method with fresh water and boil 30 minutes. Add ½ teaspoon of salt per pint or 1 teaspoon per quart to the jar, if desired. Fill hot jars with beans or peas and cooking water, leaving 1 inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a dampened clean paper towel. Adjust lids and process.

Recommended process time for Dried Beans in a dial gauge pressure canner						
			Canner Pressure (PSI) at Altitudes of			
Style of Pack	**Jar Size**	**Process Time**	**0-2,000 ft.**	**2,001-4,000 ft.**	**4,001-6,000 ft.**	**6,001-8,000 ft.**
Hot	Pint	75 min	11 lb.	12 lb.	13 lb.	14 lb.
	Quarts	90 min	11 lb.	12 lb.	13 lb.	14 lb.
Recommended process time for Dried Beans in a weighted gauge pressure canner						
			Canner Pressure (PSI) at Altitudes of			
Style of Pack	**Jar Size**	**Process Time**	**0-1,000 ft.**		**Above 1,000 ft.**	
Hot	Pints	75 min	10 lb.		15 lb.	
	Quarts	90 min	10 lb.		15 lb.	

With Tomato or Molasses Sauce

Tomato sauce – Either mix 1 quart tomato juice, 3 tablespoons sugar, 2 teaspoons salt, 1 tablespoon chopped onion, and ¼ teaspoon each of ground cloves, allspice, mace, and cayenne pepper; or, mix 1 cup tomato ketchup with 3 cups of cooking liquid from beans. Heat to boiling.

Molasses sauce – Mix 4 cups water or cooking liquid from beans, 3 tablespoons dark molasses, 1 tablespoon vinegar, 2 teaspoons salt, and ¾ teaspoon powdered dry mustard. Heat to boiling.

Fill hot jars three-fourths full with hot beans. Add a ¾ inch cube of pork, ham, or bacon to each jar, if desired. Fill jars with heated sauce, leaving 1 inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a dampened clean paper towel. Adjust lids and process.

Recommended process time for Dried Beans with tomato or molasses sauce in a dial gauge pressure canner						
			Canner Pressure (PSI) at Altitudes of			
Style of Pack	**Jar Size**	**Process Time**	**0-2,000 ft.**	**2,001-4,000 ft.**	**4,001-6,000 ft.**	**6,001-8,000 ft.**
Hot	Pint	65 min	11 lb.	12 lb.	13 lb.	14 lb.
	Quarts	75 min	11 lb.	12 lb.	13 lb.	14 lb.
Recommended process time for Dried Beans with tomato or molasses sauce in a weighted gauge pressure canner						
			Canner Pressure (PSI) at Altitudes of			
Style of Pack	**Jar Size**	**Process Time**	**0-1,000 ft.**		**Above 1,000 ft.**	
Hot	Pints	65 min	10 lb.		15 lb.	
	Quarts	75 min	10 lb.		15 lb.	

Source: USDA Complete Guide to Home Canning

Journaling

What dried bean did you choose to can? _____

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What challenges did you have with this activity? _____

What other observations do you have about this activity? _____

Let's Can Meats, Poultry and Fish

5. <u>Pick one of the meats, poultry or fish listed below and prepare and process according to instructions.</u>

<u>Chicken</u>

Choose freshly killed and dressed, healthy animals. Large chickens are more flavorful than fryers. Dressed chickens should be chilled for 6 to 12 hours before canning. Remove excess fat. Cut the chicken into suitable sizes for canning. Can with or without bone.

Hot Pack – Boil, steam, or bake meat until about two-thirds done. Add 1 teaspoon salt per quart to the jar, if desired. Fill hot jars with pieces and hot broth, leaving 1 ¼ inch headspace. Remove air bubbles and adjust headspace if needed.

Raw Pack – Add 1 teaspoon salt per quart, if desired. Fill hot jars loosely with raw meat pieces, leave 1 ¼ inch headspace. Do not add liquid.

Wipe rims of jars with a dampened clean paper towel. Adjust lids and process.

<u>Ground or Chopped Meat</u>

Bear, beef, lamb, pork, sausage, veal, venison

Choose fresh, chilled meat. With venison, add one part high-quality pork fat to three or four parts venison before grinding. Use freshly made sausage, seasoned with salt and cayenne pepper (sage may cause a bitter off-flavor). Shape chopped meat into patties or balls or cut cased sausage into 3 to 4 inch links. Cook until lightly browned. Ground meat may be sautéed without shaping. Remove excess fat. Fill hot jars with pieces. Add boiling meat broth, tomato juice, or water, leaving 1 inch headspace. Remove air bubbles and adjust headspace if needed. Add 1 teaspoon of salt per quart to the jars, if desired. Wipe rims of jars with a dampened clean paper towel. Adjust lids and process.

<u>Strips, cubes, or chunks of meat</u>

Bear, beef, lamb, pork, veal, venison

Choose quality chilled meat. Remove excess fat. Soak strong-flavored wild meats for 1 hour in brine water containing 1 tablespoon of salt per quart. Rinse. Remove large bones.

Hot Pack – Precook meat until rare by roasting, stewing, or browning in a small amount of fat. Add 1 teaspoon of salt per quart to the jar, if desired. Fill hot jars with pieces and add boiling broth, meat drippings, water, or tomato juice (especially with wild game), leaving 1 inch headspace. Remove air bubbles and adjust headspace if needed.

Raw Pack – Add 1 teaspoon of salt per quart to the jar, if desired. Fill hot jars with raw meat pieces, leaving 1 inch headspace. Do not add liquid.

Wipe rims of jars with a dampened clean paper towel. Adjust lids and process.

Fish in pint jars

Blue, mackerel, salmon, steelhead, trout, and other fatty fish except tuna

Caution: Bleed and eviscerate fish immediately after catching, never more than 2 hours after they are caught. Keep cleaned fish on ice until ready to can.

If the fish is frozen, thaw it in the refrigerator before canning. Rinse the fish in cold water. You can add vinegar to the water (2 tablespoons per quart) to help remove slime. Remove head, tail, fins, and scales; it is not necessary to remove the skin. You can leave the bones in most fish because the bones become very soft and are a good source of calcium. For halibut, remove the head, tail, fins, skin and the bones, wash and remove all blood. Refrigerate all fish until you are ready to pack in jars.

Split fish lengthwise, if desired. Cut cleaned fish into 3 ½ inch lengths. If the skin has been left on the fish, pack the fish skin out, for a nicer appearance or skin in, for easier jar cleaning. Fill hot pint jars, leaving 1 inch headspace. Add 1 teaspoon of salt per pint, if desired. Do not add liquids. Carefully clean the jar rims with a clean, damp paper towel; wipe with a dry paper towel to remove any fish oil. Adjust lids and process. Fish in half pint or 12 ounce jars would be processed for the same amount of time as pint jars.

Note: Glass like crystals of struvite, or magnesium ammonium phosphate, sometimes form in canned salmon. There is no way for the home canner to prevent these crystals from forming, but they usually dissolve when heated and are safe to eat.

Recommended process times in a dial gauge pressure canner							
				Canner Pressure (PSI) at Altitudes of			
Type of Food	**Style of Pack**	**Jar Size**	**Process Time**	**0-2,000 ft.**	**2,001-4,000 ft.**	**4,001-6,000 ft.**	**6,001-8,000 ft.**
Chicken Without Bones	Hot and Raw	Pints	75 min	11 lb.	12 lb.	13 lb.	14 lb.
		Quarts	90 min	11 lb.	12 lb.	13 lb.	14 lb.
Chicken With Bones	Hot and Raw	Pints	65 min	11 lb.	12 lb.	13 lb.	14 lb.
		Quarts	75 min	11 lb.	12 lb.	13 lb.	14 lb.
Ground or Chopped Meat	Hot	Pints	75 Min	11 lb.	12 lb.	13 lb.	14 lb.
		Quarts	90 min	11 lb.	12 lb.	13 lb.	14 lb.
Strips, Cubes or Chunks of Meat	Hot and Raw	Pints	75 min	11 lb.	12 lb.	13 lb.	14 lb.
		Quarts	90 min	11 lb.	12 lb.	13 lb.	14 lb.
Fish	Raw	Pints	100 min	11 lb.	12 lb.	13 lb.	14 lb.

Recommended process times in a weighted gauge pressure canner					
				Canner Pressure (PSI) at Altitudes of	
Type of Food	**Style of Pack**	**Jar Size**	**Process Time**	**0-1,000 ft.**	**Above 1,000 ft.**
Chicken Without Bones	Hot and Raw	Pints	75 min	10 lb.	15 lb.
		Quarts	90 min	10 lb.	15 lb.
Chicken with Bones	Hot and Raw	Pints	65 min	10 lb.	15 lb.
		Quarts	75 min	10 lb.	15 lb.
Ground or Chopped Meat	Hot	Pints	75 min	10 lb.	15 lb.
		Quarts	90 min	10 lb.	15 lb.
Strips, Cubes or Chunks of Meat	Hot and Raw	Pints	75 min	10 lb.	15 lb.
		Quarts	90 min	10 lb.	15 lb.
Fish	Raw	Pints	100 min	10 lb.	15 lb.

Source: USDA Complete Guide to Home Canning

Journaling

What meat did you choose to can? _____

_____

What challenges did you have with this activity? _____

_____

_____

What other observations do you have about this activity? _____

_____

_____

Let's Can Combinations

6. Vegetable, dried bean or pea, meat, poultry, or seafood soup

Caution: Do not add noodles or other pasta, rice, flour, cream, milk or other thickening agents to home canned soups. If dried beans or peas are used, they must be fully rehydrated first.

Select, wash and prepare vegetables, meat, and seafood's as described for the specific foods. Cover meat with water and cook until tender. Cool meat and remove bones. Cook vegetables. For each cup of dried beans or peas, add 3 cups of water, boil 2 minutes, remove from heat, soak 1 hour, and heat to boil.

Drain all foods and combine with meat broth, tomatoes, or water to cover. Boil 5 minutes. DO NOT THICKEN. Salt to taste, if desired.

Fill hot jars only halfway with mixture of solids. Add and cover with remaining liquid, leaving 1 inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a dampened clean paper towel. Adjust lids and process.

Recommended process time for Soup in a dial gauge pressure canner						
			Canner Pressure (PSI) at Altitudes of			
Style of Pack	**Jar Size**	**Process Time**	**0-2,000 ft.**	**2,001-4,000 ft.**	**4,001-6,000 ft.**	**6,001-8,000 ft.**
Hot	Pint	60* min	11 lb.	12 lb.	13 lb.	14 lb.
	Quarts	75* min	11 lb.	12 lb.	13 lb.	14 lb.

Recommended process time for Soup in a weighted gauge pressure canner				
			Canner Pressure (PSI) at Altitudes of	
Style of Pack	**Jar Size**	**Process Time**	**0-1,000 ft.**	**Above 1,000 ft.**
Hot	Pints	60* min	10 lb.	15 lb.
	Quarts	75* min	10 lb.	15 lb.

Source: USDA Complete Guide to Home Canning

***Caution: process 100 minutes if soup contains seafood's**

7. Spaghetti Sauce with Meat

30 lbs. tomatoes
2 ½ lbs. ground beef or sausage
5 cloves garlic, minced
1 cup chopped onions
1 cup chopped celery or green peppers
1 lb. fresh mushrooms, sliced (optional)
4 ½ tsp. salt
2 tbsp. oregano
4 tbsp. minced parsley
2 tsp. black pepper
¼ cup brown sugar

Yield: About 9 pints

To prepare tomatoes, follow directions for Spaghetti Sauce Without Meat, located in the activities of this manual. Sauté beef or sausage until brown. Add garlic, onion, celery or green pepper, and mushrooms, if desired. Cook until vegetables are tender. Combine with tomato pulp in large saucepan. Add spices, salt and sugar. Bring to a boil. Simmer, uncovered, until thick enough for serving. At this time initial volume will have been reduced by nearly one-half. Stir frequently to avoid burning. Fill hot jars, leaving 1 inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a dampened clean paper towel. Adjust lids and process.

Recommended process time for Spaghetti Sauce with Meat in a dial gauge pressure canner						
			Canner Pressure (PSI) at Altitudes of			
Style of Pack	**Jar Size**	**Process Time**	**0-2,000 ft.**	**2,001-4,000 ft.**	**4,001-6,000 ft.**	**6,001-8,000 ft.**
Hot	Pints	60 min	11 lb.	12 lb.	13 lb.	14 lb.
	Quarts	70 min	11 lb.	12 lb.	13 lb.	14 lb.
Recommended process time for Spaghetti Sauce with Meat in a weighted gauge pressure canner						
			Canner Pressure (PSI) at Altitudes of			
Style of Pack	**Jar Size**	**Process Time**	**0-1,000 ft.**		**Above 1,000 ft.**	
Hot	Pints	60 min	10 lb.		15 lb.	
	Quarts	70 min	10 lb.		15 lb.	

Source: USDA Complete Guide to Home Canning

8. Chile Con Carne

3 cups dried pinto or red kidney beans
5 ½ cups water
5 tsp. salt (separated)
3 lbs. ground beef
1 ½ cups chopped onion
1 cup chopped peppers of your choice (optional)
1 tsp. black pepper
3 to 6 tbsp. chili powder
2 quarts crushed or whole tomatoes

Yield: 9 pints

Wash beans thoroughly and place them in a 2 qt. saucepan. Add cold water to a level of 2 to 3 inches above the beans and soak 12 to 18 hours. Drain and discard water. Combine beans with 5 ½ cups of fresh water and 2 teaspoons salt. Bring to a boil. Reduce heat and simmer 30 minutes. Drain and discard water. Brown ground beef, chopped onions, and peppers (if desired), in a skillet. Drain off fat and add 3 teaspoons salt, pepper, chili powder, tomatoes and drained cooked beans. Simmer 5 minutes. **Caution: Do not thicken.** Fill hot jars, leaving 1 inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a dampened clean paper towel. Adjust lids and process.

Recommended process time for Chile Con Carne in a dial gauge pressure canner						
			Canner Pressure (PSI) at Altitudes of			
Style of Pack	**Jar Size**	**Process Time**	**0-2,000 ft.**	**2,001-4,000 ft.**	**4,001-6,000 ft.**	**6,001-8,000 ft.**
Hot	Pint	75 min	11 lb.	12 lb.	13 lb.	14 lb.
Recommended process time for Chile Con Carne in a weighted gauge pressure canner						
			Canner Pressure (PSI) at Altitudes of			
Style of Pack	**Jar Size**	**Process Time**	**0-1,000 ft.**		**Above 1,000 ft.**	
Hot	Pints	75 min	10 lb.		15 lb.	

Source: USDA Complete Guide to Home Canning

Journaling

What combination did you choose to can? _____

_____

What challenges did you have with this activity? _____

_____

_____

What other observations do you have about this activity? _____

_____

_____

Other Pressure Canning Activities

9. Conduct Taste Tests

Select a vegetable or dry bean and process using two different methods. Some suggestions are:

- Can a vegetable using raw pack and hot pack
- Can a dry bean with tomato sauce and in water
- Can a dry bean with molasses sauce and in water
- Compare home canned product with a commercially canned product

After preparing the two items being prepared, share them with a panel of at least four people. Here are some suggestions for your taste test:

- Do not tell the panel the preservation method used.
- Ask each panel member to write down comments about each of the samples they are comparing.
- Ask the panel to indicate which sample they prefer
- Share the results with the panel.
- Record the results of your taste test.

Journaling

What type of vegetable or dry bean did you choose to compare in your taste test? _____

_____

What challenges did you have with this activity? _____

_____

_____

What other observations do you have about this activity? _____

_____

_____

10. Labeling

Determine what type of canned product you need to label. Decide if you can write on the lid or if you need to attach the label to the jar. Here are some important things to include on the label:

- List the name of product
- List the date canned
- List the ingredients
- Processing information (i.e. raw-hot pack, processing time, altitude adjustment)
- Source of recipe (i.e. Ball Blue Book, USDA Canning Guide, So Easy To Preserve, 4-H project manual)
- List any other information you may want to know about the canned product

Journaling

What canned food did you choose to label? _____

_____

What challenges did you have with this activity? _____

_____

What other observations do you have about this activity? _____

Going Further with Pressure Canning

Create Your Own Activity

Using one of the resource materials listed in the front of this manual, create your own activity. Resource materials are available at your local CSU Extension Office.

Here are some suggestions to help you:

- Identify the resource you will be using, for example; *So Easy to Preserve*
- Decide on the recipe or method you want to use
- Get equipment, food and packaging ready
- Follow the information and directions listed carefully
- Evaluate your end results

Journaling

What activity did you choose to do? _____

What challenges did you have with this activity? _____

What other observations do you have about this activity? _____

Menu Planning

Using the menu planning information listed in the front of this manual; develop a menu plan for your friends and family. Use some foods that you have pressure canned for healthy recipes you include in your menu plan.

Journaling

What menu or menus did you plan? _____

What challenges did you have with this activity? _____

What other observations do you have about this activity? _____

Show What You Have Learned

The purpose of a demonstration is for you to share some of the fun activities you completed or important information you learned about preserving foods by pressure canning them. You are required to give a demonstration to complete this project.

Some ideas you might consider are:

- How to select suitable canning produce
- Demonstrate the proper equipment for pressure canning
- Demonstrate the parts of a pressure canner and the proper process for using one
- Demonstrate how to prepare vegetables and pack into jars
- Explain the difference between raw and hot pack
- Explain why you need to adjust for altitude and how to make the adjustment for pressure canning
- Demonstrate how to prepare meat and pack into jars

Reflections on Pressure Canning

Do, Reflect and *Apply* are how 4-H youth "Learn by Doing." You have experienced several activities in this project, shared the results and discussed them with your club members, leaders and families. Apply what you learned by showing others how to preserve food by pressure canning. To show what you have learned, answer at least two of these questions.

- Explain why pressure canning is an effective and economical way to preserve food.

  _____

  _____

  _____

- Why does produce and meat need to be at their peak of quality for canning?

  _____

  _____

  _____

- Why do we need to make elevation adjustments to canning recipes?

  _____

  _____

  _____

- Explain how to test for a seal in home canned foods.

  _____

  _____

  _____

- How could you use your pressure canned foods as a way to help with long-term menu planning for your family?

  _____

  _____

  _____