

Freezing Project Manual

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PNW 650 A Pacific Northwest Extension Publication
University of Idaho • Oregon State University • Washington State University

4-H Home Food Preservation Series

The home food preservation series contains four manuals:

Freezing for ages 8–18

Drying for ages 8–18

Boiling water canning for ages 8–18

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 lists the objectives for the project, and each activity includes a short lesson followed by hands-on activities and questions for further learning. In addition, each manual includes an achievement program to help youth identify their goals and keep track of their accomplishments.

These manuals were 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.

Acknowledgments

Many colleagues have taken time to review the curriculum and conduct pilot tests. A special thanks goes out to Extension staff, educators, and specialists at University of Idaho, Washington State University, Oregon State University, and Colorado State University.

Special acknowledgments go to the following authors and universities for use of their material:

Washington State University

Meakin, Eunice A. 1983. *Freezing Meat, Fish and Poultry at Home*. Extension Bulletin 1195. Pullman, WA: Washington State University Extension Service.

Oregon State University

Raab, Carolyn A. 2007. *Freezing Fruits and Vegetables*. PNW 214. Corvallis, OR: Oregon State University Extension Service.

Raab, Carolyn, and N. Oehler. 2009. *Freezing Convenience Foods*. PNW 296. Corvallis, OR: Oregon State University Extension Service.

Published and distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914, by University of Idaho Extension, the Oregon State University Extension Service, Washington State University Extension, and the U.S. Department of Agriculture cooperating.

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Resources

So Easy to Preserve, University of Georgia

<http://www.soeasytopreserve.com>

Ball Blue Book Guide to Preserving, 2011 or most current edition

Freezing Fruits and Vegetables, PNW 214

<http://extension.oregonstate.edu/catalog/pdf/pnw/pnw214.pdf>

Ball website

<http://www.freshpreserving.com>

National Center for Home Food Preservation website

<http://www.uga.edu/nchfp>

Abbreviations

tsp = teaspoon

tbsp = tablespoon

lb = pound



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Notes to project helper

This manual 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 practices 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 activities 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 the quality of their completed activities. Questions at the end of each activity will help youth think through the steps in the project and how to apply their new skills in their everyday lives.
- Be an example with kitchen and food safety rules.

Using experiential learning

Experiential learning is the process of "do, reflect, apply." It is an inquiry-based approach to learning. Rather than being provided with information, learners 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 and observations. 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. Learners identify general trends and real-life examples of when they could use what they have learned.

Developing life skills

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

Use this page to help you plan how to finish this manual.

- Select your helper and write down his or her contact information.
- Set goals for each year.
- Complete the number of activities required by your state each year.
- Complete a presentation or demonstration each year.

Project helper: _____

Contact information: _____

My achievement program

Do at least four activities each year. You can also make up your own activities.

Ask your project helper to initial each activity after you've completed it.

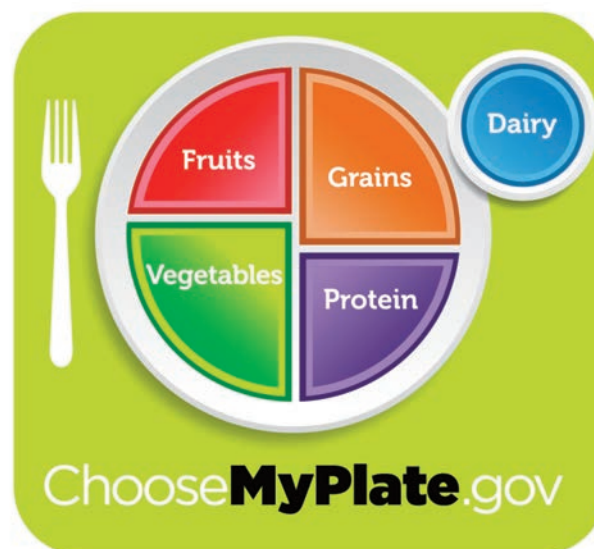
My activities		
Activities	Date completed	Helper's initials

Exploring MyPlate

10 tips for healthy eating

Learning about the nutrients that your foods contain allows you to make the best choices for healthy eating. 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:

1. Balance your calories. To balance your calories you need to know how much food you eat and how much exercise you do each day. Find out how many calories you need in 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. 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. Add fruit to meals as part of the main meal or as side dishes or 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. Eat a whole-grain product instead of a refined product. For example, eat whole-wheat bread instead of white bread and brown rice instead of white rice.



8. 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 as 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.

Food groups

A healthy meal starts with more vegetables and fruits and smaller portions of proteins and grains. 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 you drink with your meal or add fat-free or low-fat dairy products to your plate.

Grains. Grains like wheat, rye, oats, and rice are used to make bread, cereal, and pasta. Foods from the grains group have carbohydrates. Carbohydrates are fuel

your body needs. Whole grains are higher in fiber than refined grains. 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.

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

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

Oils. We do need some oils 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 provides calcium to keep your bones and teeth strong. Milk and foods made from milk are the best sources of calcium.

Protein foods. Meats and beans provide iron and protein for your body. 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. Meats can be frozen, home canned, or dried as jerky.

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.

MyPlate worksheet


For 1 day keep track of all the foods you eat and how much of them you eat on the MyPlate Worksheet for Kids (next page). First, write all your food choices in the left-hand column. Then, list each food choice in its food group. For example, if you had a banana for breakfast, list it in the fruits group. If you drank milk, list it in the dairy products group, and so on. Now, add up your total for each food group. Compare your totals to the goals for your age and gender. (See Dietary Guidelines for Youth, page 11.)


Remember to record how many minutes of physical activity you completed. Physical activity helps you to maintain a healthy weight and prevent excess weight gain. Try to get 60 minutes each day.


You can use this worksheet as a selected activity for more than 1 year. It is a good idea to track the foods you eat on a regular basis to check and see how you are doing.

Answer the following questions:

 What food groups were lacking?

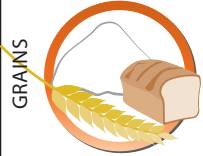





 Do you need to eat less of any food group?

 What changes could you have made on this day to eat better?

 List two goals for yourself to improve your eating.

MyPlate worksheet for kids.

Check how you did yesterday and set a goal for tomorrow. Some foods don't fit in any group. These "extras" may be mainly fat or sugar. Limit your intake of these foods. Star all the home-preserved foods.

Write in your choices from yesterday	Food and activity	Goal (based on 1,800-calorie pattern)	List each food choice in its food group. Star the home-preserved foods	Estimate your total
Breakfast:	 GRAINS	6 ounce equivalents 1 ounce equivalent is about 1 slice bread; 1 cup dry cereal; or ½ cup cooked rice, pasta, or cereal		___ ounce equivalents
	 VEGETABLES	2½ cups Choose from dark-green, orange, starchy, or other veggies, including dry beans and peas		___ cups
Lunch:	 FRUITS	1½ cups Choose from fresh, frozen, canned, or dried. 1½ cups fresh is equal to ¾ cup dried		___ cups
	 DAIRY PRODUCTS	3 cups 1 cup yogurt or 1½ ounces cheese = 1 cup milk		___ cups
Snack:	 PROTEIN FOODS	5 ounce equivalents 1 ounce equivalent is 1 ounce meat, chicken, turkey, or fish; 1 egg; 1 tbsp peanut butter; ½ ounce nuts; or ¼ cup dry beans		___ ounce equivalents
	 PHYSICAL ACTIVITY	At least 60 minutes of moderate to vigorous activity a day or most days		___ minutes
Dinner:				
Physical activity:				

How did you do yesterday? Great So-so Not so great

My food goal for tomorrow is: _____

My activity goal for tomorrow is: _____

Reading food labels

When you completed your Choose MyPlate Worksheet, did you find that you were not eating enough of the right foods?

It is not always easy to know the amount of food in 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 grains group? The answers are easy if you know where to look.


Most foods in the grocery store must 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, the number of servings in the package or container, and other nutritional information. The list of ingredients is on the label elsewhere.

Nutrition Facts			
Serving Size 1/8 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


Serving size. The place to start when you look at the Nutrition Facts Label is with the serving size. Just below that is the number of servings in the package or container. The Nutrition Facts Label at left shows that a serving size is 1/8 of the recipe. A recipe in this case would include the entire can plus additional water added as directed. This can of chili contains 4–6 servings.

Calories. 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.

% daily value. The % daily value (% DV) is the amount of a nutrient in one serving compared with dietary recommendations.

 What is the % DV for total fat in the can of chili?

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% and 35% of calories.

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

Sodium. The Dietary Guidelines for Americans suggest that we need to lower our sodium intake to less than 2,300 milligrams per day to reduce the risk of high blood pressure. One teaspoon of salt equals about 2,300 milligrams of sodium. Most of the sodium we eat comes from processed foods, not from the saltshaker. When you preserve foods at home, you can control the amount of sodium you add to your product.

Ask yourself the following questions:

- Q. How much sodium would you consume if you ate the whole can of chili? Figure that there are four servings in the can. _____
- Q. How much sodium is in one serving? _____
- Q. Is the % DV for sodium in one serving high or low? _____

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

Fiber, vitamins, and minerals. Be sure to get enough potassium, dietary fiber, and vitamins and minerals. Remember that 5% DV is low and 20% DV or more is high.

- Q. Is the calcium listed on the chili label high or low? _____

Going Further



You might want to collect your own label and answer the following questions:

- Q. What is the food item? _____
- Q. What is the serving size? _____
- Q. How many calories are in the item per serving? _____

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

How much should you eat?

ChooseMyPlate.gov or nutrition.gov gives you amounts of different foods 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 Dietary Guidelines for Youth table gives estimates (page 11).

The following tips and measurements will help you use the table.

Grains. Grains are measured in ounce equivalents. Eat 4–7 ounce equivalents 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

Vegetables. Vegetable servings are measured in cups. Vegetables can be canned, dried, frozen, or fresh.

Fruits. Fruit is part of a healthy diet. Fruit can be canned, dried, frozen, or fresh. 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. Dairy products include milk, yogurt, and cheese.

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

Dietary guidelines for youth: Amount to eat each day

Age group	Food group				
	Grains (ounce equivalents)	Vegetables (cups)	Fruits (cups)	Dairy products (cups)	Protein foods (ounce equivalents)
4–8	4–5	1½	1–1½	1–2	3–4
9–13 (girls)	5	2	1½	3	5
9–13 (boys)	6	2½	1½	3	5
14–18 (girls)	6	2½	1½	3	5
14–18 (boys)	7	3	2	3	6

Let’s plan a menu

Planning a menu can be fun when you base it on MyPlate. Using the MyPlate 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 to look at; different textures such as crunchy, soft, chewy, and liquid; different flavors such as spicy and mild; and both hot and cold foods.

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. You might choose dried or canned fruits, frozen vegetables, salsa, or other canned products. You might want to include a snack of trail mix that you made in the drying manual.

If you want another challenge, plan all the meals for 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 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.

Meal 1:

Meal 2:

Meal 3:

Snack:

Snack:

Kitchen and food safety basics

Kitchen safety

Kitchens are safe! It's the people who work in kitchens who create problems. You can prevent problems by using equipment and utensils properly and by handling sharp items and hot foods and liquids carefully. When working in the kitchen, be aware of safety hazards and take precautions to prevent injuries or accidents by creating and maintaining a safe working environment.

Many 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 on a wet floor.
- Never leave food unattended on the stove. Many fires develop while the cook is 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 his or her hand in the sink and get cut.
- 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



give bacteria no chance

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 for 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 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 when canning. 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.
- 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, unbruised, high-quality produce for food preservation.

Types of food preservation

There are seven major methods of food preservation:

Refrigeration

- Slows the growth of microorganisms.
- Slows the action of enzymes.

Freezing

- Prevents the growth of microorganisms.
- Slows, but does not stop, enzyme action.

Canning

- Destroys the microorganisms that may be present in the food by exposing them to heat.
- Destroys yeasts and molds when food reaches 190°F.
- Pressure canning exposes foods to higher temperatures than boiling water canning, killing dangerous bacteria.
- Proper canning practices remove air from the jars, leaving a vacuum.
- Molds and some yeasts are unable to grow in a vacuum.

Sweetening and acidifying jellies and jams

- Added sugar and acid tie up free water and lower the pH of the food.

Pickling and fermenting

- Fermenting uses bacteria to produce lactic acid, which lowers the pH of the food.
- Added acid (fresh pack) reduces pH with vinegar.

Drying

- Prevents growth of microorganisms.
- Dried foods must be packaged in oxygen-proof and moisture-proof containers.

Salting

- Chemically bonds water, inhibiting growth of microorganisms.

Freezing foods basics

Project objectives

- Learn how to safely freeze foods and maintain top quality
- Learn how to use the frozen foods you prepared in healthy recipes
- Show others how to preserve foods by freezing

Why freeze foods?

Freezing is one of the easiest, quickest, and most convenient methods of preserving foods for later use. Properly frozen foods maintain more of their original color, flavor, and texture, and generally more of their nutrients, than foods preserved by other methods.

Cold temperatures stop the growth of organisms that can make you sick. Foods that are frozen continue to be safe because of these cold temperatures. Freezing also slows down the chemical reactions that break down food and reduce quality.

Getting ready to freeze

Freezing does not improve food, so start with the best and freshest available; this is a good idea when using any method of food preservation. Different foods have different freezing recommendations. For instance, some foods require a pretreatment called blanching, while others do not. Blanching is the process of immersing food into boiling water for a short period of time, then into cold water. This stops the enzyme process that could cause off colors and flavors in frozen fruits and vegetables. Some foods such as peaches freeze better in a liquid than they do dry. Follow approved recipes and instructions for best results.

Freezing fruits

Select ripe fruit that is not soft or mushy. Fruit ripened on the tree or vine is best. Use only freshly harvested fruit, and prepare it as quickly as possible for the best results. Wash, peel, trim, pit, or slice as directed or needed.

Packing fruit dry or with syrup

There are two types of packs: dry and syrup. Any fruit can be frozen without sugar. However, the texture may be softer.

Dry pack. Fruits that will be used for cooked products are often packed dry in sugar. Follow these guidelines:

- Use 1 cup of sugar for each 2–3 pounds of fruit.
- Mix sugar and fruit gently until the sugar has dissolved in the juice.
- Pack loosely in suitable packaging, leaving ½ inch headspace between the food and the lid. Label and freeze.

Syrup pack. Fruits that will be served uncooked are usually packed in syrup, although fruit may also be packed in water or fruit juices. Follow these guidelines:

- If using syrup, prepare the strength of syrup desired; this will depend on the sweetness of the fruit, intended use of the product, and personal preference. See the syrup strengths chart below.
- Plan for about ⅔ cup of syrup for each pint of fruit; about 1 ⅓ cup for each quart.
- Dissolve sugar in hot water to fully dissolve the sugar. Cool before using.
- Place fruit in the selected container and pour the syrup, water, or juice over the fruit. Allow headspace, label, and freeze.

Syrup strengths

Syrup strength	Water	Sugar	Yield
Light	4 cups	1 cup	4¾ cups
Medium	4 cups	1¾ cups	5 cups
Heavy	4 cups	2¾ cups	5½ cups

Equipment for freezing foods

Equipment	Use
Dry measuring cups	Used to measure dry and solid ingredients. They usually come in a nesting set of 1 cup, ½ cup, ⅓ cup, and ¼ cup.
Liquid measuring cups	Measure liquids with clear measuring cups. You can see through the cup to measure, and there is headspace.
Measuring spoons	Used to measure dry and liquid ingredients. They usually come in a nesting set of 1 tbsp, ½ tbsp, 1 tsp, ½ tsp, and ¼ tsp. When you measure liquid ingredients, measure carefully to avoid spills.
Sharp knives and cutting boards	Used to cut food to the desired size. Wash knives and cutting boards after each use in warm, soapy water.
Potholders	Used to protect hands when working with hot pans.
Rubber spatula	Used to scrape the sides of bowls or pans. You can use the flat side to level dry or solid ingredients when measuring.
Large pans	Heavy-duty pans are best for cooking ingredients. Don't use aluminum pans.
Long-handled spoons	Spoons should be tall enough that they will not fall into the ingredients.
Mixing bowls	Made of pottery, glass, metal, or plastic. They come in different sizes.
Funnel	Used to pour liquids into jars.
Colander	Used to drain foods after washing.
Timer	For timing food preparation and processing times.
Airtight storage containers	Used to store food for freezing. Containers that you can eliminate air from are best.
Food chopper, blender, or food processor	Equipment that will 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.
Labels, permanent markers	Used to write on containers to identify the type of food, pretreatment step, and date.
Cookie sheet or jelly roll pan	Used for freezing items individually before packaging them.
Blanching basket	Used for blanching vegetables before freezing.
Freezer bags and freezer jars	Used for safely storing frozen or dried foods for an extended period of time.
Jars and lids	Used for safely storing frozen foods for an extended period of time. Mason-type, threaded, home canning jars with 2-part lids. Recommended sizes: ½ pint, 1½ pint, quart, and ½ gallon (only for juice).
Bubble remover & headspace measurer	Has graduations on one end to accurately measure headspace and a tapered tip on the other end to remove bubbles from the jar. Only use plastic versions. Used to measure headspace if using jars for freezer storage.
Peeler	Utensil used to remove the skin from vegetables.
Scale	Used to weigh fruit and vegetables.

Preventing browning. Light-colored fruit may turn brown. To prevent this, ascorbic acid or a commercial anti-darkening agent may be added. Ascorbic acid is available in the canning sections of many stores, or use 500-milligram vitamin C tablets. Three crushed tablets equal ½ teaspoon of ascorbic acid.

Follow these guidelines:

- For syrup packs, add ½ teaspoon ascorbic acid to each quart.
- For dry packs, dissolve ½ teaspoon ascorbic acid in 3 tablespoons of cold water and sprinkle over 4 cups of fruit before adding sugar.
- Follow manufacturer’s directions for commercial anti-darkening agents.

See the guidelines for freezing fruit chart below for more information.

Individual quick freeze (IQF)

To freeze individual pieces of fruit or vegetables, prepare them by washing, draining, hulling, pitting, or peeling if necessary. Place them in a single layer on a cookie sheet. Freeze immediately. Once frozen, package in an airtight container for convenient use in smoothies or other recipes that call for a specific amount of fruit or vegetable.

Freezing juices

Many kinds of fruit juices can be prepared and frozen for later use. These include cherry, grape, plum, raspberry, and strawberry. The procedure is similar for each:

- Use only fully ripe and high-quality fruit.
- Prepare fruit by washing, draining, hulling, pitting, or peeling if necessary.
- Extract juice by heating the fruit slightly and straining through a jelly bag. Alternatively, place the fruit in a steam juicer.
- Sweeten as desired.
- Pour into containers, allowing 1 inch headspace. Seal and freeze.

Note: Grape juice must be allowed to sit overnight in the refrigerator to allow sediment to sink to the bottom. Pour off the clear juice or strain the juice before freezing.

Tomato juice can be extracted by simmering quarters or eighths of tomatoes for 5 to 10 minutes. Then press through a sieve or food mill, salt if desired, and freeze. Omitting the heating phase will cause the juice to separate.

Guidelines for freezing fruit

Fruit	Preparation	Freezing method
Apples	Wash, peel, core, and slice; use anti-darkening agent to prevent browning.	Syrup pack, dry pack, or pack without any sugar and freeze.
Bananas	Peel and freeze whole for snacks or mash with an anti-darkening agent.	Wrap whole bananas tightly, pack mashed bananas into container and freeze.
Cherries, sweet	Stem, wash, and pit if desired.	Syrup pack, dry pack, or pack without any sugar and freeze.
Pears	Wash, peel, cut in halves or quarters, core, and heat in syrup for 1–2 minutes; drain and cool.	Syrup pack and freeze.
Peaches	Wash, peel, remove pit, cut into halves or slices, use anti-darkening agent to prevent browning.	Syrup pack, dry pack, or pack without any sugar and freeze.
Raspberries	Wash and drain.	Syrup pack, dry pack, or pack without any sugar and freeze.
Strawberries	Wash, drain, and remove hulls; slice if desired.	Syrup pack, dry pack, or pack without any sugar and freeze.
Cantaloupe, melons	Cut in half, remove seeds, peel; cut into slices, cubes, or balls.	Syrup pack and freeze.

Source: Raab, Carolyn A. 2007. *Freezing Fruits and Vegetables*. PNW 214. Corvallis, OR: Oregon State University Extension Service.

Freezing vegetables

Always select the best and freshest vegetables for any method of food preservation. If possible, harvest the morning of freezing or the evening before when it was cool. Prepare vegetables quickly to avoid loss of quality, or store them in the refrigerator if there is going to be a delay. Wash; sort under cool, running water; peel; trim; pit; or cut into pieces as directed or needed.

Prepare vegetables for freezing by blanching. Blanching is the process of immersing food in boiling water for a short period of time, then cooling it quickly to stop cooking. This short heat treatment stops the enzymes that can cause undesirable changes in the food after it is frozen. Without proper blanching, most vegetables will lose nutritive value and undergo changes in color, flavor, and texture.

Follow these guidelines:

- Put water in a large saucepan with a tight lid and bring to boil.

- Allow 1 gallon of water for each pound of vegetables, except leafy greens, which require 2 gallons per pound.
- Place a small quantity of vegetables in a basket or strainer and immerse in boiling water.
- Cover the saucepan and boil for the length of time required. Begin timing as soon as the vegetables are placed in the water.
- Lift vegetables out of the water and cool immediately under cold, running water or in ice water. Cool for about the same length of time as blanching.
- When cool, drain, pack into containers, and freeze.

See the guidelines for freezing vegetables chart below for more information.

Guidelines for freezing vegetables

Vegetable	Preparation	Blanching and freezing
Beans, snap	Wash, snip off ends, cut or break into pieces, or slice lengthwise.	Blanch 3 minutes, cool, pack, and freeze.
Beets	Select beets less than 3 inches across and remove tops. Wash and cook until tender (small 25–30 minutes, medium 45–50 minutes).	Cool, pack, and freeze; may be sliced or diced before freezing.
Carrots	Remove tops, wash, scrape, dice, or slice ¼ inch thick.	Blanch 2 minutes, cool, pack, and freeze.
Corn, cut off the cob	Husk, remove silk, and wash.	Blanch ears 4–5 minutes, cool, cut off cob, then pack and freeze.
Onions	Peel, wash, and chop.	Blanch 1½ minutes, cool, pack, and freeze. May also be frozen unblanched.
Peas, edible pod	Wash, remove ends and strings.	Blanch small pods 1 minute, large 1–2 minutes; cool, pack, and freeze.
Peppers, sweet	Wash, cut out stem, remove seeds, halve, slice, or dice.	Blanch halved peppers 3 minutes, sliced or diced 2 minutes; cool, pack, and freeze. May also be frozen unblanched.
Tomatoes	Remove stem ends, peel and quarter, cook until tender. Best if pureed or minced.	Cool by setting pan in cold water, pack and freeze.
Zucchini	Wash and slice small, tender squash.	Blanch ¼-inch pieces 3 minutes, 1½-inch pieces 6 minutes; cool, pack, and freeze.

Source: Raab, Carolyn A. 2007. *Freezing Fruits and Vegetables*. PNW 214. Corvallis, OR: Oregon State University Extension Service.

Freezing meat, fish, and poultry

Freezing meat, fish, and poultry at home is a simple and cost-efficient way to have quality protein sources on hand for your family. Freeze only fresh, high-quality meat, fish, and poultry.

Here are some general guidelines:

- Freezer wraps are acceptable for meats, fish, and poultry but must be moisture-resistant, flexible, and limit the transfer of flavor and odor.
- Cut meat into roasts, steaks, chops, stew meat, and other cuts for family needs.
- Boneless cuts are smoother to wrap and take less space.
- Watch for sharp bones, which might pierce wrapping material.
- Fish should be washed, cleaned, and descaled. Cut into fillets or leave whole.
- Whole birds may be frozen. Clean the bird and remove all internal organs. Package in wrap or a freezer bag with as much air removed as possible.
- Poultry may also be cut up and packaged for family needs.
- Perishable foods should be thawed in a refrigerator to prevent bacterial growth.

See the storage times for frozen meats and fish chart below.

Storage times for frozen meats and fish

Food	Suggested storage time at 0°F
Ground beef	2–3 months
Beef steaks, roasts	8–12 months
Bacon	Less than 1 month
Ham	1–2 months
Salmon, tuna	5–9 months
Cod, haddock	7–12 months
Whole turkey	6 months
Whole chicken	12 months
Poultry cuts	12 months

Source: Meakin, Eunice A. 1983. *Freezing Meat, Fish and Poultry at Home*. Extension Bulletin 1195. Pullman, WA: Washington State University Extension.

Freezing convenience foods

There are many benefits to freezing main dishes, baked goods, desserts, and other foods for use at a later time. You can prepare foods in quantity when you have time so they are available to enjoy when you are busy; avoid waste by freezing leftovers; use time more efficiently by making more than one dish at a time; or save money by making convenience foods yourself and freezing them for later use.

Keep in mind that prepared foods have a shorter storage life than their ingredients. For instance, an apple pie can be frozen for 3–4 months, while the apples alone can be frozen for 8–10 months without significant loss of quality.

Some products don't freeze well, and you must also allow adequate time for thawing. With that in mind, here are some general guidelines:

- Foods to be frozen should be slightly undercooked if you are going to reheat them after freezing.
- Cool foods quickly after cooking to ensure safety. It is recommended to freeze in serving size portions, not large quantities.
- Select packaging suited for thawing and reheating. Remember that it must be moisture- and vapor-resistant. Label all packages with the contents and reheating instructions.
- Nonperishable foods (bread, cakes, and cookies) can be thawed at room temperature in their packaging.
- Perishable foods should be thawed in a refrigerator to prevent bacterial growth.
- Perishable foods that were cooked and frozen can be reheated in an oven or microwave. They must be reheated to 165°F internal temperature. Use a food thermometer to be sure this temperature is reached.

See the guidelines for freezing convenience foods chart on page 19.

Guidelines for freezing convenience foods

Food	Preparing and packaging	Thawing and heating	Suggested storage time at 0°F
Waffles	Bake to light brown; wrap individually or in pairs.	Heat without thawing in a toaster.	1–2 months
Cookies, baked	Bake according to recipe; package in rigid container with freezer paper between layers.	Thaw 15–20 minutes in wrapping.	4–6 weeks
Cookies, unbaked	Prepare according to recipe; form dough into roll, wrap tightly, and freeze.	Slightly thaw dough and slice; bake cookies according to recipe.	2–3 months
Pizza	Make as usual; do not bake. Freeze and then package.	Unwrap; bake unthawed at 450°F, 15–20 minutes.	1 month
Applesauce	Make as usual; cool quickly and pack into containers.	Thaw in refrigerator.	8–10 months
Freezer jam	Follow the recipes on packages of commercial pectin.	Thaw in refrigerator.	1–3 years

Source: Raab, Carolyn, and N. Oehler. 2009. *Freezing Convenience Foods*. PNW 296. Corvallis, OR: Oregon State University Extension Service.

Packaging and freezing your product

Packaging

Frozen foods must be protected from the dry climate in the freezer and be packaged with the least amount of air as possible. Protect food from drying (freezer burn) by wrapping or packaging it in recommended wraps or containers and removing as much air as possible. Good packaging materials are moisture- and vapor-resistant, durable, leak-proof, resistant to cracking, and easy to seal and label.

Packaging must be expandable or sealed with sufficient headspace for expansion. For rigid containers, leave at least ½ inch of headspace between the food and the lid.

Plastic freezer bags are easy to use, come in various sizes, and work well for most frozen foods. Be sure to use only bags labeled as “freezer” bags to assure product quality. Bags can be gently squeezed or rolled to remove as much air as possible. Vacuum sealers may also be used. Follow instructions that come with the sealer.

Packages should contain only enough product to be cooked at one time; thawing and refreezing product will decrease its quality.

Labeling

Every package should list the name of the product, date frozen, type of food, and weight or number of servings or pieces. Be sure to use freezer tape, marking pens, or labels that are made specifically for freezing. Put foods in the freezer as soon as they are packaged and labeled. Keep an inventory of all the foods in your freezer.

Freezing your product

Your freezer should be at 0°F or lower. Foods that freeze too slowly may lose quality due to the formation of large ice crystals that rupture food cells and cause an undesirable soft or mushy texture.

Be sure not to overload your freezer; add no more unfrozen food than will freeze in a 24-hour period. This is usually 2 or 3 pounds of food for each cubic foot of capacity. Leave some room between packages until they are completely frozen. They then may be stacked tighter in your freezer.

Storing frozen foods

Use a freezer thermometer to monitor the temperature in your freezer to ensure that it remains

at 0°F or lower. Rotate your frozen foods, eating the older foods first. Most fruits and vegetables will maintain high quality for 8–12 months. Frozen foods kept for an extended time will not become unsafe, but they will be less tasty.

If your freezer stops

Frozen food can spoil if your freezer stops running or if the door is accidentally left open. Use a thermometer to determine the temperature in the freezer. If the temperature has warmed to above 40°F, foods should not be refrozen. Otherwise, it is safe to refreeze foods that still have ice crystals. However, refrozen foods will be of lower quality than when originally frozen.

Thawed frozen fruit is safe to use, although it may have developed an “off” flavor from fermentation. Never use thawed vegetables, precooked meals, or meat that is warmer than 40°F. Their low acidity makes it possible for harmful bacteria to grow.

Remember: Unsafe foods may not show any sign of spoilage. Call your local Extension office for more information and be prepared to explain how long the freezer has been off and what temperature the food reached.

Thawing your product

Fruit

Packaged frozen fruits can be thawed in the refrigerator, in a microwave, or at room temperature. Thaw only as much as you need, but if you have leftover thawed fruit it will keep better if you cook it. Frozen fruits used for desserts can be served when they still have a few ice crystals so they won't have a mushy texture.

Vegetables

In most cases, frozen vegetables should be cooked when they are still frozen. However, corn on the cob should be partially thawed before cooking in order for the cob to heat through when the corn is cooked. Frozen spinach will cook more evenly if partially thawed before cooking.

Meat, fish, and poultry

These animal products can be cooked either frozen or thawed. Meat, fish, and poultry are best thawed in the refrigerator in their original packaging. For faster thawing, they can be placed in water-proof wrapping under cool, running water. If thawed in a microwave, the product must be cooked immediately after thawing. Allow additional cooking time when cooking frozen meat, fish, or poultry. Do not thaw on the counter.

Convenience foods

Thawing is not required for most cooked or prepared foods that have been frozen. These foods can be reheated in the oven, but be careful that the packaging is oven safe. If products containing meat, fish, poultry, or eggs are thawed, thawing should be done in the refrigerator or microwave and the product should be cooked immediately to prevent possible illness. Thawing precooked breads, cakes, and cookies at room temperature is acceptable.



Activities

1. Let's Freeze Fruit: Individual Quick Freeze (IQF)

Prepare fruit by washing, draining, hulling, pitting, or peeling if necessary. Place fruit in a single layer on a cookie sheet. Freeze immediately. Once frozen, package in an airtight container for convenient use in smoothies or other recipes that call for a specific amount of fruit. Label and freeze.



Journaling

What fruit did you choose to IQF?

What challenges did you have with this activity?

What other observations do you have about this activity?

2. Let's Make a Fruit Smoothie

RECIPE: FRUIT SMOOTHIE

INGREDIENTS:

2 MEDIUM BANANAS
10-12 IQF STRAWBERRIES
1 CUP APPLE JUICE

SERVES 4

Procedure: Place all the ingredients in a blender and mix until smooth. Pour into glasses and enjoy.

Create your own smoothie

List one fruit you used _____

List the second fruit you used _____

List the liquid you used _____

Explain how you created "Your Own Smoothie."



Journaling

What smoothie recipe did you try?

What challenges did you have with this activity?

What other observations do you have about this activity?

3. Let's Freeze Fruit in a Syrup Pack

Choose a fruit to freeze using the syrup pack method. Following the instructions in this manual, prepare the syrup strength you prefer and pack fruit into a container. Pour syrup over the fruit, leaving headspace. Label and freeze.



Journaling

What fruit did you freeze?

What challenges did you have with this activity?

What other observations do you have about this activity?

4. Let's Freeze Fruit in a Dry Pack

Choose a fruit to freeze using the dry pack method. Following the instructions in this manual, mix the correct amount of sugar and fruit, pack, label, and freeze.



Journaling

What fruit did you freeze?

What challenges did you have with this activity?

What other observations do you have about this activity?

5. Let's Freeze Fruit Without Sugar

Choose a fruit to freeze using the dry or syrup pack method. For the dry method, add fruit, pack, label, and freeze. For the syrup method, use water only, add fruit, pack, label, and freeze.



Journaling

What fruit did you freeze?

What challenges did you have with this activity?

What other observations do you have about this activity?

6. Let's Freeze Fruit Juice

Choose a fruit for juice. Following the instructions in this manual, extract the juice from the fruit, pack, label, and freeze.



Journaling

What type of fruit juice did you freeze?

What challenges did you have with this activity?

What other observations do you have about this activity?

7. Let's Freeze Blanched Vegetables

Choose a vegetable to freeze. Following the instructions in this manual, prepare the vegetable, blanch for the correct amount of time, cool, pack, label, and freeze.



Journaling

What type of vegetable did you freeze?

What challenges did you have with this activity?

What other observations do you have about this activity?

8. Let's Freeze Vegetables Without Blanching

Choose a vegetable such as sweet peppers or onions that doesn't have to be blanched before freezing. Following the instructions in this manual, prepare the vegetable, pack, label, and freeze.



Journaling

What type of vegetable did you freeze?

What challenges did you have with this activity?

What other observations do you have about this activity?

9 Let's Freeze Convenience Foods: Baked Cookies

Make or buy your favorite type of baked cookie. Following the instructions in this manual, prepare the cookies for freezing by packaging them correctly. Within the suggested storage time, thaw the cookies and eat.



Journaling

What type of cookie did you freeze?

What challenges did you have with this activity?

What other observations do you have about this activity?

10. Let's Freeze Convenience Foods: Pizza

Make or buy your favorite type of ready-to-cook pizza. Following the instructions in this manual, prepare the pizza for freezing by packaging it correctly. Within the suggested storage time, bake the pizza. There is no need to thaw it before cooking.



Journaling

What type of pizza did you freeze?

What challenges did you have with this activity?

What other observations do you have about this activity?

11. Let's Freeze

Convenience Foods: Freezer Jam

Decide what type of fruit freezer jam you would like to make. Prepare fruit by washing and draining. If using strawberries, remove hulls.

Purchase a package of commercial pectin, either liquid or dry, regular, low-sugar, or no-sugar. Carefully follow the instructions provided with the pectin for freezer jam. A freezer jam made with added pectin is not processed and therefore retains the taste and bright color of the fresh fruit. It will keep for a few weeks in the refrigerator or 1–3 years in the freezer.



Journaling

What type of jam did you freeze?

What challenges did you have with this activity?

What other observations do you have about this activity?

12. Conduct a Taste Test

Select a fruit or vegetable and freeze using two different methods. Some suggestions are:

- Freeze peaches in heavy syrup and in plain water.
- Freeze strawberries in a sugar dry pack and dry packed with no sugar.
- Freeze blanched green peppers and unblanched green peppers.
- Mash and freeze bananas with and without an antidarkening agent.
- Think of other freezing methods to compare.
- Compare home-frozen to commercially frozen foods.

After thawing and heating (if needed) the two items being compared, share them with a panel of at least four people. Here are some suggestions for your taste test:

- Do not tell the panel the freezing 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 freezing methods used with the panel.
- Record the results of your taste test.



Journaling

What types of frozen foods did you compare in your taste test?

What challenges did you have with this activity?

What other observations do you have about this activity?

13. Label Your Product

Determine how to label each type of packaging for the freezer. Decide if you can write on the package or if you need to attach the label to the package. Here are some important things to include on the label:

- Name of the product
- Date frozen
- Ingredients
- Any other information you may want to know about the frozen product



Journaling

What type of storage container did you choose to label?

What challenges did you have with this activity?

What other observations do you have about this activity?

14. Create a Freezer Inventory

A freezer inventory is important to keep track of the food in your freezer. Frozen foods are better if they are used before the end of their suggested storage time. Most fruits and vegetables will maintain high quality for 8–12 months. Frozen foods kept for an extended time will not become unsafe, but they will be less tasty.

Here are some suggestions for your inventory:

- Make a chart on paper listing the items as they are placed in the freezer. Be sure to include the date and contents.
- Use a computer program such as Excel to create a freezer inventory.
- Develop a plan to keep your inventory up-to-date. Update the inventory sheet as you add or remove items.



Journaling

What type of freezer inventory did you create?

What challenges did you have with this activity?

What other observations do you have about this activity?

15. Going Further: 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 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 results.



Journaling

What did you decide to do?

What challenges did you have with this activity?

What other observations do you have about this activity?

16. Make a Menu Plan

Using the menu planning information in the front of this manual, develop a menu plan for your friends or family. Use some foods that you have frozen for the healthy recipes you include in your menu plan.

Menu:



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 freezing. You are required to give a demonstration to complete this project. Some ideas you might consider are:


- Define what blanching is and why it is important.
- Display different freezer packaging and tell the pros and cons of each.
- Show how to label frozen foods properly.
- Explain individual quick freezing (IQF).
- Develop and share a home freezer inventory record.
- Demonstrate how to read a freezer thermometer and why it is important.
- Show how to conduct a taste test.
- Share something from one of the recipes you made in this project.


Reflections on freezing


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. You have applied what you learned by showing others how to preserve food by freezing. To show what you have learned, answer at least two of these questions.

 Why is freezing an effective and economical way to preserve food?

 Why do vegetables need to be blanched before freezing?

 How would you evaluate the safety of foods in your home freezer if the electricity goes off?

 Explain the advantages and disadvantages of freezing fruit without sugar?

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