

Freezing Fruits & Berries: 4-H Food Preservation Project Unit 1

Freezing is an easy way to preserve foods. It preserves food by stopping the growth of bacteria, mold, and yeast.

Correctly frozen foods maintain excellent color, flavor, texture, and food value. Frozen berries and fruits are delicious as snacks or in other dishes.

Here are some things you will learn in this project:

- Identify the kinds of berries and fruits that can be frozen.
- Freeze berries and fruits in syrup with sugar and by the dry pack method.
- Identify equipment needed for freezing and learn how to use each item.
- Use the freezer to prepare fun snack foods.
- Figure the value of preserving food for future use.

Plans for this project:

- Keep a record of food preservation activities.
- Help your parents make a food preservation plan for a year.
- Learn to select and prepare fruit for freezing.
- Learn to freeze fruits in syrup, both with the sugar method and with the unsweetened method.
- Learn to select and use freezer packaging materials.
- Learn to select frozen food properly.
- Learn the principles and importance of handling food safely to prevent spoilage before and after freezing.
- Give one visual presentation on freezing fruits to your family, friends, or club.
- Prepare and freeze at least five packages of fruit.
- Exhibit your food preservation plan and an example of frozen fruit, using proper packaging material and a non-food material to represent food.

Words to Know

Moisture-vapor-resistant or moisture-vapor-proof – These words describe containers or wrapping materials that keep water and air away from frozen food. These materials also keep the juices and flavors of the food in the package.

Enzymes – Enzymes are chemical substances in all living things. They cause changes in color, flavor, taste, texture, and food value. When food is frozen at a very low temperature, the cold almost stops the activity of enzymes. However, if food is stored too long, there may be a noticeable change

in taste and food value. Most fruits and vegetables frozen at zero degrees or below will keep well in storage for six months to a year.

Scalding or blanching – Fruits such as peaches may be blanched or dipped in boiling water to make their skins loose and easy to slip off. They are then cooled in cold water.

Headspace – The space left in top of the container to let food and liquid expand is called “headspace.”

Anti-darkening agent – Ascorbic acid (Vitamin C) is an anti-darkening agent. When added to fruit, ascorbic acid helps prevent the fruit from losing its light, fresh appearance before freezing and during storage in the freezer. You can buy ascorbic acid crystals in drugstores, or you can buy a commercial anti-darkening product in the grocery store.

Quick freeze – Foods are frozen as quickly as possible after packaging. Quick-freezing produces very small ice crystals from the moisture in food tissue, while slow-freezing tends to result in large ice crystals. Large ice crystals cause an undesirable mushy texture in frozen foods. This is an important reason for freezing food at 0 °F (-18 °C) or colder.

Freezer burn – Freezer burn can occur in frozen food that has been improperly packaged. This drying out results in loss of flavor, color, and texture.

Equipment You Will Need

- Freezer
- Pans for washing and holding food
- Brush for cleaning fruit
- Colander or strainer for draining fruits
- Stainless steel paring knife
- Measuring cups and spoons
- Large spoon or small scoop
- Pan for making syrup
- Clean dishcloth, towels, and pot holders
- Freezer containers, jars, or packaging materials
- A funnel with a wide neck for filling containers (These funnels keep the top part of the jar or container clean and free from syrup and sugar.)
- Freezer tape for sealing rigid plastic containers
- Marking pen or crayon for labeling

Facts About Quality Frozen Foods

You must use moisture-vapor-proof packaging materials. Do not use waxed paper, light-weight aluminum foil, or ice cream or milk cartons. These are not moisture-vapor-proof. Good packaging materials are important for these reasons:

- Protect food from drying out
 - Prevent flavors in the freezer from mixing
 - Easy to stack in freezer and do not waste freezer space.
- Packing materials are of two general types:
- Rigid containers are made of plastic and glass
 - Non-rigid containers are plastic bags, heavy aluminum foil, plastic film, polyethylene, or laminated paper. Boxes are available to use with plastic bags as liners. They are easy to stack and help save space.

Facts about packing food in containers:

1. Chill syrup before using.
2. Pack food firmly, so the amount of air in the package is as little as possible.
3. Leave headspace to let foods expand as they freeze.
4. Seal properly for the kind of packaging material you use.
5. Place packages in freezer immediately after packaging and sealing.



Labeling and Freezing

1. Write label plainly, stating the kind and variety of food, style of pack, and the day, month, and year.
2. Arrange food in freezer so you will know where to find it (vegetables in one section and fruits in another).
3. Keep a checklist of food you put in and take out of the freezer.

How Much Fruit Should You Freeze?

The tables below should make it easier for you to plan for your family. You learned from the Food Guide Pyramid the amount of fruits and vegetables needed in a well balanced daily diet. You will be using fresh foods almost all summer. You may wish to make changes in the number of weeks preserved foods are needed. Thirty-six weeks is based on the amount of time most families would not have fresh fruits and vegetables available. The amount of fruits needed for one person is given. Multiply this amount by the number of people in your family to get the number of quarts of food your family will need. With the help of your family, decide how much of each food you will freeze, can, or preserve in other ways.

Take the total number of quarts of fruits and berries your family will need and decide how many quarts of each your family will use. Consider what your family enjoys eating, as well as the berries and fruits available for freezing.

Approximate amount needed per person per week	Number of weeks preserved foods needed	Total needed per year per person	Total needed per year in my family
7 servings per week; 1/2 cup per serving 7 x 1/2 = 3 1/2 cups	36	36 x 3 1/2 cups = 125 cups 126 cups/4 = 31 1/2 quarts	31 1/2 quarts x number of people in my family

Fruit or berry	Number of quarts family plans to can	Number of quarts family plans to store, pickle, etc.	Number of quarts family plans to freeze	Number of packages I plan to freeze
Apples				
Blackberries				
Figs				
Grapes				
Peaches				
Plums				
Nuts	Not recommended			
Strawberries				
Other (list)				

Fruit Yields

The following chart will help you determine how many quarts of frozen food you will have when you have frozen the indicated amount of fresh fruit.

Fruit	Fresh	Frozen
Apples	1 bu (48 lb)	16–20 qt
Berries (other than strawberries)	1 crate (16 qt)	10–12 qt
Peaches	1 bu (48 lb)	14–16 qt
Pears	1 bu (50 lb)	20–25 qt
Plums	1 bu (56 lb)	19–28 qt
Strawberries	1 crate (16 qt)	12–14 qt

Selecting Fruits and Berries

Most fruits freeze very well. Pears, however may become mushy. Freeze only the best firm, well-ripened fruits. Their quality will depend on growing conditions, variety, and maturity, as well as method of freezing. Certain varieties of some fruits freeze better than others. A few of the better varieties recommended for freezing are listed here. They all grow well in Mississippi.

Mississippi-Grown Varieties of Fruits Suitable for Freezing:

- **Apples:** Early Harvest, Red Delicious, Stayman Winesap
- **Crabapples:** Transcendent, Dolgo, Yellow Siberian
- **Strawberries:** North, Central, and South Mississippi – Dixieland, Pocahantas; North Mississippi – Sunrise, Tennessee Beauty; South Mississippi – Dabreak, Klommore, Headliner
- **Pears:** Orient, Garber, Waite, Kieffer, Baldwin
- **PLUMS:** Bruce, Burbank, Methley, Munson, American, Santa Rosa
- **Peaches** (in order of ripening): Central and North Mississippi – Dixiegem, Ranger, Keystone, Redhaven, Triogem, Ambergem, Halehaven, Sullivans Early Elberta, Elberta, Rio Oso Gem; South Mississippi – Southland, July Elberta, Redskin
- **Pecans:** Stuart, Desirable, Elliot, Owens, Curtis, Schely
- **Blackberries:** Williams (semi-erect), Flint (semi-erect), Brazos (semi-erect)
- **Blueberries:** Calloway, Homebelle, Tifblue, Woodard, Garden Blue, Menditoo
- **Figs:** Celeste, Brown Turkey
- **Raspberries:** Sodus, Marion (purple); Latham, Sunrise, Cuthbert, St. Regis, Mandarin (red), Golden Queen (yellow)

- **Muscadines:** Black– Magoon, Hunt, Southland, Thomas, Bountiful, Chief, Creek; Bronze – Dearing, Topsail, Scuppernong, Higgins
- **Grapes bunch:** Concord or Champanel (blue); Delaware or Catawba (red); Niagara (white)
- **Cantaloupe:** Edisto 47, Hale’s Best No. 36
- **Watermelon:** Charleston Gray, Crimson Sweet, Jubilee, Petite Sweet

Steps in Freezing Fruits

Get materials and equipment. Be sure you have enough containers of the proper size. Check plastic or glass containers for chips or cracks. Be sure containers are clean. Make syrup, if you are using a syrup pack for your fruits. Be sure it is cold when you use it.

Select the fruit. The fruit you use should be wellripened, firm, plump, and tender. Freeze it at the stage it would taste best when eaten fresh. Sort out all fruit that is bruised, decayed, or under-ripe. Under-ripe fruit may develop a poor color and a bitter off flavor during freezing.

Prepare the fruit and berries. Wash fruit or berries gently and quickly in cold water. Over-soaking makes for a poor frozen product. Drain fruit in colander or sieve. Work with a small amount of fruit at a time to allow for easy handling. Peel or cut. Use an anti-darkening agent, ascorbic acid, citric acid, or lemon juice to prevent darkening of fruit.

Pack fruit. Fruits may be packed in sugar syrup or in dry sugar or dry-packed with no sugar. Follow the directions for the pack you want. In syrup-pack, fruit should be well covered with syrup or juice during freezing and thawing to prevent darkening of the top surface. You can place crumpled freezer paper under the lid of a rigid container to hold fruit under the syrup or juice. When you use plastic bags, press out all of the possible air. Be sure your container is sealed properly.

Ways to pack fruit. How you plan to use the fruit will help determine how you will pack it. Syrup pack is best for dessert use; dry sugar or unsweetened packs are best for most cooking purposes. Dissolve sugar in hot or cold water. If you use hot water, cool syrup to 70°F before using. You may make syrup ahead of time and keep it in the refrigerator.

Sugar pack. For most fruits, adding one part sugar by weight to four parts fruit by weight makes the fruit sweet enough and preserves its quality. Mix sugar and fruit gently with a large spoon until juice is drawn out and sugar is dissolved. Pack fruit and juice in container and place a piece of crumpled moisture-vapor-resistant paper on top to hold fruit in juice. Close and seal container. Label and freeze.

Sugar Syrup for Freezing Fruits

Sugar (%)	Syrup	Amount of water	Amount of sugar	Approximate amount of syrup
20	Light	4 cups	1 cup	4¾ cups
30	Medium	4 cups	1¾ cups	5 cups
40	Heavy	4 cups	2¾ cups	5½ cups

Unsweetened pack. Pack prepared fruit into container without liquid or sweetening, or cover with water containing ascorbic acid. Some fruits, such as peaches and strawberries, may be mushier when packed without sugar than when packed with it. It is best to cover light-colored fruit with water containing ascorbic acid. You may crush or slice fruit in its own juice without sweetening. Press fruit into the juice or water with a small piece of crumpled parchment paper, as described in the syrup or sugar pack. Close and seal container. Label and freeze.

Apples

1. Gather all needed equipment and place on work table.
2. Make a medium syrup by combining 1 and ¾ cups sugar and 4 cups water in medium saucepan. Bring the sugar and water to a full rolling boil. Chill syrup in the refrigerator before using. You may add ½ teaspoon ascorbic acid to each quart of syrup to prevent further darkening.
3. Wash apples.
4. Make salt solution by adding 2 tablespoons salt to 1 gallon (4 quarts) of water in a bowl.
5. Peel apples. Cut into halves and remove cores. Slice ½-inch thick slices into the salt solution. Drain well.
6. Pack gently into containers, leaving ½ inch headspace for pints and 1 inch for quarts.
7. Cover fruit with chilled syrup.
8. Put lid on airtight.
9. Label and place containers in freezer immediately.

NOTE: Apples will freeze well using the dry pack method. Simply omit the syrup and pack as suggested above.

Peaches Packed in Syrup

Peaches packed in either a syrup or sugar make an excellent frozen product. In the following series of illustrations, sliced peaches are shown being packed in syrup. A pint glass freezer jar is used here, but other sizes and types of containers are suitable.

Follow these general directions for packing other fruits in syrup. Vary the syrup as called for in the directions for each

fruit. Make up syrup ahead of time so it will be ready and cold when you need it. Peaches are best in a 40 percent syrup, using 3 cups of sugar to 4 cups of water. This makes about 5½ cups of syrup. You need about 2/3 cup of syrup for each pint container of peaches.

For frozen peaches with better color and flavor, add ascorbic acid to the cold syrup. For peaches, use ½ teaspoon crystalline ascorbic acid to each quart of syrup.



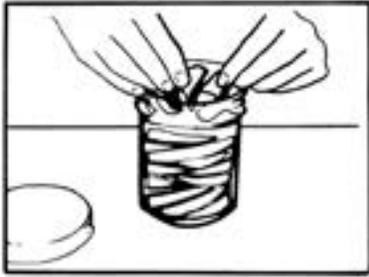
10. Select mature peaches that are firm-ripe, with no green color in the skins. Allow 1 to 1½ pounds fresh peaches for each pint to be frozen. Wash carefully and drain.
11. Pit peaches and peel them by hand for the best looking product. Peaches peel quicker if you first dip them in boiling water for 30 seconds to 1 minute, then in cold water.



12. Pour about ½ cup cold syrup into each pint container. Slice peaches directly into container.
13. Add syrup to cover peaches. Leave ½ inch headspace at top of wide-mouth pint containers to let fruit expand during freezing.



14. Put a small piece of crumpled wax paper on top of fruit to keep peaches down in the syrup. Syrup should always cover fruit to keep top pieces from changing color and flavor.



15. Wipe all sealing edges clean for a good seal. Screw lid on tight. Label with name of fruit and date.



Strawberries Packed in Sugar

Strawberries, sliced and sweetened with dry sugar, are the pride of the freezer. In the following illustrations, strawberries are shown being packed in sugar. Follow the general steps shown in those illustrations for other fruits packed in sugar. The container illustrated is a pint plastic box, but other types of containers may also be used. Freezing jars are excellent containers.



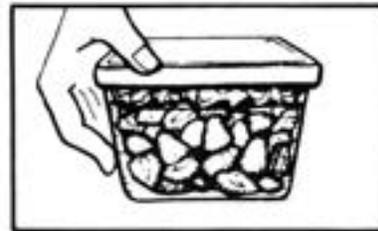
16. Select firm, ripe strawberries. About $\frac{2}{3}$ quart fresh berries are needed for each pint frozen.



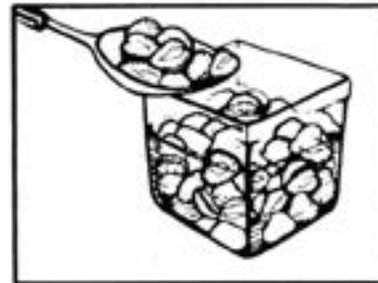
17. Wash berries a few at a time in cold water. Lift berries gently out of water and drain.



18. Remove caps; then slice berries into a bowl or shallow pan.
19. Using $\frac{3}{4}$ cup sugar per quart of strawberries, combined with $\frac{1}{2}$ teaspoon crystalline ascorbic acid (or follow directions on package of commercial ascorbic acid mixture). Sprinkle sugar mixture over the sliced berries. Turn berries over and over until sugar is dissolved and juices are formed.

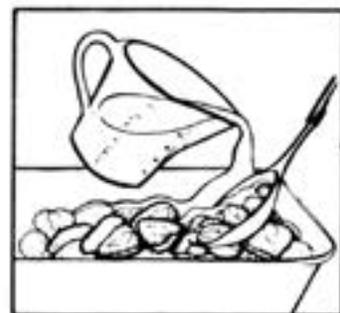


20. Pack berries in container, leaving $\frac{1}{2}$ inch head space in the wide-mouth pint box. Place a small piece of crumpled wax paper on top of berries. Press berries down into juice.



21. Press lid on firmly to seal. Be sure the seal is watertight. Use low-temperature tape to assure a tight seal. Label with name of fruit and date of freezing. Place in freezer immediately.

Note: Other berries except blueberries can be frozen using the above recipe.



How Does Your Preserved Food Score?

Use these scores to see how well you can preserve food. Check your work often and improve your score.

Score for Frozen Food

(perfect score = 100 points)

- Color (20 points) – Color is similar to that of raw food
- Condition (40 points) – Fruit is ripe but firm.
- Vegetables are young, tender, immature, and properly blanched. Fruit and vegetables are free of blemishes and / or insect bites.
- Uniformity (20 points) – All pieces of food in each container are same color, size, and shape.
- Pack (20 points) – The package is well filled, with no air.

Score for Freezer Packaging Materials

(perfect score = 100 points)

- Is it moisture-vapor-proof? (40 points)
- Is it durable and reusable (if handled properly)? (16 points)
- Is it suitable for packaging the particular food to be frozen? (16 points)
- Is it sanitary? (12 points)
- Is it easily labeled? (8 points)
- Is it economical for freezer space? (8 points)

Using Frozen Fruits & Berries

Now that you have frozen berries and fruits in your freezer, you can serve fruit for dessert or tempting snacks. To thaw, leave berries in their sealed containers. You can thaw berries in three ways:

- In the refrigerator – 6–8 hours for 1-pound package.
- At room temperature – 1–2 hours for a 1-pound package.
- In a pan of cool water (turned several times) – ½ to 1 hour for a 1-pound package.

The times given here are for berries packed in syrup. Fruit packed with dry sugar thaws slightly faster. The type of pack you used in freezing your berries will help you decide how to use them.



Fruit packed in syrup is usually best for eating as fresh frozen. Berries packed in sugar or unsweetened are good for using in recipes because there is less liquid in the pack. You can use unsweetened packs for jams and jellies or in baking when you need to know how much sugar the ingredients contain. Use the unsweetened pack for a diabetic diet.

If you want to serve your berries uncooked, thaw them before serving. To cook your berries, thaw them until the pieces can be loosened; then cook them like fresh berries. You may need to add water if there isn't enough juice to prevent scorching.

Other uses for your berries are as a crushed fruit topping for ice cream or cake, as a filling for sweet rolls, or for jam. You can also use them for fruit cups, fruit salad, fruit-flavored yogurt, cobblers, or pies.

Frozen Fruit Treats

In addition to preserving fruit in the freezer, you can also freeze quick snacks such as these:

Fruit Pops

- 2 tablespoons lemon juice or pineapple juice
- ½ cup water
- 2 tablespoons sugar
- 4 cups chopped fresh fruit (bananas, peaches, pears or melons) or canned fruit cocktail
- 8 paper cups (5-ounce)

Mix ingredients. Fill eight 5-oz paper cups. Put a wooden or plastic spoon in the center and freeze.

Frozen Bananas

- 1 firm banana
- 2 popsicle sticks or toothpicks
- Optional: honey, chopped nuts, crushed cereal, peanut butter.

Peel banana and cut in half. Insert one stick or toothpick through center of each half. Wrap in plastic wrap and place in freezer. When ready to eat; dip in honey and roll in nuts or cereal. Can also be spread with peanut butter. They are delicious just plain.



Yogurt Popsicles

- 1 pint yogurt (plain)
- 6 tablespoon frozen orange juice concentrate
- 1 teaspoon vanilla

Stir together. Freeze in popsicle molds or small waxed paper cups. Insert sticks into paper cup molds when partially frozen. To serve, peel off paper cups. Option: Substitute frozen grape or pineapple concentrate.

Easy Apple Turnover

- 1/3 cup thawed, drained apples
- 2 slices white bread
- 1 tablespoon water
- 1 teaspoon lemon juice
- 1/4 teaspoon cinnamon
- 2 teaspoon sugar

In a small saucepan on medium heat, cook lemon juice, apple, water, cinnamon, and sugar until apples are tender. Stir to prevent sticking. Cool mixture. Remove crust from bread and roll bread thin. Place half of mixture on each bread slice. Fold bread to make triangle. Moisten edges of bread and press together. Place on baking sheet. Bake at 350 °F until crispy.

Blueberry Muffins

- 1 egg
- 1/2 cup milk
- 1/4 cup vegetable oil or melted shortening
- 1 1/2 cups of flour
- 1/2 cup of sugar
- 2 teaspoon baking powder
- 1/2 teaspoon salt
- 1 cup frozen blueberries



Heat oven to 400°F. Grease bottom of muffin cups or use paper baking cups. Beat egg with fork. Stir in milk and oil. Measure flour by dip-level-pour method or by sifting. Blend dry ingredients. Stir in liquid until flour is just moist. Carefully blend in blueberries. Batter should be lumpy. Do not over mix. Fill muffin cups two-thirds full. Bake 20–25 minutes or until golden brown. Muffins will have gently rounded and pebbled tops. Loosen immediately with spatula. Serve warm. Makes 12 medium muffins.

Peaches and Cereal

Before you go to bed, put frozen peaches in the refrigerator. For a breakfast treat, put your favorite cereal in a bowl; add milk and thawed peaches. Another good cereal idea is to spoon thawed peaches on cooked oatmeal and sprinkle with brown sugar.

Quick Strawberry Shortcake

- 1 pint slightly thawed strawberries
- 8 purchased individual sponge cakes or shortcakes

OR

- 8 slices plain yellow cake
- Sweetened whipped cream or whipped topping

Place cakes on individual serving plates. Spoon strawberries on top of each. Save eight pretty strawberries. Top with whipped cream or topping. Put remaining strawberries on top of whipped cream or topping and serve immediately.



4-H Project Record for Freezing Fruits and Berries

Name Date

Name of 4-H club or project group

Age Grade in school

1. What are the most important things you learned in this project?

2. How many food preservation project group meetings did you attend?

3. List any assistance you have given to other 4-H'ers with their food preservation projects.

Number helped	Kind of assistance given

4. List talks and demonstrations given which relate to this project. (Include radio and TV appearances.)

Topic	Number in audience	Number of times on each level*

* Levels: Local (L), County, (C), District (D), State (S)

5. List awards and recognition received in this project.

Type of award	Indicate level*

* Levels: Local (L), County, (C), District (D), State (S)

6. List fruits and berries frozen.

Date	Name of fruit or berry	No. of pints/quarts	Dry pack	Sugar pack	Syrup pack

7. List other foods you froze this year.

Date	Food	No. and size of jars or packages	Method of preparation*

*Methods of preparation: blanching, dry pack, sugar pack, or syrup pack.

8. Write a story about what you did and learned in your food preservation project.

Leader's Signature _____

Extension Agent's Signature _____

Notes

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Reviewed by **Courtney Crist**, PhD, Associate Extension Professor, Biochemistry, Nutrition, and Health Promotion. Revised from materials originally prepared by the University of Kentucky College of Agriculture.



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