FREEZING FOODS FOR HOME USE

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Tips for Freezing...

For top-quality frozen products, follow closely these simple rules for preparation, packaging, and freezing.

★ Select products of good quality. Freezing will not improve low-grade food.

★ Select those varieties of fruits and vegetables which are suitable for freezing. Process at the optimum stage of maturity—generally when ready for table use. Field ripened fruits are preferable. Prompt handling is of utmost importance in retaining quality.

★ Chill meats promptly and thoroughly after slaughtering. Beef for freezer storage should not be aged as long as meat intended for immediate use. A common mistake is to age beef too long before it is frozen; this greatly reduces storage life.

★ With few exceptions, containers or packages of frozen food should be only large enough to hold a quantity that will be used or cooked at one time.

★ Use good packaging and wrapping materials. Unpleasant flavors in frozen meat often can be traced to use of poor wrapping material.

★ In freezing the product, avoid close packing in the freezer to allow heat to escape from food. The rate of cooling depends not only on air temperature, but also on air movement and on size, shape, and distribution of the packages.

★ Use a storage temperature of 0° F. for most foods.

Frozen meat, poultry, fish, and eggs equal the fresh product in nutritive value. Retention of the nutritive value of fruits and vegetables depends largely on their treatment before freezing, on the storage temperature, and on the method of cooking and serving—much the same as with the fresh product. Retention of palatability results in retention of nutritive values.
FREEZING preserves a great many foods with very little change in flavor, color, texture, and nutritive value. Freezing is one of the simplest methods of home food preservation, and most foods can be prepared quickly and with relative ease.

If desired, complete, well-balanced meals can be prepared at almost a moment's notice from the freezer to the table, in some instances with little more preparation than heating or just thawing. Preliminary time-consuming preparation has been done before the products are frozen.

Frozen fruits and vegetables are popular because they add "out-of-season" foods to year-round menus. The homemaker will find almost endless possibilities in the freezing of ready-to-eat cooked foods, bakery goods, and school lunches. With a variety of frozen foods in a home freezer or locker drawer, marketing can be an occasional pleasure instead of a daily routine for the homemaker. Farmers can slaughter their animals at their prime condition instead of feeding them until cold weather comes. City families can purchase meat in wholesale cuts at quantity prices.

Gardeners can freeze home-grown fruits and vegetables in their peak seasons while others may purchase these foods in season at a saving. Hunters and fishermen find freezing an ideal way to preserve their game and fish.

A common belief is that "quick frozen" foods must be frozen very rapidly to retain their quality. But "quick freezing" really means getting the product frozen before deterioration sets in. With most foods, no loss of quality has been noted in the laboratory when the product temperature is reduced to 20° F. within 10 to 15 hours after starting to freeze them. It is im-
Right—Chicken stored for 11 months at zero in a double wrap of waxed locker paper. Note the severe freezer burn. When cooked, this chicken had poor flavor.

FIG. 1. Left—Chicken stored for 11 months at zero in a single wrap of plain aluminum foil (gauge .0015). Note its bright appearance. There was no freezer burn, and the natural flavor and juiciness were well retained.

Right—Chicken stored for 11 months at zero in a double wrap of waxed locker paper. Note the severe freezer burn. When cooked, this chicken had poor flavor.

portant, however, to lower the food temperature below 40°F, as quickly as possible to reduce the growth rate of spoilage organisms.

Retention of quality depends chiefly on (1) proper handling of the food before it is frozen, (2) good packaging, (3) storage at a temperature no higher than 0°F, (4) proper handling and cooking after removal from freezing storage.

The rate of freezing, if fast enough to retard the growth of spoilage organisms, has relatively little effect on quality retention.

Freezing does not sterilize the product, but the low temperature prevents the growth and development of harmful yeasts, molds, and bacteria. Many of these microorganisms are killed by freezing storage, but some survive. Consequently, cleanliness and sanitary methods are just as important in handling foods for freezing as in preparing foods for immediate table use.

Make sure that the water supply is clean and pure. See that all utensils are clean. Wash hands thoroughly.

Wrapping Materials

Undesirable flavors in frozen meat, poultry, and fish usually result from rancidity. If beef fat, for instance, shows a characteristic tallowiness, the meat is beginning to turn rancid.

Rancidity in meats is most commonly caused by exposure of the natural fats and oils to atmospheric oxygen. For this reason, the exclusion of oxygen from the package is a most important factor in freezing.

"Freezer burn," a surface discoloration apparently caused by loss of moisture, may or may not be associated with rancidity. Freezer burn appears as light gray spots or areas on the surface of meat. On poultry, it appears as light-colored circular spots around feather follicles or as larger discolored areas on the skin surface.

Proper freezing technique demands a wrapping material which will exclude oxygen and will protect the product from loss of moisture. The wrapping should be pliable enough to make a
tight wrap and prevent air pockets. Unless the wrap is snug and tight the value of a good material may be lost.

In addition, a good wrapping material should be odorless, especially when damp; should possess high wet strength so that meat juices will not cause it to soften and break; should be greaseproof and have good “stripping” quality so that it will not adhere to the meat.

It should also be strong enough to resist tearing or puncturing in wrapping and handling; be easy to mark for identification and date of packing; and not become brittle or crack at low temperature.

Many laboratory experiments have demonstrated conclusively that the better the wrapping material the longer meat, poultry, and fish retain their original flavor when stored at zero. When a package is properly wrapped, the major loss of moisture is through the packaging material itself, rather than through the folds. Oxygen moves into the package in the same way.

A single wrap of one of the better materials will give better protection than a double wrap of an ordinary waxed locker paper, and will require less labor and less material. It costs little if any more, per 100 pounds of meat wrapped, to use the best materials. The additional cost seldom exceeds 50 to 75 cents per 100 pounds of meat.

Laboratory tests of packaged foods held at zero indicate that transparent films, foils, and laminated sheets are the better materials. A single wrap provides adequate protection.

Fish and cut poultry may be frozen in a block of ice by packing the product in any clean, water-tight container and covering with water; or the meat may be frozen before covering it with water. This method is satisfactory but gives no better protection than good wrapping.

**Aluminum Foil**

Numerous tests indicate that aluminum foil is one of the very best of the wrapping materials. It may be purchased as plain foil or as a wrapping with foil on one side, and paper, glassine, or other material on the other side. The latter type is known as laminated foil and is used with the foil side placed next to the meat. Both types are suitable for frozen foods.

Plain foil lighter than .001 gauge usually is not desirable because of pinholing and poor stripping quality. The recommended thickness is .0015 gauge, in widths of less than 24 inches, or .002 in 24-inch width.
FIG. 3. Polyethylene bags are easy to fill. Bags made of transparent film may be closed by twisting and tying the tops with soft twine, rubber binders, or Twist-ems.

Cellophane

Of the many types of moisture-proof cellophane, very few are recommended for wrapping moist foods such as meat. Dupont cellophane MSAT 83 or 87, or Sylvania cellophane MSBF-3, should be used for moist foods. Unfortunately, the wrong types of cellophane are frequently sold for freezer wrappings. Although such types may be labelled "made for frozen foods," they may be intended for wrapping and freezing dry products rather than moist meat.

Cellophane requires an outer wrap of stockinette or paper to protect it from breakage at low temperatures. To keep cellophane soft and pliable, it should be stored in a damp cellar or room. If it has become dry and brittle, place it in the cellar at least 24 hours, or lay it between two damp towels several hours before using.

Cellophane may also be obtained in laminated form, which provides a stronger sheet, or with cellophane and paper in the same roll but not laminated. Place the cellophane side next to the product.

The proper types of cellophane are effective barriers to oxygen and moisture-vapor.

Pliofilm

This is a transparent, rubber-derivative film for wrapping frozen foods. If the product is to be handled much, use an outer wrap. The proper type of Pliofilm is FF-140. It is available in sheet and in bag form.

The stretched film will shrink if dipped momentarily in water at about 180° F.

Other Transparent Films

New transparent films, most of which will stand more handling at low temperatures than either cellophane or Pliofilm, have been developed from derivatives of polyethylene and vinyl. They are available in sheet and in bag form. These films are sold under various names including Cry-O-Rap, Howard-Seal, Saran, Shellene, Tralon, and Visqueen.
Polyethylene (polythene) is the lightest and most inert of the plastic films used for food packaging. It is durable and tough at both normal and low temperatures. It does not soften until heated to about 212° F., so it may be washed in water as hot as the hands can stand.

Polyethylene bags are suitable for fruits, vegetables, and bakery goods. However, the vinyl films (Cry-O-Rap and Saran) are preferred for meats as polyethylene is not as good an oxygen barrier, especially in thin films of less than 0.002 inch in thickness.

Laminated Papers

Many types of laminated papers are available. These consist of two sheets of paper laminated together to form one sheet. Most of these papers made for wrapping frozen foods are very good for this purpose.

Coated Papers

Tests of foods stored at zero indicate that waxed locker papers and other coated sheets now in use provide only moderate protection from rancidity development. Some are better than others, but none tested was as effective as the packaging materials previously described.

If you use a waxed locker paper, make a double wrap, with the wax side next to the meat.

How to Wrap

Freezer burn and rancidity may develop wherever air pockets exist in frozen food packages, even when the best wrapping materials are used. Tight wrappings, therefore, cannot be stressed too strongly.

The "druggist's wrap" is the easiest method of making tight folds and a close, tight wrap. This wrap also takes about 20 per cent less wrapping material than the "butcher" type of wrap.

To make a druggist's wrap, place the product in the center of the paper. Bring the two longest sides of the

FIG. 4. Start a druggist-type wrap by folding edges over, usually twice, to make a tight lock seam. A tight, snug lock seam should be made, except when using foil. Use locker tape or twine to hold the end folds in place. Tape is preferred because it holds down the ends very securely.
FIG. 5. Left—The butcher-type wrap is started by placing the meat close to one corner of the paper. A double wrap should be used with waxed locker paper.

Right—Use locker paper between layers of fish, chops, steak, or cut poultry, so that the pieces may be separated easily after the product is frozen. Note that the product is placed in the center of the wrapping when starting a druggist’s wrap.

Paper together over the product and fold these edges over about one inch. Fold again as many times as necessary to bring the paper tight and flat against the top of the product. To avoid waste of wrapping material, the paper should be only long enough to make two folds.

Turn the package over and fold end corners toward each other; then fold the ends over, stretch tight, and secure with locker tape or twine. Plain aluminum foil needs no tape or twine because the ends can be folded and rolled tightly into place.

The butcher wrap, commonly used at meat markets, is started by placing the product close to one corner of the paper. Then fold all sides over and roll the package over and over until all the paper is used. Secure with tape or twine. Tape will make a tighter seal.

An 18-inch width of paper will be satisfactory for wrapping most meats at home, although some large cuts of meat and large chickens will require a 24-inch width. You will want to place “steak paper” between layers of meat and fish so that the layers can be separated while still frozen. Any frozen-food wrapping material or parchment paper will serve this purpose. Paper folded double, rather than single sheets, will make separation easy. Package all cuts flat, so that cooking can be started, if desired, before the meat is thawed out.

Do not roll steaks. Wrap meat promptly after cutting.

Label all packages with the name of the product and the date. Use a soft crayon, china-marking pencil, or a special pen or brush. Special inks are available for marking foil. When stockinette is used as an over-wrap for cellophane, you may place a label inside the stockinette.

Wrapping Costs

A single druggist’s wrap will require about 80 sq. ft. of paper per 100 pounds of meat wrapped, while a double butcher wrap will require about 200 sq. ft.

Wrapping and freezing meat at home costs about $1.75 to $2.25 per 100 pounds for the wrapping material (at retail cost) and for electricity used in freezing. Locker plants often will cut, grind, wrap, and freeze the meat and mark the packages for little more than the cost of wrapping and freezing at home.

Containers

Unwaxed or lightly waxed cartons made for ice cream, cottage cheese, and other purposes are unsatisfactory for freezing foods. Good results have been
obtained with almost all types of frozen-food containers now on the market, so buy these for your home freezing. Select any container you prefer on the basis of convenience for use, space occupied in the locker or home freezer, and cost. Wide mouth glass canning jars may be used.

A quart size is the most economical, although this will be too large for some families. A quart container will hold about 24 ounces drained weight of most vegetables and will provide about 6 servings; or 20 to 24 ounces drained weight of most fruits plus sugar or sirup to about 2 pounds, which will provide about 8 servings. Two pint-sized bags may also be packed into a quart carton. Avoid packing too many containers of any one fruit or vegetable.

The different types of containers vary in the amount of space they occupy in the home freezer or locker. Approximately 40 pint cartons, either rectangular or cube shape, can be stored in one cubic foot. A cubic foot will also hold 27-30 cylindrical or tub-type waxed containers of the pint size. About 25 glass freezer jars (pint) will fit into the same space.

Most bag containers may be closed satisfactorily by twisting the tops and tying with soft twine, rubber binders, or 4-inch Twist-ems. The latter, used by florists for tying, are inexpensive and easy to use. Rubber binders may break after 6 months at zero.

Under home conditions, heat-sealing does not approach the effectiveness of factory heat-sealing. Twisting and tying, therefore, is usually to be preferred, even though the material can be sealed with heat.

Freezing Operations

Foods may be frozen satisfactorily at temperatures of 0° to -10° F., or lower. The rate at which heat can escape from the product is more important than the air temperature.

Packages of unfrozen food should be spaced at least an inch apart to facilitate the escape of heat. In single-compartment chest units, the packages should be spread out in the lower third of the storage space, in contact with refrigerated surfaces if possible.

Home freezers have a limited freezing capacity. In well designed commercial units a freezing load of 2 to 3 pounds per cubic foot of storage space is allowable. For example, 24 to 36 pounds of unfrozen food may be placed in a 12 cubic foot freezer. With the packages spread out and in contact with refrigerated surfaces whenever possible, all the food will be frozen in 10-12 hours or less.

Figures 6 and 7 show that considerable time is required to freeze food in a home freezer. Even under the favorable conditions for rapid freezing (represented by figure 6), the time required to bring the food from room temperature to below 20° F. was nearly 8 hours in a popular make of home freezer. In a less favorable situation (Fig. 7), the time is much greater.

A few pounds of food may be frozen in a home unit at the regular storage temperature of 0° F., but for larger quantities it is advisable to set the cold control at -10° F., or lower, about 24 hours in advance. This temporary lowering of temperature will have no ill effect on the frozen food already in storage, and it will facilitate more rapid freezing. There is no gain in the rate of freezing by setting the temperature control to a lower value at the time that the unfrozen food is placed in the box.

Small home freezers are not satisfactory for freezing a quarter of beef or similar quantities of food at one time. Large quantities should be taken to a locker plant for freezing, or they can be frozen outdoors if the temperature is low enough.
In home freezers, the packages should remain in the freezing position for 24 hours before they are packed close together. At locker plants, the packages usually are held in the sharp-freeze room overnight.

A separate freezing compartment in a home freezer is sometimes convenient, but it is not a necessity because foods may be frozen satisfactorily in a single-compartment home freezer. In both instances, the condensing unit must be large enough to handle the added heat load.

**Storage Temperatures**

Many persons believe that frozen foods will keep indefinitely if kept "frozen hard." This is not true. For example, noticeable loss of quality and vitamin content is likely to occur in 10 to 20 days with many foods stored at about 25°F in an "open-at-one-end" ice cube compartment of a household refrigerator.

Similar results may be expected from many foods after two to four weeks of storage in household refrigerator "freezer compartments" which maintain temperatures of about 15 to 18°F, or after 8 to 10 weeks in compartments that maintain temperatures of 10°F to 12°F. Such compartments will not store foods properly for long periods unless 0°F is maintained.

The recommended temperature for locker plant and home freezer storage is 0°F, and modern locker plants and home freezers are designed to maintain this temperature. Higher temperatures, especially if they reach 10°F, will not preserve food as well.

Most fruits and vegetables held at 10°F lose their vitamin C value at a rather rapid rate, but the loss is very slow at 0°F. A few foods, especially
FATTY FISH, will keep much better if stored at -10 to -20° F. STORE fish and pork in the coldest part of the freezer (usually near the bottom in chest types), because they will keep better at a few degrees below 0° F. than at 0° F. The operating temperature of a home freezer should be checked with an accurate thermometer placed on top of the food packages.

Frozen foods do not store well at temperatures above 0° F. because higher temperatures permit undesirable enzyme activity. Enzyme action speeds up undesirable chemical changes which result in the development of unpleasant flavors in most foods, changes in color, and the destruction of vitamin C. Enzymes are very much more active at 10° F. than at 0° F.

Loss of quality during storage does not result from bacterial action when the food is held at 0° F. Although temperatures as low as 10-15° F. are required to check all growth of micro-organisms on stored beef, comparatively few grow to any appreciable extent below 19° F. In fact, the destruction of bacteria in frozen beef and pork is more rapid at 20 to 25° F. than at 0° F. Food which has been properly prepared and frozen may become unpalatable during frozen storage due to enzyme action if the temperature has been too high or if it has been stored too long. Such food is not likely to be dangerous to eat if it has remained frozen. The dangerous botulinum toxin is not known to develop below 40° F.

**Storage Time**

Length of time that frozen products may be expected to keep without ap-

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**FIG. 7.** Temperature at the Center of a Pint Package of Cut Corn. In this case, the package was placed on top of another package being frozen at the same time. The time required for freezing was nearly 15 hours. The freezer was set for approximately -6° F.
<table>
<thead>
<tr>
<th>Foods</th>
<th>Storage Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples (sliced)</td>
<td>16 to 20 Months</td>
</tr>
<tr>
<td>Cherries (sour)</td>
<td></td>
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<tr>
<td>Cranberries</td>
<td></td>
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<tr>
<td>Pineapple</td>
<td></td>
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<tr>
<td>Pumpkin or Squash Pie Mix</td>
<td></td>
</tr>
<tr>
<td>Blackberries, Boysenberries, Loganberries (with sugar or sirup)</td>
<td></td>
</tr>
<tr>
<td>Raspberries and Strawberries (with sugar or sirup)</td>
<td></td>
</tr>
<tr>
<td>Peaches and Apricots (when packed with ascorbic acid)</td>
<td></td>
</tr>
<tr>
<td>Plums and Cherry-plums (when packed with ascorbic acid)</td>
<td></td>
</tr>
<tr>
<td>Blueberries</td>
<td>12 to 15 Months</td>
</tr>
<tr>
<td>Ground cherries</td>
<td></td>
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<tr>
<td>Huckleberries</td>
<td></td>
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<tr>
<td>Beets</td>
<td></td>
</tr>
<tr>
<td>Broccoli</td>
<td></td>
</tr>
<tr>
<td>Beef</td>
<td>8 to 12 Months</td>
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<tr>
<td>Lamb</td>
<td></td>
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<tr>
<td>Venison</td>
<td></td>
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<tr>
<td>Rabbits</td>
<td></td>
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<tr>
<td>Game birds</td>
<td></td>
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<tr>
<td>Liquid eggs</td>
<td></td>
</tr>
<tr>
<td>Baked fruit cakes</td>
<td></td>
</tr>
<tr>
<td>Mixed vegetables</td>
<td></td>
</tr>
<tr>
<td>Veal</td>
<td>6 to 8 Months</td>
</tr>
<tr>
<td>Pork (except broilers)</td>
<td></td>
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<tr>
<td>Turkeys</td>
<td></td>
</tr>
<tr>
<td>Lean fish (bass, cod, perch, plie, sunfish, etc.)</td>
<td></td>
</tr>
<tr>
<td>Ground beef</td>
<td>4 to 6 Months</td>
</tr>
<tr>
<td>Broilers</td>
<td></td>
</tr>
<tr>
<td>Pork (when cut up)</td>
<td></td>
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<tr>
<td>Pork sausage (with an antioxidant added to the seasoning)</td>
<td></td>
</tr>
<tr>
<td>Fatty fish (if treated with ascorbic acid solution)</td>
<td></td>
</tr>
<tr>
<td>Ham</td>
<td>3 to 4 Months</td>
</tr>
<tr>
<td>Bacon (not sliced)</td>
<td></td>
</tr>
<tr>
<td>Ground pork (unsalted)</td>
<td></td>
</tr>
<tr>
<td>Most fatty fish (catfish, herring, mackerel, etc.)</td>
<td></td>
</tr>
<tr>
<td>Goose</td>
<td></td>
</tr>
<tr>
<td>Ham</td>
<td>2 to 3 Months</td>
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<tr>
<td>Bacon (not sliced)</td>
<td></td>
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<tr>
<td>Most cooked meats, wiensers</td>
<td></td>
</tr>
<tr>
<td>Stews and soups</td>
<td></td>
</tr>
<tr>
<td>Baked yeast bread and rolls</td>
<td></td>
</tr>
<tr>
<td>Baked quick breads</td>
<td></td>
</tr>
<tr>
<td>Poultry (stuffed for roasting)</td>
<td></td>
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<tr>
<td>Creamed turkey</td>
<td></td>
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<tr>
<td>Less than 1 Month</td>
<td></td>
</tr>
<tr>
<td>Left-over cooked foods</td>
<td></td>
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<tr>
<td>Sandwiches</td>
<td></td>
</tr>
<tr>
<td>Ice cream</td>
<td></td>
</tr>
<tr>
<td>Bacon (sliced)</td>
<td></td>
</tr>
<tr>
<td>Unbaked rolls and yeast dough</td>
<td></td>
</tr>
</tbody>
</table>
preciable loss of quality will depend largely on (1) whether they have been handled properly before freezing, (2) the packaging material used, (3) the storage temperature, and (4) the kind of food stored. The rate of freezing, within certain limitations as explained on page 3, will make little if any difference.

For example, fish cleaned and frozen promptly after it is caught will keep much longer than fish not frozen promptly. Loss of quality usually can be detected by taste in less than four months when meat is wrapped in waxed locker paper as compared with similar meat wrapped in one of the good packaging materials. Most frozen foods will lose quality much faster when stored at 10° F. as compared with zero storage.

The length of time that various frozen foods may be expected to keep without appreciable loss of quality, when properly prepared and packaged, is shown in table 1. Every effort should be made to have a fairly rapid turnover and to avoid long storage periods resulting from buying or processing too much of any product at one time. There will be better satisfaction from the use of frozen foods in the home if excessively long storage periods are avoided.

**Capacity**

The accepted standard of capacity is 35 pounds of frozen food per cubic foot of usable space. Actually, this amount will vary from about 15 to 25 pounds for vegetables to 30 to 42 pounds for meats, or 20 to 50 pounds for fruits. Average, 25 to 35 pounds.

An 8 cubic foot chest type home freezer will have about 7½ cubic feet of usable space, as the top 1 to 2 inches should not be used for food storage. The usable space in a locker is also often slightly less than its rated capacity.

### Utensils to Avoid

Because copper destroys vitamin C, foods should not be allowed to come in contact with this metal. Contact with copper, aluminum, or nickel however, does not result in any form of food poisoning. Contact with iron will cause darkening of sweet potatoes.

Because of the danger of zinc poisoning, acid foods or juices should not be cooked in galvanized iron kettles. Do not place acid foods or juices in cadmium-plated utensils.

### Foods Not Suitable for Home Freezing

- Sponge cake batter
- Cream pie fillings
- Bananas
- Custard pie
- Celery (raw)
- Cooked egg whites
- Lettuce
- Gelatin desserts
- Pears
- Gelatin salads
- Custards
- Mayonnaise

### Thawing Time for Frozen Foods

<table>
<thead>
<tr>
<th>Product</th>
<th>Room temperature (minutes)</th>
<th>Household refrigerator (hours)</th>
<th>Other (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bread</td>
<td>30-35</td>
<td>5-6</td>
<td>20-25 (in 325° F. oven)</td>
</tr>
<tr>
<td>Cakes</td>
<td>20-30</td>
<td></td>
<td>20-30 (in 325° F. oven)</td>
</tr>
<tr>
<td>Pies, baked</td>
<td>30-45</td>
<td></td>
<td>50-60 (in 400° F. oven)</td>
</tr>
<tr>
<td>Pies, unbaked</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruits (pints)</td>
<td>3-4</td>
<td>5-6</td>
<td></td>
</tr>
<tr>
<td>Meat (per pound)</td>
<td>2-2½</td>
<td>5-8</td>
<td></td>
</tr>
<tr>
<td>Poultry, 3-4 pounds</td>
<td>5-6</td>
<td>18-20</td>
<td>1½-2 (in running water)</td>
</tr>
<tr>
<td>Poultry, 5-6 pounds</td>
<td>6-8</td>
<td>24-26</td>
<td>2-2½ (in running water)</td>
</tr>
<tr>
<td>Turkey, 12-18 pounds</td>
<td></td>
<td>48-72</td>
<td>4-6 (in running water)</td>
</tr>
</tbody>
</table>
Freezing Fruits...

FRUIT FOR FREEZING should be slightly riper than for canning, but not soft or mushy. Tree- or vine-ripened fruits contain more vitamins and a richer flavor than fruits picked green and allowed to ripen before freezing. Freezing fruit at just the right stage of ripeness is important, even though it may mean some delay in freezing. Freeze vine-ripened berries within 12 hours.

The varieties of fruit best adapted to freezing differ according to the region in which they are grown. In each region there are certain varieties which retain their original color, texture, and flavor exceptionally well when frozen.

Packing Methods

In packing fruit for freezing, sort, wash, and prepare as for table use. Most fruits to be used for dessert are best packed in sirup, although a dry-sugar pack is preferred for sliced strawberries and is optional for a number of other fruits. Most fruits intended for jam, pies, and similar cooking purposes should be packed in dry sugar and some without any sweetening.

Sirup Pack

1. Dissolve needed sugar in cold water. Stir occasionally and allow to stand until sugar is completely dissolved. Do not heat. Sugar sirup may be held in refrigerator for up to two days. Sirup pack best preserves vitamins.
2. Replacing one-third of the sugar with light-colored corn sirup, cup for cup, sometimes results in improved texture, flavor, and color of fruits.
3. When freezing peaches, apricots, sweet cherries, and figs, add ½ teaspoon ascorbic acid for each quart of water used, just before pouring sirup over fruit. Mix the ascorbic acid (citric acid, also, if recommended) with 2-3 tablespoons of the sirup and add to remainder of sirup. Mix thoroughly, but avoid beating air into the sirup.
4. Place the prepared fruit in containers and cover with sirup. Allow about ½ inch at top of container for expansion. For fruits that darken, place crumpled locker paper between lid and fruit to keep fruit submerged.

Sugar Pack

1. Place prepared fruit in a bowl. To avoid crushing berries, do not place more than about three boxes of berries in the bowl.
2. Sprinkle required amount of sugar over fruit and allow to stand until sugar begins to dissolve in fruit juice.
3. Gently stir fruit until each piece is coated with sugar and juice.
4. Pack fruits tightly into containers but do not crush.

Pack Without Sugar

For those who cannot use added sugar, apricots, peaches, raspberries, and strawberries may be frozen in water mixed with one teaspoon ascorbic acid per quart. Most berries may be crushed and frozen in their own juice. Blueberries may be frozen whole. Losses
of vitamin C are greatest when fruits are dry packed without sugar.

Sweetening materials should be used when possible as they best preserve the quality of almost all fruits.

**Fruit Purée**

Crush or chop fruit. Add 1 cup sugar to 6-8 cups purée according to taste. Show on label sugar used. Package and freeze.

**Use of Ascorbic Acid**

Ascorbic acid (vitamin C) is added to sugar sirups when packing such fruits as peaches, apricots, figs, and sweet cherries to help preserve their fresh color and flavor. These fruits would otherwise darken rapidly and lose flavor when thawed. Ascorbic acid also enriches the vitamin content.

Ascorbic acid is a natural constituent of fruits and vegetables. The pure ascorbic acid may be purchased in crystalline or powdered form in 25- or 50-gram bottles from a druggist or other distributor. A 25-gram bottle will pack six to seven 16-pound crates of peaches. Vitamin C tablets may be used, but the cost will be considerably higher. About 100-150 milligrams of ascorbic acid should be added to 1 pint (1 pound) container filled with fruit. See page 14 for instructions.

There are some special commercial preparations of ascorbic acid for frozen fruits on the market. These generally are not the pure ascorbic acid but contain added sugar or citric acid. Because of the acidity of citric acid, large proportions of this ingredient as used in some of these preparations may mask delicate natural flavors of fruits. When using commercial mixes, follow manufacturer's directions and be sure to use enough liquid to cover the fruit.

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**Table 2. Approximate Quantity of Sirup Needed for Packing Fruits**

<table>
<thead>
<tr>
<th>Fruit</th>
<th>Amount of Fruit</th>
<th>Water (Quarts)</th>
<th>Sugar (Cups)</th>
<th>Containers Filled (Pints)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apricots</td>
<td>14-lb. crate</td>
<td>3</td>
<td>9</td>
<td>24</td>
</tr>
<tr>
<td>Peaches</td>
<td>16-lb. crate</td>
<td>3</td>
<td>9</td>
<td>24</td>
</tr>
<tr>
<td>Raspberries</td>
<td>24-pint crate</td>
<td>3</td>
<td>9</td>
<td>24</td>
</tr>
<tr>
<td>Sweet Cherries</td>
<td>15-lb. crate</td>
<td>3</td>
<td>9</td>
<td>24</td>
</tr>
</tbody>
</table>

FIG. 8. Left—In packing with sirup, place the fruit in the container and cover with liquid. Leave a space one-tenth the volume of the container for expansion.

Right—A wad of waxed locker paper under the cover keeps peaches, sweet cherries, and apricots immersed and helps to prevent discoloration.
FIG. 9. Mixing sugar with strawberries. Left—Sugar is first sprinkled over fruit. Right—After waiting a few minutes for the sugar to dissolve, the mixture is stirred carefully until each berry is coated with dissolved sugar and fruit juice.

Fruits for Freezing

Apples

Varieties—Prairie Spy (preferred), Golden Delicious, Haralson, Jewell Winter, Jonathan, Northwestern, Patten Greening, Stayman Winesap, Victory, Wedge, Willow Twig, and Wolf River.

Selection—Firm-fleshed cooking varieties; freezing tends to soften textures. Apples should be fully ripe, but not mealy. Apples held in storage for long periods may darken after freezing.

Preparation—Peel apples and cut into pie slices. To prevent darkening, submerge the slices for not less than 5 minutes in a sodium bisulfite solution prepared by dissolving 1½ teaspoonfuls of sodium bisulfite (U.S.P. grade) in a gallon of water at about 60-70° F. Mix solution in a glass, earthenware, stainless steel, or enameled container. The same solution may be used to treat about ½ bushel of apples. Do not use sodium sulfide or sodium sulfate.

Stronger solutions will result in a distinct toughening of the slices and a sulfur taste after cooking. The color of some varieties that do not darken readily may be preserved by using only one teaspoon of sodium bisulfite per gallon water. Two ounces of sodium bisulfite (11 level teaspoonfuls) will treat about 5 bushels of apples at a cost of 5 to 10 cents per bushel.

Sliced apples used in baked frozen pies need no special treatment.

Packing—After the 5-minute dip, remove slices from solution and drain. Pack in sugar, using 5 to 7 pounds of slices to 1 pound of sugar. Pack into containers. Press slices down gently with a wooden potato masher or similar instrument and pack slices tightly, so that the juice will cover as much of the fruit as possible. Freeze immediately. The sugar may be omitted for those who do not eat sweetened fruits.

Other Treatments—Slices treated with sodium bisulfite (10-minute dip) may be held for a number of days under refrigeration at about 35° F. without being frozen. However, if the slices are to be frozen, it is best not to hold them in this manner.

Soft apple slices may be firmed by the addition of calcium chloride (U.S.P. grade) to the sodium bisulfite solution. The amount of calcium chloride will vary from 5 to 10 level teaspoonfuls per gallon depending on the variety and ripeness of the apple. It is difficult to select the proper amount of calcium chloride when packing small lots at home.

Apples may be prepared for freezing by scalding the slices in steam for 2 to 3 minutes instead of dipping in
sodium bisulfite solution. The sulfite method is likely to best preserve flavor, however, since steaming and subsequent cooling in water results in loss of flavor and natural sugars. Treatment with calcium chloride is desirable when the slices are steamed, because steaming softens the fruit.

**Apricots**

**Varieties**—Blenheim (Royal), Moorpark, Tilton.

**Selection**—Well-ripened fruits of uniformly golden-yellowish color.

**Preparation**—Follow instructions given for peaches. Unless apricots are peeled before freezing, the canned product is considered superior for dessert use. Unpeeled frozen apricots are satisfactory for pies.

Soft ripe fruit, which has best flavor, may be halved, steamed 4 minutes, then crushed and packed with sugar. Use 1 pound sugar to 5 pounds fruit. Ascorbic acid is not needed when the fruit is steamed.

**Blackberries, Boysenberries, Dewberries, Loganberries, Youngberries, and Nectarberries**

**Selection**—Firm berries with rich flavor and bright appearance.

**Preparation**—Discard any green, off-colored, soft, or bruised berries. Wash carefully in iced water, lift fruit from water, and drain. For dessert use, pack in sugar sirup using 3 cups of sugar to 1 quart of water. For pies, pack dry without sweetening. The berries may be crushed and packed in sugar, using 4 pounds of fruit to 1 pound of sugar. Freeze immediately.

**Blueberries**

**Varieties**—Any available variety.

**Preparation**—Remove leaves, stems, and inferior berries. Wash in iced water; lift fruit from water and drain.

Pack dry with no sugar. It is desirable to scald wild blueberries in steam for 1 minute for better retention of flavor and to prevent toughening of the skins. Cool quickly in ice cold water. The heat is needed only to penetrate the skin. Do not scald large-fruited, cultivated berries.

**Muskmelons**

**Varieties**—Beauty Osage, Bender's Surprise, Golden Gopher, Iroquois, and other firm-fleshed varieties.

**Selection**—Firm, ripe, fine-textured cantaloupe of top quality with well-developed netting or veining. If the melon is slightly immature, quality when frozen will be inferior.

**Preparation**—Wash, halve, and remove seeds. Cut flesh into ½- to ¾-in. cubes or balls, add whole seedless grapes, and cover with orange juice. Freeze immediately. For top flavor, serve while still partially frozen.

**Sour Cherries**

**Varieties**—Any good quality cherry.

**Preparation**—Wash, stem, and pit. For pie, mix 4 pounds of fruit with 1 pound of sugar. Pack and freeze immediately.

**Sweet Cherries**

**Varieties**—Bing (preferred), Schmidt, Lambert, Black Tartarian, Windsor.

**Selection**—Bright, fully-ripened cherries of dark-colored varieties.

**Preparation**—Chill in iced water to keep cherries from bleeding when pitted. Lift from water, and drain. Discard inferior cherries; stem and pit. Pack in sugar sirup, using 2 cups of sugar for 1 quart of water.

The natural fruit flavor will not be retained unless ascorbic acid is added. (See instructions, page 14.) The addition of 1 teaspoon of citric acid or 4 tea-
sponges of lemon juice plus the ascorbic acid is recommended to give a desirable acidity to the frozen product. Freeze at once. Suitable for salads.

**Citrus Fruits**

Citrus fruits are on the fresh fruit market during much of the year. Their best use for freezing is when mixed with other fruits. See page 20.

**Coconut**

Cut into pieces or shred, cover with liquid from the nut, and package.

**Cranberries**

**Varieties**—Any available variety.
**Selection**—Firm, plump berries with glossy skins.
**Preparation**—Sort, discarding off-colored berries. Wash in iced water, lift berries out of water, and drain. Pack without sugar. Freeze immediately. Cranberries may also be pureed and sweetened to taste or made into a relish by grinding cranberries, oranges, and lemons together and sweetening to taste. Storage life of the relish is about one month.

**Currants**

**Varieties**—Red Lake and similar large-fruited varieties.
**Preparation**—Stem, wash in iced water, lift fruit from water, and drain. Gently mix 1 pound of sugar to 4 pounds of currants. For better sugar penetration crush slightly. Currants may also be packed dry with no sugar. Freeze immediately.

**Gooseberries**

**Varieties**—Any good cooking variety.
**Preparation**—Remove blossom ends and stems. Wash, lift from water, and drain. Pack without sugar or sirup and freeze immediately.

**Grapes**

**Varieties**—Thompson Seedless and Tokay.
**Selection**—Ripe, firm, sweet grapes.
**Preparation**—Sort, stem, and wash. Lift from water, and drain. Pack Thompson Seedless whole or halved; remove seeds from Tokays and pack halved or quartered. Pack in sugar sirup using 3 cups sugar to 1 quart water. Freeze immediately.

**Peaches**

**Varieties**—Dixigem, Redhaven, Southland, Sunbeam, Triogem (these are non-browning varieties and do not need ascorbic acid); Elberta, July Elberta, Fireglow, J. H. Hale, Halehaven, Sunhigh, and others.

Elberta and J. H. Hale are two varieties commonly found on upper midwest markets. The Elberta is superior in flavor but is inferior to J. H. Hale in color and texture for freezing. Clingstone varieties are not recommended unless they are to be used for such products as preserves or pies.
Selection — Well-ripened fruits, slightly riper than for canning. Unripe shipped-in peaches ripen best when held at about 75° F.

Preparation — Prepare sugar sirup using 3 cups of sugar to 1 quart of water plus ½ teaspoon pure ascorbic acid. (See page 14 for instructions.) Dip only 3 or 4 peaches (or about 6 apricots) at one time into boiling water for 15 to 20 seconds until the skins loosen; chill quickly in iced cold water. Peel, halve, and remove pit. Work rapidly. For nectarines, follow same directions in preparation and packing.

Packing — Use containers with lids. Fill containers about one-third full of prepared sirup and pack halves or slices directly into the sirup. Delay at this stage may result in darkening of the outer layer of the fruit. Completely cover the fruit with sirup, but leave about ½ inch for expansion. Top slices should be kept submerged in the sirup by placing a generous piece of crumpled locker paper under the lid. This will keep top slices from darkening. For better retention of color and flavor, use glass or other airtight containers.

If peaches cannot be packed immediately, the cut fruit may be submerged for a short time in cold water containing 1¼ level teaspoonsfuls of ascorbic acid per gallon of water to prevent darkening. This treatment may also be used on sliced peaches for table use.

Some varieties of peaches, especially the non-browning types, may be frozen in dry sugar. Mix ½ teaspoon of pure ascorbic acid with 4 cups sugar, then mix with 8 pounds (about 4 quarts) of sliced fruit. Do not use this method for Elberta.

If ascorbic acid is not available, pack peaches in glass containers using a sugar sirup made with 4 cups of sugar per quart of water for best results.

Pears

It is better to can pears instead of freezing them.

Pineapple

Selection — Bright appearance, dark orange-yellow color with fragrant odor. If tops pull out easily, pineapple is ripe for freezing.

Preparation — Peel and core. Dice, slice, or cut into wedges. Pack without sugar and cover with pineapple juice; make a sirup if there is not enough juice to cover the fruit, using 2½ cups sugar to each quart of juice and added water. Freeze immediately. If pineapple is to be used in gelatin molds, it must first be cooked to inactivate the enzyme bromelin which would otherwise prevent jellying.
Prunes

**Variety**—Italian, Stanley.

**Preparation**—Wash, halve, and pit. Pack into containers and cover with sugar sirup, using 3 cups of sugar to 1 quart of water. Freeze immediately.

Whole prunes may be frozen without sugar or sirup for cooking purposes.

The liquid from a sirup pack makes a pleasing beverage.

Raspberries

**Varieties**—Preferred varieties are: red—Cuthbert, Madawaska, Taylor, Viking, and Washington; purple—Sodus. Others are: red—Chief, King, Latham, and Newburgh. Some of the varieties listed are not suitable for growing in Minnesota.

**Selection**—Firm, fully-ripened berries of good bright color.

**Preparation**—Pick out immature and moldy berries, wash in iced water, do not allow to soak, lift berries from water, and drain. Pack raspberries in sugar sirup or sugar—many persons prefer a sugar pack using the method shown in Fig. 11. For the sugar sirup pack, use 3 cups of sugar for 1 quart of water—for sugar pack use 1 pound of sugar to 4 to 5 pounds of fruit according to sweetness of the berries (1 cup of sugar to 7 to 8 cups of berries). A 24-pint crate will yield about 17 pounds of berries or about 28 pints of frozen berries. Freeze immediately.

Black raspberries for dessert use should be packed in sirup; for jam, pack without sweetening.

Strawberries

**Varieties**—Burgundy, Dorsett, Julymorn, Marshall, Midland, Redheart, Robinson, Red Rich, Sparkle (preferred varieties); Blakemore, Dunlap, Gem, and Wayzata.

Beaver and Premier are acceptable varieties for home freezing but not as good as those listed above. Some of the varieties listed are not suitable for growing in Minnesota.

**Selection**—Firm, ripe berries of a bright red color, of rich aromatic flavor and free from rots.

**Preparation**—Pick out immature and defective berries. Hull, and wash in iced cold water. Lift berries from water, and drain. Pack strawberries whole, sliced, or crushed in sugar. More of the full strawberry flavor is retained in crushed or sliced berries, because there is more sugar penetration. Berries of medium size are best for freezing whole.

Use 1 pound of sugar to 4 to 5 pounds of fruit, depending on the sweetness of the berries. This is equivalent to 1 cup sugar to 8 or 9 cups of hulled strawberries. A sirup pack, 3 to 4 cups of sugar to 1 quart of water, is equally desirable for whole berries.

A 24-quart crate of berries will yield about 38 pints of frozen berries. Unsweetened strawberries are much less desirable except for persons who do not eat sugared products. Freeze immediately.

**Variations**

**Fruit Cocktails and Salads**

Mixed fruits frozen for cocktails and salads give variety to party or everyday menus. Use simple combinations with eye-appeal. Select fruits which contrast in color, flavor, and texture. Each fruit will retain most of its original flavor. Choose well-ripened fruits. Sort, wash, and prepare each as you would for table use. Cut the fruits into attractive sizes and shapes.

**Fruits for Mixes**

Apricots—sliced or cubed; cherries—Bing, quartered; Maraschino—halved or quartered; grapefruit—segmented; oranges—segmented or crosscut; peaches—sliced or cubed; pineapple—cubed or wedge cut; pomegranate
seeds; Thompson Seedless grapes—whole; Tokay grapes—halved or quartered.

Sprinkle sugar over each layer of fruit, sweetening to taste. When all the sugar is added, allow the fruit to stand in the refrigerator until the juice that forms covers as much fruit as possible. Pack into containers and freeze. If the fruit mix is to be kept for any length of time, \( \frac{1}{4} \) teaspoon of ascorbic acid should be added to the sugar used for each 2 pints of fruit.

Maraschino cherries and pomegranate seeds should be used sparingly and only for color effect. Cantaloupe, raspberries, and strawberries usually do not blend well in frozen fruit mixes. Nuts or fresh fruits, such as bananas and apples, may be added at time of serving.

**Thawing fruit mixes:** Thaw fruit mixes in original sealed containers. The amount of thawing will depend on how the fruits are to be used.

**Cocktails:** Serve cocktail fruits while ice crystals still glisten on the fruit.

**Salads:** Completely thaw fruit, but use while still chilled. Drain, and mix with dressing or whipped cream.

**Jellied Salads:** Completely thaw fruit and drain. Add to gelatin as usual. If mix contains pineapple, the pineapple must first be cooked to inactivate the enzyme bromelin which would otherwise prevent jellying.

**Frozen Fruits for Jam and Preserves**

Freshly-made jam and preserves prepared from frozen fruit are better in quality than jam made in season and stored for several months. When frozen fruit is used, the jam or preserves can be made at your convenience.

**Frozen Fruits for Conning**

Frozen fruits may be canned, but the same changes in color and flavor occur in this process as in fresh-fruit canning. The texture of canned peaches, apricots, and some berries may become very mushy when frozen fruits are used. Fruits such as cherries, pineapple, and blueberries, however, retain their texture to a greater extent.

**Frozen Fruits Purchased in Large Containers**

For easier handling on a household basis, these large-quantity packs of frozen fruits can be repacked into smaller frozen food containers and returned to the freezer.

The fruits should be allowed to stand at room temperature in the original container until defrosted enough to begin repacking. When the ice crystals between the fruit defrost enough so that the individual pieces can be separated from the original pack without damage to any of the fruit, repacking should be started. Thus, repacking can be done without the fruit itself thawing.

The blocks of frozen fruit should be watched constantly, because the outside fruit is ready for repacking much sooner than the inner portions. Each fruit requires a different length of time for defrosting. Repacking is a continuous process of alternately packing and waiting.

As each container is filled, it should be placed immediately in the freezer, thus preventing further thawing which would affect the texture of the fruit. If the instructions are followed exactly, there will be no apparent deterioration in color, flavor, or texture of fruit.

**Thawing Frozen Fruits**

Thaw all fruits in their original containers. Quality and nutritive values are best retained by fairly rapid defrosting, so thawing at room temperature is preferred. If faster defrosting is desired, place packages in front of an electric fan or submerge them (if watertight) in cool or lukewarm water. Serve as soon as defrosted, preferably while a few ice crystals remain.
Freezing Vegetables...

SPEED in getting vegetables from garden to freezer is one of the most important factors in attaining top-quality frozen vegetables for your home freezer or locker drawer.

During hot weather it is wise to harvest vegetables in the early morning before they have absorbed much heat from the sun. Select vegetables at optimum maturity—when they have reached their best flavor and texture—the same as you would select them for immediate table use.

Process and freeze all garden products with as little delay as possible. If it becomes necessary to store vegetables for a short time after harvesting, spread them out loosely in a cool, well-ventilated place, or pack loosely in refrigerator. Prompt cooling in ice cold water of many freshly picked vegetables such as asparagus or un-shelled peas, followed by storage in a refrigerator, will help retain flavor and quality and greatly reduce loss of vitamin C. For longer periods of storage, pack in crushed ice.

Varieties known to be suitable for freezing are listed in this bulletin. However, there are many other varieties of good quality that will be found satisfactory for home freezing.

Methods of Preparation

Scalding

To prevent loss of quality and to preserve the vitamin content of vegetables for freezing, scald them in boiling water or steam. The boiling water method is recommended for home use because household equipment is generally not adequate to perform a satisfactory steam scald.

Nutritive values are best retained when the water is brought to a boil quickly, when the scalding period is as short as possible, and when the vegetable is chilled quickly and removed from the cold water promptly.

The scalding (or blanching) process is necessary to inactivate enzymes. If these enzymes were left in their active state, the frozen vegetable would lose quality after a storage period of 1 to 2 months or less. "Off" flavors would develop, and the vegetable would tend to lose its garden-fresh color, vitamin content, and texture. When enzymes are inactivated by heat, the storage life of the vegetable is lengthened to 8 to 12 months, depending on the individual vegetable. Scalding brightens the color of a vegetable and assists in keeping its texture similar to that of a fresh vegetable.

Use the following procedure:

1. Place water in large kettle (aluminum, enamelware, or stainless steel) and bring to rolling boil. Use 1 gallon per pound of vegetable; 2 gallons for leafy greens.

2. Place about 3 pounds of prepared vegetable in a wire basket or large loose cheesecloth bag and submerge into boiling water. (The small amount of vegetable in proportion to the large amount of water is necessary to insure the water's returning to a simmer boil within 60 to 75 seconds after the vegetable is submerged, and to provide proper heat penetration in the
required length of time. The internal temperature of the vegetable must be brought up to about 180° F.)

3. Keep the kettle covered during scalding and keep the heat on high. The use of two sets of baskets and kettles saves much time.

**Timing**

Each vegetable requires a different scalding time. The scalding directions given with each vegetable should be followed exactly. Too long a scalding period will result in softening of texture and in unnecessary loss of water-soluble vitamins and other nutrients. Underscalding will produce results similar to no scalding. Start counting scalding time as soon as the vegetable is put into the boiling water.

Complete cooking prior to freezing is not recommended for most vegetables, since flavors developed by cooking are more readily lost during freezing storage than flavors of the uncooked, scalded product. Completely cooked vegetables tend to have a warmed-over flavor when heated for serving.

Additional scalding time is required at altitudes greatly above sea-level. At 2,000-4,000 feet, add ½ minute; 4,000-6,000, add one minute; over 6,000 feet, add 2½ minutes.

**Chilling**

The scalded vegetable should be placed immediately in running cold water or iced water. About one pound of ice is necessary to cool one pound of vegetable. The chilling stops any further cooking and also prevents loss of quality. To conserve water-soluble nutrients, the chilling should be only long enough to cool the vegetable.

Test coolness of the vegetable by biting into several pieces. If the product is cool to the tongue, it is cool enough to pack.

If vegetables are to be taken to a locker plant, place in refrigerator for not more than two hours until you are ready to make the trip to the locker.

**Steam Scalding**

For steam scalding, place about 1 inch of water in the bottom of a large kettle and bring to a rolling boil. Place a thin layer of vegetable in a wire basket or in a loose cheesecloth bag and suspend over the rapidly boiling water. Keep the cover on during the entire process. This method is recommended only for broccoli.
Vegetables for Freezing

**Asparagus**

**Varieties**—Martha Washington and Mary Washington.

**Harvesting** — Pick bright-colored, brittle stalks which snap when broken and which have tight, compact tips. Harvest early in morning if weather is hot.

**Preparation** — Discard woody and blemished stalks. Wash in running cold water. Sort into medium and large stalks. Trim stalks by removing scales with a sharp knife. Break off fibrous end. Pack whole or cut into 1- to 2-inch lengths. Process as quickly as possible; asparagus becomes woody and loses vitamins rapidly after harvesting. Fibrous ends may be completely cooked and pureed for soups.

**Scalding**—Medium stalks: water, 3 minutes. Large stalks (⅝ to ⅞ inch diam.): water, 4 minutes. Chill in iced or cold running water. Drain, package, and freeze immediately. Asparagus tips are a rich source of vitamin C.

**Snap Beans**

**(Green Podded)**

**Varieties**—Kentucky Wonder (pole), Blue Lake Stringless (pole) (preferred varieties); Giant Stringless Rival, Green Pod, Stringless Green Pod, Tendergreen, and Topcrop. It is important to select a suitable variety.

**Harvesting** — Pick young, tender beans which snap when broken. Pick while seeds are still small and tender.

**Preparation**—Discard off-colored and blemished beans. Wash in running cold water. Snip off tips and sort for size. Cut or break beans into about 1½-inch lengths. Freeze small beans whole, if desired. Do not delay processing the cut beans.

**Scalding**—Scald in water, 3½ minutes. Chill in iced or cold water. Drain. Package and freeze immediately.

**Snap Beans**

**(Yellow Podded)**

**Varieties**—Brittle Wax (Round Pod Kidney Wax) and Pencil Pod Black Wax.

**Processing**—Process the same as green podded beans. Most persons prefer the green podded types.

**Soy Beans**

**Varieties**—Giant Green, Bansei, and Sousei.

**Harvesting** — Pick well-developed pods which contain green beans.

**Preparation**—Wash in cold running water. Scald in pods.

**Scalding**—Scald in water, 5 minutes. Chill before shelling. Shell and discard blemished beans. No further scalding is necessary. Package and freeze immediately.

**Beets**

**Varieties**—Detroit Dark Red and other garden varieties of good color and quality.

**Harvesting** — Pick smooth, tender beets of small to medium size.

**Preparation** — Discard blemished beets, remove tops and wash.
Scalding—Cook until tender. Chill thoroughly in iced or cold running water. Remove skins, and slice or dice larger beets. Freeze immediately.

Broccoli

Varieties—Italian Green Sprouting and Freezer’s Sprouting Green.

Harvesting—Firm, tender stalks with compact heads.

Preparation — Discard off-colored heads or any which have begun to blossom. Remove tough leaves and woody butt ends. Cut stalks to fit container. Cut through stalks lengthwise leaving heads about 1 inch in diameter. This gives more uniformity for scalding and more attractive pieces for serving. Before processing, soak stalks, head down, for ½ hour in salt brine (¼ cup salt to 1 quart water) to drive out small insects. Rinse in fresh water and drain.

Scalding—Water, 4 minutes; steam, 5 minutes. Steam usually preferred. Chill in iced or cold running water. Drain. For more compactness, pack heads and stalk ends alternately in the container. Freeze immediately.

Brussels Sprouts

Varieties—Half Dwarf Improved and Long Island Improved.

Harvesting — Pick firm, compact heads of good green color.

Preparation—Discard any discolored heads. Wash thoroughly and trim. Before processing, soak sprouts for ½ hour in salt brine (¼ cup salt to 1 quart water) to drive out small insects. Rinse in fresh water and drain.

Scalding — Medium heads: water, 4 minutes. Larger heads: water, 5 minutes. Chill in iced or cold running water and drain. Package and freeze immediately.

Carrots

Varieties—Nancy, Nantes, Imperator, and Chantenay Red Core.

Harvesting—Pick smooth, tender carrots before the roots become woody. Plan time of planting so as to harvest in cool weather. Small immature roots harvested during hot weather usually are not of good quality when frozen. These contain less carotene (the source of vitamin A).

Preparation — Remove tops, wash, and scrape. Dice or slice ¼ inch thick.

Scalding—Water, 3½ minutes. Chill and drain. Package and freeze immediately.

Cauliflower

Varieties—Snowball, White Mountain (preferred varieties).

Harvesting—Pick well-formed, compact, white heads, with fresh leaves.

Preparation — Trim, discard leaves, and wash thoroughly. Split heads into individual pieces about 1 inch in diameter. Before processing, soak pieces for ½ hour in salt brine (¼ cup salt to 1 quart water) to drive out small insects. Rinse in fresh cold water and drain. Work rapidly to prevent discoloration.

Scalding—Water, 4 minutes. Chill and drain. Package and freeze immediately.

Celery

Varieties—Although celery is not generally recommended for freezing, especially where freezer space is limited, green varieties can be frozen.

Preparation — Trim, and discard tough and blemished stalks. Wash and dice or cut into 1-inch pieces.

Scalding—Water, 4 minutes. Chill and drain. Package, and freeze immediately. Use only in hot dishes, such as soups or chow mein.

Sweet Corn

Varieties—Golden Bantam types are preferred. Hybrid corn is desirable because of its more uniform maturity.
**Harvesting**—Harvest in early morning if weather is hot. Corn is at optimum maturity (73 to 75 per cent moisture content) for only a short period of time, usually 48 hours. A rough test for maturity is to press the thumbnail into a kernel. If milk spurts out freely, the corn is at or near the proper stage of maturity. If corn is picked when immature, it will be watery when cooked; if it is too mature, it will be doughy. Process as rapidly as possible. A delay of more than a few hours may result in a significant loss of quality unless the corn is held under refrigeration.

**Preparation**—Husk corn, remove all silk and trim ends. Scald, using a canning kettle or other large container holding at least 12 to 15 quarts of boiling water. Keep kettle covered. Whole kernel corn to be cut from the cob should be scalded 4½ minutes before cutting. Follow schedule below for corn on the cob.

Chill the corn quickly in cold running water or iced water. Drain, and package in a good wrapping material. Do not scald ears while wrapped in foil.

**Cream style**—Slice through tips unscalded kernels (make 2 thin slices if desired). Scrape, add water to prevent scorching. Cook 4 minutes. Cool quickly.

**Eggplant**

**Varieties**—Any garden variety of good color and quality.

**Harvesting**—Pick before eggplant becomes too mature, and while seeds are still tender. Heavy, firm eggplant of uniformly dark color are desirable.

**Preparation**—Peel; slice into ⅛- to ⅜-inch slices, or dice. To retain light color, drop sliced or diced vegetable immediately into a solution of ½ teaspoon of ascorbic acid to 1 quart of cold water and submerge for 5 minutes. Also, add the same proportion of ascorbic acid to the boiling water used to scald the vegetable. Lemon juice (3 tsp. per quart) or citric acid (1 tsp. per quart) may be substituted for the ascorbic acid with fairly good results.

**Scalding**—Scald in water for 4½ minutes. Chill in iced water. Drain and package in layers, separated by sheets of locker paper. Freeze immediately.

**Garden Herbs**

A number of garden herbs may be preserved by freezing. Wrap a few

<table>
<thead>
<tr>
<th>Size of ears</th>
<th>No. ears scalded at one time with each 12 quarts of water</th>
<th>Diameter at large end after trimming</th>
<th>Scald (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midget</td>
<td>24</td>
<td>1¼ inches or less</td>
<td>8</td>
</tr>
<tr>
<td>Small</td>
<td>14</td>
<td>Between 1¼ and 1½ inches</td>
<td>8</td>
</tr>
<tr>
<td>Medium to large</td>
<td>10</td>
<td>Over 1½ inches</td>
<td>11</td>
</tr>
</tbody>
</table>
sprigs or leaves in foil or seal in film bags and store in a carton or glass jar. Wash, but do not scald the leaves.

**Kohlrabi**

**Varieties**—Any good garden variety.

**Harvesting**—Pick young and tender kohlrabi.

**Preparation**—Cut off tops, wash, peel, and dice in \( \frac{1}{2} \)-inch cubes.

**Scalding**—Scald in water, 2½ minutes. Chill and drain. Package and freeze immediately.

**Lima Beans**


**Harvesting**—Pick well-filled pods containing green, young, tender beans (white beans are overmature).

**Preparation**—Wash and remove beans from pods. Use kitchen shears to snip tough pods. Do not wash after shelling. Discard blemished beans. Prepare immediately, as shelled beans lose flavor rapidly.

**Scalding**—Scald small and medium beans 3 minutes in water; larger beans 4 minutes. Chill in iced or cold running water. Drain, package, and freeze immediately.

**Mushrooms**

**Harvesting**—Pick young, firm mushrooms.

**Preparation**—Process with care and with as little delay as possible to prevent bruising and deterioration. Wash and remove base of stem. Freeze small mushrooms whole. Cut larger ones into four or more pieces. To prevent darkening, add citric acid (or lemon juice or ascorbic acid) to the scalding water as recommended for eggplant.

**Scalding**—Water scald is recommended. Scald medium or small whole mushrooms for 4 minutes, and cut pieces for 3 minutes. Chill and drain. Package and freeze immediately.

Steam scalding sometimes may be desirable to preserve the flavor of very mild flavored mushrooms.

**Alternate method of preparation**—Slice \( \frac{1}{4} \) inch. Saute in butter for two minutes. Cool, pack into containers. Any excess butter may be poured over mushrooms in container.

**Okra**

**Varieties**—Any good garden variety.

**Harvesting**—Select young tender pods, 2 to 4 inches in length.

**Preparation**—Remove stem and wash.

**Scalding**—Scald under water, 3 to 4 minutes. Large podded types grown in west coast regions require 4 to 5 minutes. Chill and drain. Package and freeze immediately.

**Parsnips**

**Varieties**—Any garden variety of good quality.

**Harvesting**—Select smooth, firm roots of good quality, free from woodiness. In northern regions, parsnips may be harvested either in late fall or early spring.

**Preparation**—Remove tops; wash thoroughly; and peel. Slice, dice, or cut lengthwise.

**Scalding**—Scald in water, 3½ minutes. Chill and drain. Package and freeze immediately.

**Peas**

**Varieties**—Freezonian, Lincoln, Shasta, Little Marvel, Thomas Laxton (preferred varieties); Hundredfold (Laxtonian), Burpeana Early Dwarf, Oneida, Teton, Laxton’s Progress, and Victory Freezer. Alaska and other starchy peas should be avoided.

**Harvesting**—Pick bright green, crisp pods, with peas which are tender and sweet but not overmature. Peas are at
their optimum maturity for a short period of time, usually only 24 hours. One bushel will pack 15 to 20 pints.

**Preparation**—If peas are hard to shell, scald pods in boiling water for 1 minute; dip in iced cold water for 1 minute. Shell a small amount at a time. Do not wash after shelling. Discard small, poorly formed peas. Before scalding, overmature peas may be separated from the tender peas by floating the peas in cold salt brine (about ½ cup salt per gallon water at 55°F.). After 10 seconds, remove the floaters which are the tender peas. Process with as little delay as possible. Delay between shelling and freezing toughens the skins. Some persons like to mix 2 to 3 teaspoons of sugar with each pound of peas after scalding and chilling.

**Scalding**—Scald in water, 1½ to 2 minutes. Black eyed peas require 2 minutes. Chill and drain. Package and freeze immediately.

### Peppers

**Varieties** — Any variety of good quality.

**Harvesting** — Pick crisp, well-developed peppers of deep green or red.

**Preparation**—Wash thoroughly. Cut out stem end and remove seeds of green peppers. Halve, slice, or dice. Peppers lose their crispness when frozen, but are excellent for hot dishes.

Pimiento peppers may be peeled by roasting them in an oven at about 400°F. for 3 to 4 minutes until peel is charred. Cool and pack dry without additional heating.

**Scalding**—Scald halved green peppers in water for 3 minutes; 2 minutes if sliced or diced. Chill and drain. Package and freeze immediately.

### Sweet Potatoes

**Varieties** — For pies—Porto Rico and Nancy Hall. For table use—Porto Rico, Nancy Hall, and Yellow Jersey.

**Selection**—Pick smooth, firm roots of bright appearance.

**Preparation**—Wash thoroughly. Bake in oven at 350°F. until soft. Dry varieties such as Yellow Jersey will be slightly better if steamed under pressure (10 pounds pressure for 10 minutes or more, depending on size of potato). Cool, peel, and slice into ¼-inch slices. To help preserve bright color, dip slices in solution of 4 tablespoons lemon juice to 1 pint of cold water. For candied sweet potatoes, drain and roll in granulated sugar. Color is less bright when brown sugar is used.

Sweet potatoes may also be pureed. Steam or bake the potatoes, cool, scoop flesh from skin, and purée through ricer. Add 5 teaspoons lemon juice for each 10 cups (5 pounds) of puree to help preserve color. Add also ¼ pound of sugar. For pie mix, purée may be mixed with milk, egg, and spices (except cloves) before freezing.

### Pumpkin

**Varieties** — Any good pie pumpkin.

**Harvesting** — Pick at optimum maturity, indicated by good color and stem that breaks loose easily.

**Preparation**—Wash thoroughly. Cut or break into fairly uniform pieces and remove seeds. Bake at 350°F. or steam until tender. Cool, scoop pulp from rind, and mash or put through ricer. If desired, prepare pie mix from favorite recipe by adding milk, egg, sugar, and spices (except cloves) before freezing.

### Rhubarb

**Varieties** — Valentine, Crimson Delicious, Canada Red, McDonald Red (preferred varieties); any other variety.

**Harvesting** — Select stalks in early spring. Stalks should be crisp, tender, and of a good red color.
FIG. 15. The bag-in-box type of carton may be filled easily by using a simply-made wooden form to hold the cartons upright. Another aid in this operation is a carton filler consisting of a wire frame and a funnel.

**Preparation**—Remove leaves and woody ends. Discard blemished and tough stalks. Wash thoroughly, and cut into 1-inch lengths. Do not scald.

Rhubarb may be packed without sugar (dry pack) for pies. One pound of fruit is sufficient for an 8-inch pie. For sauce, pack rhubarb in sugar sirup, using 3½ cups sugar to 1 quart cold water. Package, freeze immediately.

**Rutabagas**

**Varieties**—American Purple Top and Long Island Improved.

**Harvesting**—Tender young rutabagas.

**Preparation**—Wash and remove tops. Peel and slice or dice ¼-inch cubes.

**Scalding**—Scald in water, 3½ minutes. Chill and drain. Package and freeze immediately.

**Spinach and Other Greens**

**Varieties**—Spinach—Long Standing Bloomsdale (preferred variety); King of Denmark, and Nobel. Swiss Chard—Fordhook and Lucullus. Beet greens, kale, mustard greens, and turnip tops are also satisfactory for freezing. Because of their nutritional value, chard, kale, turnip tops, and mustard greens are preferred to spinach and beet greens. The former contribute calcium to the diet; the latter contain calcium oxalate which the body cannot utilize.

**Harvesting**—Pick young, tender leaves. Harvest early in the morning if weather is hot.

**Preparation**—Cut off large tough stems. Discard all infected leaves. Wash thoroughly in cold running water.

**Scalding**—Scald all leafy greens in water, 2 minutes; except collards and stem portions of Swiss chard, 3 to 4 minutes. Very small, tender spinach requires only 1½ minutes. Chill and drain. Package and freeze immediately.

**Summer Squash**

**Varieties**—Summer Crookneck and Zucchini.
**Harvesting**—Pick while rind is still tender and seeds small.

**Preparation**—Wash, peel, and cut into pieces not over 1½ inches thick.

**Scalding**—Scald in water, 4 minutes. Chill and drain. Package and freeze immediately.

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**Winter Squash**

**Varieties**—For pies—Banana, Golden Delicious, and Greengold. For table use—Buttercup, Greengold, and Rainbow.

**Harvesting**—Pick fully mature squash, with shells hard enough so that thumbnail cannot be pushed through them. “Dry” types of squash are recommended.

**Preparation**—Wash and cut or break into fairly uniform pieces and remove seeds. Bake in oven at 350° F. or steam until tender. Cool. Scoop pulp from rind and mash or put through ricer. Pie mix may be prepared for favorite recipe, if desired, by adding milk, egg, sugar, and spices (except cloves) before freezing. Two or more varieties may be blended, or squash blended with pumpkin.

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**Tomatoes**

Whole tomatoes are not recommended for freezing. The texture changes considerably after freezing and thawing, although color and flavor are preserved. For best results, stew the tomatoes according to favorite recipe, but omit bread or cracker until preparing stew for serving. Cool tomatoes by partially submerging kettle in iced cold water. Pack in regular frozen food containers.

Uncooked tomato pulp may be frozen and stored for a few months.

**Ground Cherries (Husk Tomatoes):** Husk, scald 2 minutes, pack in sugar sirup, 3 cups sugar to 1 quart water.

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**Turnips**

**Varieties**—Purple Top, White Globe. 

**Harvesting**—Young, tender turnips.

**Preparation**—Remove tops and wash. Peel, slice, or dice (% inch).

**Scalding**—Scald in water, 2½ minutes. Chill and drain. Package and freeze immediately.

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**Mixed Vegetables**

Each vegetable should be prepared and scalded separately according to instructions. The vegetables may be frozen separately and mixed later after the pieces have been defrosted only enough to separate.

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**Vegetable Puree**

Scald as directed, cool, put through a puréer or chopper. Package and freeze.

---

**Table 3. Time Table for Cooking Frozen Vegetables in Covered Pan**

<table>
<thead>
<tr>
<th>Vegetable</th>
<th>Time after water returns to a gentle simmer</th>
<th>Vegetable</th>
<th>Time after water returns to a gentle simmer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asparagus</td>
<td>7 to 10</td>
<td>Kohlrabi</td>
<td>7 to 10</td>
</tr>
<tr>
<td>Green or Wax Beans</td>
<td>12 to 15</td>
<td>Lima Beans (Fordhook type)</td>
<td>10 to 12</td>
</tr>
<tr>
<td>Beet Greens</td>
<td>10 to 15</td>
<td>Lima Beans (Henderson type)</td>
<td>16 to 18</td>
</tr>
<tr>
<td>Broccoli</td>
<td>5 to 8</td>
<td>Mixed vegetables</td>
<td>6 to 10</td>
</tr>
<tr>
<td>Brussels Sprouts</td>
<td>4 to 8</td>
<td>Mushrooms (saute)</td>
<td>10 to 15</td>
</tr>
<tr>
<td>Carrots</td>
<td>7 to 10</td>
<td>Peas (except black-eyed)</td>
<td>5 to 7</td>
</tr>
<tr>
<td>Cauliflower</td>
<td>5 to 10</td>
<td>Soybeans (garden type)</td>
<td>8 to 12</td>
</tr>
<tr>
<td>Corn, whole kernel</td>
<td>4 to 6</td>
<td>Spinach</td>
<td>4 to 6</td>
</tr>
<tr>
<td>Corn on the cob</td>
<td>3 to 5</td>
<td>Swiss Chard</td>
<td>7 to 10</td>
</tr>
<tr>
<td>Kale</td>
<td>20 to 25</td>
<td>Turnip Greens</td>
<td>15 to 20</td>
</tr>
</tbody>
</table>

*Beets, winter squash, pumpkin and sweet potatoes have already been completely cooked and need only be heated to serving temperature.*
Table 4. Time Table for Cooking Frozen Vegetables in Pressure Saucepan

<table>
<thead>
<tr>
<th>Vegetable</th>
<th>Time</th>
<th>Vegetable</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asparagus cuts</td>
<td>1½</td>
<td>Cauliflower</td>
<td>½</td>
</tr>
<tr>
<td>Asparagus tips</td>
<td>½ to 1</td>
<td>Corn, whole kernel</td>
<td>½ to 1</td>
</tr>
<tr>
<td>Green or wax beans</td>
<td>1¼ to 2</td>
<td>Corn on cob</td>
<td>2⅔ to 3</td>
</tr>
<tr>
<td>Broccoli</td>
<td>1½ to 2</td>
<td>Peas</td>
<td>½ to 1</td>
</tr>
<tr>
<td>Carrots and Peas (mixed)</td>
<td>1 to 1½</td>
<td>Spinach</td>
<td>½ to 1</td>
</tr>
</tbody>
</table>

Cooking Frozen Vegetables

All vegetables can be cooked from the frozen state except corn on the cob, which should be partially defrosted. Vegetables frozen in a solid block may be allowed to defrost slightly so that individual pieces may be separated easily, but the vegetable itself should not be allowed to defrost. If you prefer, the solid block of vegetable may be put into the boiling water and separated with a fork after it has begun to thaw.

Do not overcook the vegetables—cook only until tender. Most of the vegetables have already been partially cooked (some completely) and therefore require less cooking time than fresh vegetables.

Cook the vegetables (except purees) in a small amount of water—about ½ cup is sufficient. Add salt to taste. Have the water boiling before adding the vegetable. Keep the heat high until the water returns to a boil after adding the vegetable, then reduce heat so that the water simmers gently for the remainder of the cooking time. Keep the cover on while cooking.

Cooking times given in tables 3 and 4 should be used merely as guides. The length of cooking time for the various cooking methods will vary with the variety of the vegetable, with the maturity, size of pieces, length of scalding time before freezing, and amount of defrosting before cooking. Follow instructions on the package for commercially frozen vegetables.

Serve the cooked vegetables immediately, while piping hot. If the vegetables are held warm or reheated, they lose valuable nutrients and attractiveness. Serve the cooking liquid with the vegetable or save it for soup stock.

Partially or completely defrost the corn-on-the-cob before cooking. Follow general cooking instructions. The cooking time should be very short because the ears were almost completely cooked during the scalding process. Serve immediately. Delay causes sogginess which gives the corn an unattractive appearance. For best results, a second serving should be cooked separately instead of being held in the hot water until ready to eat.

Other Methods of Cooking

Pressure saucepan: Add frozen vegetables to a small amount of boiling water in pressure saucepan and break apart with fork. Follow manufacturer's directions for use and length of cooking time, if given. Careful timing is necessary to prevent overcooking.

Oven cooking: Many vegetables may be seasoned, buttered, put into a covered casserole dish, and cooked in a 350° F. oven.

Double Boiler: Pureed or mashed vegetables may be warmed in the top of a double boiler. If vegetable seems dry, add milk or melted butter. Season to taste. Frozen vegetables may also be used in deep-fat frying, pan frying, creamed dishes, hot dishes, souffles, fritters, and soups—the same as fresh vegetables.
Fruit and Vegetable Juices...

Many fruit juices and a few vegetable juices may be frozen very successfully. Blends of different fruit juices offer an unlimited field for mixing juices (before freezing or after thawing) to suit individual tastes; for example: apple-plum, apple-cherry, or apple-raspberry.

Fruit juices should be completely thawed and then stirred before being served. The part that thaws first contains a large share of the soluble solids and if poured off, it may be too rich and the remainder too dilute.

Apple Juice

Apple juice blends well with almost all other juices. Some varieties of apples make better juice than others. If four to six varieties are mixed, however, the juice is likely to be of very satisfactory quality. Do not use the varieties Duchess (Oldenburg), Hibernial, Patten Greening, or Virginia.

The natural flavor of unpasteurized apple juice is best preserved during storage by the addition of $\frac{1}{2}$ teaspoon of pure ascorbic acid per gallon.

Raspberry Juice

Blends of purple and black raspberries or red and black raspberries produce the best juices. Sort and wash the berries; stir in 1 pound of sugar with each 10 pounds of fruit. Pack into earthenware crock or other suitable container, cover, and allow to freeze hard. Then thaw the unopened container at room temperature. Crush the thawed fruit, strain out the juice, and pour into containers for refreezing.

This method preserves the natural flavor of the juice better than any method using heat. It also yields more juice of better color than cold-pressing fruit without freezing. If the frozen berries are held until the apple season, the pulp left after pressing out the juice may be mixed with an equal quantity of apple juice. Heat to 145° F., and extract additional juice. After thawing, dilute with half the volume of light sugar sirup, or blend with twice the volume of apple juice.

Rhubarb Juice

This juice is most useful for diluting with equal quantities of water and blending with other fruit juices in proportions not over 25 per cent.

Harvest the rhubarb in the early part of the season. Later the stalks become tough and fibrous and hard to press. The red-colored varieties produce the most attractive juice. Wash stalks and cut into 4- to 6-inch pieces. Add 4 cups of water per 5 pounds, and simmer for a few minutes at 175°-180° F. Press while hot, and add $\frac{1}{2}$ cup of sugar per gallon.

Citrus Juices

It seldom pays to attempt the home-freezing of citrus juices now that high-quality concentrated frozen juices are on the market. It is difficult to retain high quality with single strength juices, except lemon juice. The latter may be frozen after adding one-half pound of sugar per pint of juice.

Do not keep thawed citrus juice, concentrated or diluted, in refrigerator longer than 48 hours.
Freezing Meats...

Much of the space in a home freezer or in a locker drawer is devoted to the storage of meat. Meat, like other products for freezing, has to be handled properly in order to retain its original fresh qualities and flavor.

Important steps in handling meat are:

Selection of Meat

Freezing will not change a tough steak into a juicy tender one.

The United States official grades of beef, veal, lamb, and mutton sold at retail are Prime, Choice, Good, and Commercial. Equivalent grades used by packers are AA, A, B, and C, respectively. If you are unfamiliar with meat grades and handling methods or if you lack proper facilities, it is wise to obtain the advice and services of an expert butcher or locker plant operator. Locker operators will slaughter, chill, cut, wrap, and freeze your meats for a reasonable charge. They will also smoke and cure your meats.

Slaughtering

Animals to be slaughtered should be kept comfortable and not crowded or excited. All animals bleed more freely, produce a brighter carcass, and are easier to dress if feed (not water) is withheld for 24 hours previous to slaughter.

Chilling and Aging

After slaughtering, the carcass should be hung where it will cool rapidly without freezing. Prompt and thorough chilling is very important to prevent spoilage and inferior quality in the meat. The proper temperature for a chill room is about 34° F.

It is desirable to have separate chilling and aging rooms so that incoming warm carcasses are separated from chilled carcasses. The usual temperature for an aging room is 34° to 36° F., with humidity of 85 to 90 per cent.

Cutting the Carcass

Instructions for cutting meat may be obtained from the Division of Animal Husbandry at University Farm, St. Paul. Tougher or less desirable cuts such as brisket and shank may be boned and cut into stew meat, or ground. Cuts with a large percentage of bones may be boned to conserve freezer space, save wrapping material, and lessen danger of the bones puncturing the wrapping. Removal of bones prior to freezing has no effect on the flavor or juiciness of the cooked meat.

Specify thickness of steaks, number of steaks or chops per package, and proportion of stew meat and ground meat desired. It is economical to remove the tail ends of T-bone and porterhouse steaks (often wasted) and use them in the ground meat. Chops and steaks should be at least ¾-inch thick for broiling.

Wrapping

Use good wrapping material, especially for ground meat. Consult pages 4-7.
Yield of Meat

Front quarters are more economical in price and yield. Choice and lower grades will yield about 90 per cent of their weight in retail cuts and ground beef. Prime and Choice hind quarters yield about 75 per cent; a grade of Good or lower yields about 82 per cent of the wholesale cut.

Meats for Freezing

Beef

Hind quarters of good quality may be aged at 34° to 36° F. for 10 to 12 days after slaughtering; front quarters only 6 to 7 days. Beef of commercial grade or lower should be aged for only 5 to 6 days after slaughtering. Beef may be aged longer for persons desiring the "aged" flavor, but this greatly reduces the storage period at zero and causes larger weight losses in trimming.

As the storage period lengthens, the aging period becomes less of a factor in making the meat tender. This is because zero storage, over a period of several weeks or longer, has a tenderizing effect.

Meat should not be purchased for freezing if the chilling and aging period has been much longer than recommended, except in cases where the meat will be held at zero for only a relatively short period.

Pork

A hog carcass is hung whole and chilling requires about 24 hours at

Table 5. Approximate Yield of Edible Meat

<table>
<thead>
<tr>
<th></th>
<th>Live Weight</th>
<th>Dressed Carcass Yield before Cutting</th>
<th>Packaged Meat Yield after Cutting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>750</td>
<td>410</td>
<td>325</td>
</tr>
<tr>
<td>Pork</td>
<td>225</td>
<td>180</td>
<td>130</td>
</tr>
<tr>
<td>Veal</td>
<td>200</td>
<td>110</td>
<td>90</td>
</tr>
<tr>
<td>Lamb</td>
<td>90</td>
<td>45</td>
<td>35</td>
</tr>
</tbody>
</table>

* Per cent of original live weight. Lower yields may be expected from some top grades of beef.
† Per cent of dressed carcass. Lower yields may be expected from some top grades of beef.
‡ Not including about 35 pounds of lard.
34° F. To speed cooling, the body cavity should be opened and leaf fat pulled loose from the pork carcass and left attached to the ham. Failure to chill promptly to 38° F. at the ham bone is likely to result in bone souring and spoilage in the pickling process. Pork should be cut, packaged, and frozen as soon as it is chilled to the bone. Never hold chilled pork longer than 3 days after slaughtering.

Fish oil or fish meal included in the rations fed to hogs may be expected to accelerate the development of rancidity during storage.

**Ham and Bacon**

The length of time ham and bacon can be kept at 0° F. depends to a great extent on how well the fresh meat was handled and on the method of curing and smoking. Ham and bacon generally do not keep as long as fresh pork. It is not recommended that these meats be sliced before freezing, because this shortens the storage life considerably. Ham and bacon bought over the counter, unless freshly cured, may have a very short storage life at zero.

**Sausage**

The most satisfactory method is to use a seasoning containing an antioxidant and wrap the sausage in aluminum foil or other equally good wrapping. This type of seasoning is obtainable at locker plants. Sausage handled in this way will keep at least 4 to 6 months. Otherwise, satisfactory storage is limited to about 3 months for unseasoned sausage and a month or less for seasoned sausage. Smoked sausage has a longer storage life than unsmoked sausage, other factors being equal.

Bologna does not freeze very satisfactorily because of change in texture.

**Lard**

Lard should be rendered and may be packed in metal containers or wrapped in grease-proof packaging materials.

**Veal, Lamb, and Mutton**

These carcasses are also hung whole during the chilling period and require about 10-16 hours to reach an internal temperature of 38° F. Veal should be processed for the freezer as soon as it is chilled to the bone. Lamb and mutton may be held for an aging period of 4-7 days after slaughtering.

**Big Game Animals**

Handle these animals much the same as beef. Bleed, dress, and cool the carcass immediately after killing. Clean blood from cavity. If weather is warm, sprinkle cavity with pepper to keep flies away. Trim parts damaged by gun shot. Hang carcass in cool, breezy place until well chilled. Sometimes it is desirable to spread the ribs apart with a stick to allow cold air to circulate.

Usually the hide should not be removed because it helps to protect the meat from contamination. In some states during warm weather, however,
it is necessary to skin antelope promptly after killing to prevent spoilage. If the carcass is to be moved over dusty roads or otherwise exposed to contamination, wrap it. If in good condition, age the meat 5 to 6 days. Otherwise, cut, wrap, and freeze at once.

Cooking of Meats

Defrosting

Whether the meat is defrosted or not before cooking makes little difference in the taste or juiciness of the cooked meat. Thin steaks, chops, and cutlets are often cooked from the frozen state with no previous thawing, while thick steaks and roasts should be at least partially defrosted to permit uniform cooking and shorten cooking time. Ground meat must be completely thawed before it can be made into patties.

Cutlets, liver, or any meat that will be dredged or dipped before cooking should be at least partially thawed.

Meat should be defrosted in its original wrapping material and cooked soon after thawing. It may be defrosted in a refrigerator or at room temperature. Thawing will be hastened if the package is placed in front of an electric fan. Do not thaw meat in water. However, meat may be thawed rapidly in water if the wrapping is watertight.

Cooking

Completely defrosted meats are cooked the same as fresh meats. Frozen or only partially thawed meats require a longer cooking time because the meat has to both thaw and cook. Roasts will require an additional 10 to 15 minutes per pound.

Roasts should be cooked, without searing, in a moderate oven (300°-350° F). The pan should be left uncovered and no water added. A meat thermometer is recommended to give the exact stage of "doneness" of the meat, especially for frozen meats.

Pork should be cooked until well done or to an internal temperature of 185° F. Beef, lamb, and mutton may be cooked to the desired stage of "doneness." Broiling should also be done at a temperature of 350° F. Panbroiling of frozen meats should be started at a low temperature until the meat is thawed. A high temperature should not be used to "hurry" the meat along. Otherwise the outside may be brown before the center has begun to cook.

Poultry and Game Birds

Select young, healthy, well-finished birds. It is not necessary to starve the birds for 24 hours before killing (to allow the crop and intestines to be emptied) when they are drawn before freezing. This permits good bleeding and easier drawing and improves the flavor of the meat. Preferably, birds should be drawn. If birds are not to be drawn, however, they should be starved. Do not use feed containing fish oil or meal for at least two weeks prior to killing as this may give the meat a fishy taste.

Killing may be done by beheading, dislocating the neck, or sticking. To insure proper bleeding, hang the bird by the legs, no matter which method is used. If the bird is killed by beheading, hold the bird by the legs until bleeding and fluttering cease. Bruising will result if the bird is allowed to flop.

Plucking should be done while the bird is still warm. Loosen the feathers of fowl and turkey by completely submerging the bird (except for feet) for about 30 seconds into water at 125-129° F. Test looseness of the feathers by pulling a few during this process. The temperature of the water and
FREEZING FOODS

FIG. 18. Twine is used to truss chickens for freezing. The neck is folded under the wings to make a smooth, compact surface.

Length of dipping depends on the age of the bird. The lowest temperature and shortest time is required for the young birds. Wing tips may be removed at the joint with a knife. Hairs may be singed off over a gas flame or by other suitable means.

If possible draw and wash the bird while still warm. Remove body heat quickly. This will require 2 to 3 hours or longer. Crushed ice is best (1 pound per pound poultry); or chill in ice-cold water or cold moving air. Freeze the bird as soon as chilled. Aging will not improve tenderness. Freeze birds whole, split, or cut up. Older birds are more flavorful for creamed frozen dishes.

Wrap birds in good wrapping material. Wrap giblets (except livers) separately and use within 3 months. Wrap livers in separate package, and use within 6 weeks. It is best to store birds no longer than 9 months. Poultry stuffed before freezing should be used within 2 months.

Young birds sometimes develop darkened bones as a result of seepage of hemoglobin from marrow. The defect is visual only; it does not affect flavor.

Ducks, Geese

Handle much like other fowl. Scald domestic birds at $145^\circ F.$ for 2½ minutes, with ¼ cup vinegar added per 10 gallons. Wild birds usually are plucked dry without scalding.

Game Birds

Game birds are handled in much the same way as poultry. Remove body heat as quickly as possible. Birds should not be heaped together. If possible, space to allow for air circulation and quicker cooling. Birds should not be piled or sacked in a car trunk any longer than is necessary, because deterioration is rapid under such conditions. Scald pheasants at $155^\circ-160^\circ F.$ Birds may be frozen at a locker plant before returning from a long trip.

Defrosting and cooking poultry and game birds: Partially or completely defrost the birds in their original package at room temperature or in a refrigerator. A 3-pound bird requires about 15 hours to defrost in a mechanical refrigerator. Whole birds may be thawed faster in cold water.
Fish

Because fish deteriorates rapidly, it should be frozen soon after being caught. If this is not possible, pack the fish in crushed ice or place in the refrigerator. Prepare fish for freezing the same as for table use. Scale, eviscerate, remove head and fins, wash thoroughly, and drain. Freeze small fish whole. Fillet or steak large fish. Dip fillets and steaks from lean fish in a cold salt brine (½ cup salt to 1 gallon water) for 30 seconds to reduce leakage in thawing.

Most fatty fish, including lake herring, lake trout, and especially pink salmon, become rancid rather quickly when stored at zero. A temperature of −10°F is much better. The best temperature for long storage periods, however, is −20°F. Store fish near the bottom of a chest-type home freezer where temperatures are coldest.

Storage qualities of fatty fish will be improved if the cut pieces are dipped for 1 minute in a solution of ascorbic acid (3 teaspoons of ascorbic acid to 2 quarts of cold water, or about ¼ ounce ascorbic acid in one gallon water). Whole fish may be glazed in a similar solution. The cost of this treatment is relatively high, although the cost may be reduced to a minimum by dipping a number of lots in a small amount of the same solution. A more economical method is to paint the entire surface of the fresh or frozen fish with ascorbic acid solution made by dissolving ½ teaspoonful in ½ cup of water. Use pastry brush.

Package fish in aluminum foil or equally good wrapping material.

Defrosting and cooking fish: Partially or completely defrost fish in original wrapping material. If defrosted in a refrigerator, there will be less drip from the fish. Cook fish while it is still chilled. Prepare the defrosted fish the same as fresh fish, but allow additional cooking time at a lower temperature if the fish is only partially defrosted.

Shellfish

Shellfish are very susceptible to spoilage and should therefore be processed and frozen at or near the original source of supply. Frozen shrimp, however, may be cooked and refrozen. Do not store cooked peeled shrimp longer than 2 to 3 months; cooked unpeeled shrimp no longer than 4 to 6 months. Shrimp cocktail or shrimp creole may be frozen and stored for about 6 weeks.
Dairy Products...

Butter
Freeze freshly-made creamery butter. Wrap in good packaging materials even if previously wrapped in parchment. Do not freeze butter made from unpasteurized cream because it may become rancid during storage.

Hard or Semi-hard Cheese
Most types of hard cheese such as cheddar and semi-hard brick cheese freeze satisfactorily. Wrap in good packaging materials. Freeze rapidly in small packages to avoid crumbling.

Cottage Cheese
Creamed cottage cheese loses quality when frozen due to change in texture. The curd from pasteurized skim milk may be washed, lightly salted (but not creamed) and frozen. Use about ½ the amount of salt needed for the finished creamed product.

Cream
Heavy pasteurized cream containing not less than 40 per cent butterfat may be frozen. For best results, add about 10 per cent sugar by weight before freezing, and store at 10-15° below zero. Do not store at 0° F. for over 3 months. The freezing of household cream is not recommended.

Ice Cream
For top-quality desserts, ice cream should not be stored longer than about three weeks if in original containers.

Milk
Pasteurized homogenized milk may be frozen and stored several weeks at zero or about four months at −10° F. Flavor retention is improved by adding ½ teaspoon ascorbic acid per 10 quarts.

Eggs
Eggs should be broken for freezing, preferably after cooling them to about 32° F. Egg whites or yolks may be frozen separately or mixed. Egg whites need no treatment. Beat mixed whites and yolks slightly before freezing. When yolks are frozen separately, beat them slightly and add either 1 tablespoon light-colored corn sirup or ¾ teaspoon salt per cup. The sweetened yolks are better for general cooking and baking, the salted yolks for mayonnaise or other special uses. Dirty eggs should be rinsed in warm water and dried without wiping before being broken. Before pouring each egg into the mixing bowl, break into a small dish to be sure that it has no stale odor.

Surplus egg whites that sometimes accumulate from feeding yolks to infants may be frozen and stored until needed.

Frozen eggs should be used promptly after thawing. Do not allow to stand in refrigerator over 12 hours.

The following proportions should be followed for correct measurement:
1½ tablespoons yolk—1 egg yolk
2 tablespoons whites—1 egg white
3 tablespoons yolks and whites—1 egg
Ready-To-Eat Foods...

Many cooked foods such as chow mein, chili, baked beans, stew, and chicken ala king may be frozen ready to serve except for heating. Baked foods such as cakes, cookies, and rolls may also be frozen ready to serve except for thawing and, in some cases, heating. In fact, freezing is the only method of preserving some of these foods. All cooked foods do not freeze successfully, particularly egg whites.

Cooked Foods

Combination dishes and soups which require a long cooking period can be cooked in larger quantities than usual. Then cool, freeze, and store away for future use. You will save time because the heating time for these foods is only a small fraction of their original cooking time. Most soups freeze well.

All types of cooked foods should be packed as solidly as possible to avoid air spaces in the container. Gravy and sauces are desirable with meats and vegetables as they fill air spaces.

Do Not Overcook—Vegetables should be only partially cooked, or the subsequent freezing and heating will make them mushy and unattractive. If completely cooked before freezing, they develop a warmed-over flavor when heated. For stew, add the vegetable when the meat is nearly cooked. Do not overcook dishes containing meat. Meat should be tender, but firm.

Keep the saucepan covered during the entire cooking period. Simmer; do not boil. Before the food is completely cooked, the amount to be frozen should be taken from the saucepan, cooled, properly packaged in containers, and frozen immediately.

Cooling and Freezing—Cool the cooked foods promptly to prevent continued cooking. Loss of flavor occurs rapidly when foods are held at high temperatures. Warm foods are excellent media for the growth of bacteria. The temperatures between 130° F. and 68° F. are most conducive to spoilage. It is important, therefore, that foods which have been heated to these temperatures be cooled rapidly.

Large quantities of food are difficult to cool rapidly. To hasten cooling, partially submerge the saucepan of cooked food in a large pan of ice water until the food is cooled. Stir occasionally with a fork, being careful not to mash or break up the food. Keep the saucepan covered to reduce loss of aroma and to prevent contamination.

After cooling, package immediately. Label and date. Place in freezer and store at 0° F. or colder.

When metal containers are used, the food may be packed hot and the filled container cooled promptly in water.

Heating the Cooked Foods—The heating process completes the cooking. Heat the food in a covered saucepan, with a small amount of melted butter or fat in the bottom of the pan, place in a double boiler, or put in a covered casserole dish and heat in a moderate oven. Creamed dishes, stews, creamed soups, and similar dishes which scorch easily should be reheated in a double boiler, allowing 20 to 30 minutes. If necessary, break up large clusters of the frozen foods with a fork, but keep stirring at a minimum. Heat rapidly to prevent unnecessary loss of flavor.
and aroma. Do not overcook. Prolonged heating will change the texture and cause a greater loss of vitamins. Serve foods immediately after cooking.

**Storage Life** — Do not overestimate your needs. A rapid turnover is the secret to success because many of these foods lose their distinctive flavors after 2 to 3 months of storage unless held at a temperature of -10° F. or lower.

Differences in the quality of fat used greatly affect the length of time that many cooked foods may be stored.

The ingredients for most cooked dishes can be purchased the year round, so there is little reason for using limited freezer space by stocking up with an abundant supply.

**Roasted and Fried Meats**

Left-over roasted meats such as beef, pork, ham, chicken and turkey with dressing and gravy, and Swiss steak covered with gravy freeze satisfactorily. Fried foods are the least desirable for freezing because they are likely to become rancid after relatively short storage, and when heated they develop a warmed-over flavor. Meat loaf may be frozen, either cooked or uncooked.

**Gravies, Sauces, and Stews**

Fat has a tendency to separate in gravies, sauces, and stews, but is usually recombined during heating. Gravy keeps best when most of the fat is drawn off and part of the thickening is added when reheating.

Thickened sauces and gravies have a tendency to become thicker with freezing but may be thinned at time of heating. Dishes containing large amounts of milk tend to curdle or separate during thawing but generally recombine when heated. The addition of cheese to sauces has a slight curdling effect.

**Macaroni, Spaghetti, and Rice**

Macaroni, spaghetti, and rice dishes may be frozen. However, the meat and sauce combinations for such dishes as Italian spaghetti, Spanish rice, and chow mein may be frozen separately and the other ingredients added freshly cooked at the time of serving.

**Potatoes**

Potatoes become mushy and grainy when frozen in stew, so it is best to add them at time of heating. Whipped and stuffed-baked potatoes, however, make tempting frozen products. Add about 3 tablespoons of butter to each pound of potatoes, milk as needed, and season with salt and pepper. For variety, a 3-oz. package of cream cheese may be combined with the whipped potato, or grated cheese or paprika may be sprinkled on top. The stuffed potato may be browned slightly under broiler.

French-fried potatoes freeze best when cut very thin. Reheat in oven.

**Baked Beans**

Baked beans freeze and store well if the salt pork is fresh.

**Seasonings**

Because the flavors of cloves and garlic become stronger during storage, these seasonings should not be added before freezing. Onions gradually lose flavor. Nutmeg, cinnamon, and sage show little change in strength; green peppers and pimientos increase.

**Left-overs**

Freezing simplifies the problem of what to do with left-overs. Do not allow food to stand around before freezing, but cool and freeze immediately. Store for only a couple of weeks. Left-overs are likely to have a warmed-over flavor when heated because they have been completely cooked. Glass jars are particularly useful for left-overs.

**Gelatin Dishes**

Gelatin, unless whipped, becomes pebbly and tends to "weep" on thawing.
Baked Foods

Pies

It takes little extra work to make five or six pies instead of one or two. Although a frozen pie crust is not quite as flaky as that of a fresh pie, it runs a close second place.

Pies Suitable for Freezing—Fresh fruit pies; vegetable pies such as squash, pumpkin, and sweet potato; mince pies; and chiffon pies freeze successfully. With chiffon pies, always include egg white or whipping cream, depending on the recipe used, to prevent “weeping” on thawing. Most custard pies do not freeze successfully. Meringue toppings tend to toughen, shrink, separate, and stick to the wrappers. Baked and unbaked pie shells and graham cracker shells may also be frozen. Meat pies are excellent for freezing.

Freezing Pies—Pies may be frozen baked or unbaked. Both methods are satisfactory; however, the lower crust of the unbaked pie may absorb juices from the filling and become quite soggy. Deep dish pies may be frozen, thus eliminating the problem of a soggy bottom crust.

If frozen fruit is used in unbaked pie, thaw and drain off the excess juice. Use only a small amount of the liquid; or thicken the excess juice. Cool quickly and pour over the fruit. Fill the pie and freeze immediately. If canned fruit is used follow a similar procedure. Do not vent the top crust of an unbaked pie until ready to bake.

Frozen baked pies are prepared the same as fresh pies. If frozen fruit is used, thaw and drain off a small amount of the excess juice. Then proceed as you would using fresh or canned fruit.

Cool a baked pie rapidly, then place the unwrapped pie in the freezer. Both baked and unbaked pies freeze faster unwrapped, and they are easier to wrap after freezing. Keep pie level while freezing. Before wrapping, place another pie plate over the top to protect the crust.

Thawing Pies—When ready to use, place the unbaked pie in a pre-heated oven while still frozen. Bake at 425 to 450°F. for 15 to 20 minutes; complete baking at 350°F. The baked fruit or vegetable pie may be allowed to stand at room temperature for a short time, but put it in a 350°F. oven before it begins to thaw, and heat until just warm. Do not reheat chiffon pies.

Freezing Pie Mixes—Frozen pies are bulky, so where freezer space is limited, it is wise to package special pie mixes in frozen food containers. A pint container holds about the right amount for an 8-inch pie.

Ingredients for squash, pumpkin, and sweet potato pies including the milk, the thickening agent, sweetening, eggs (if needed), and spices (except cloves) may be mixed together and frozen. When ready to use, partially thaw in the original container. Add other ingredients (if necessary) and pour into pastry-lined pie plate.

Storage—Varies with the filling. Usually best not to store over 5 weeks, but some pies may be stored much longer.

Cakes

Most cakes and cup-cakes may be frozen satisfactorily. The cakes may be baked on a “slack” day and then frozen and stored until needed. If cake batter is frozen, the results are quite uncertain because the batter may lose some of its rising capacity during freezing and thawing. Also, it is simpler to thaw out a baked cake than to thaw out the batter, then bake, and then cool the cake. From the standpoint of time, work, and quality of the finished product, cakes baked before freezing are more practical.
Freezing Baked Cakes—Completely cool the baked cakes before packaging. The type of wrapping material is not as important for cakes to be eaten within a couple of days as it is for cake that is to be stored for a longer period. For long storage periods, package in moisture-proof materials. If desired, package in "family-size" pieces. Label and date. Cakes do not freeze solid. After wrapping and freezing, place the cake in a metal container or heavy carton to protect from being crushed.

Frostings and Fillings—For best results, do not frost or fill cakes before freezing. Some frostings do not freeze satisfactorily, and fillings tend to make the cake a bit soggy. Frostings made with confectioner's sugar and fat are among the most satisfactory. Boiled frostings freeze well but are difficult to wrap as the frosting has a tendency to stick to the wrapper. One method of eliminating some of the sticking is to freeze the cake before wrapping, or to insert toothpicks around the top of the cake to prevent contact of the frosting with the wrapper.

Thawing Baked Cakes—Thaw baked cakes in their original wrappings to prevent formation of moisture on the surface of the cake. A large cake will thaw in about two hours at room temperature. If quicker thawing is desired, the time may be reduced about one third by thawing in front of an electric fan. Or quicker still, thaw in a 250° to 300° F. oven for a very short time. Watch closely so cake does not dry out. Do not thaw frosted or filled cakes in the oven.

Storage Life — When properly wrapped, baked cakes remain in top condition about 1 to 2 months. Fruit cakes may be stored considerably longer.

Cookies

Freeze cookies baked or unbaked, whichever you prefer. Both methods will produce excellent results.

Freezing, Defrosting, and Baking Cooky Dough—Freezing the cooky dough is considered the simplest method. It takes up much less freezer space, but of course requires more work after freezing than baked cookies do. Shape dough for freezer (refrigerator) cookies into a roll of desired diameter. Wrap in locker paper and freeze. When ready to use, remove from freezer, slice with a sharp knife.
Place on greased cookie sheet and bake in usual manner. Or, if you desire, chill the dough for several hours in refrigerator and slice into cookies before freezing. Package the unbaked cookies in layers in frozen food containers. Separate each layer with two sheets of waxed paper. Keep layers at a minimum to avoid crushing. When ready to bake, place the frozen unbaked cookies on a greased cookie sheet. Bake.

Pack drop-cookie dough in frozen food containers. When ready to bake, thaw dough until soft enough to drop by spoonfuls onto greased cookie sheets. Cooky dough frozen in pans may be slipped into the oven without previous thawing. The layer of dough is so shallow that it will thaw out rapidly in the oven. Bake in usual manner. If dough is packaged in containers, thaw until product can be easily transferred into baking pan.

**Freezing Baked Cookies**—Cool the cookies after baking. Package in frozen food containers, cooky jars, or canisters with tight fitting covers.

**Thawing Baked Cookies**—Thaw cookies in original containers. The thawing period will be very short.

**Length of Storage**—Cookies and cooky doughs may be stored 6 to 12 months.

**Yeast Breads and Rolls**

Bread and rolls may be frozen baked or unbaked. If the proper methods of packing, freezing, and storing are followed, baked rolls will be just as light and tender after freezing as they were before. If unbaked rolls are put into the freezer, the results cannot always be predicted. Unbaked dough may lose some of its rising capacity after being frozen and thawed, and texture may be tougher and volume smaller. Brown 'N' serve rolls may be frozen and stored for a few weeks. Wrap well.

**Freezing Baked Rolls and Bread**—Use your favorite plain or sweet dough recipe and bake in your usual manner. After baking, remove from pans and cool to room temperature. Wrap in moisture-proof material. Polyethylene bags are excellent for this purpose.

**Thawing and Heating Baked Rolls**—Heat rolls in oven at 250° to 300° F. for about 10 to 15 minutes.

**Thawing Baked Breads**—Thaw in original wrapper at room temperature. Bread thaws in a short time because of its relatively low moisture content. Slices of frozen bread may be put into the toaster without thawing.

**Storage Life**—Do not store baked products longer than about 3 months.

**Freezing Shaped or Bulk Dough**—Allow dough to rise until double in bulk. Shape into rolls, rings, and loaves or freeze in bulk form. The shaped product will take the least amount of preparation when you are ready to bake it. Freeze bulk dough flat—about 1 to 1 1/2 inches thick—for quicker freezing and thawing. Grease all surfaces. Package in moisture-proof wrappings or containers. Place two sheets of locker paper between layers.

**Thawing Dough**—When ready to use, allow dough to thaw in a warm, moist place away from drafts. Thaw frozen bread dough in the wrapper to prevent surface drying which may result in streaks in the baked loaf. Shape bulk dough and let rise. Place shaped rolls in greased muffin pans and shaped loaves in loaf pans and allow to thaw and rise in a warm, moist place. Bake.

**Storage Life**—Do not store unbaked dough longer than 2 to 4 weeks.

**Quick Breads**

Quick breads such as baking powder biscuits, muffins, and nut breads may
be frozen baked or unbaked. The results will be similar to those for yeast breads.

Freezing and Thawing the Baked Quick Breads—Cool and package the same as yeast breads. Freeze immediately. When ready to serve, thaw in original wrappings at room temperature, or warm in a 250° to 300° F. oven. Waffles may be frozen; thaw and heat in an electric toaster.

Storage Life—Do not store baked quick breads longer than three months.

Freezing and Thawing the Unbaked Product—Freeze batters in baking pans and overwrap with moisture-proof paper. When ready to bake, thaw at room temperature, but do not allow batter to stand around before baking. Bake in usual manner. Freeze cut baking powder biscuits in frozen food containers. Partially thaw before baking.

Storage Life—Do not store longer than about two to four weeks.

Sandwiches

Sandwich Fillings—The following are suggestions for sandwich fillings and spreads. Use them separately or combine them with very small amounts of mayonnaise, salad dressing, cream cheese, or creamed butter to make spreading easy. Luncheon meats, leftover sliced roast beef, roast pork, baked ham, chicken, turkey, dried beef, tuna, salmon, sliced cheese, cheese spreads, hard-cooked egg yolks, and peanut butter make good fillings. Add sliced or chopped olives, and chopped dill or sweet pickles to any of these. If desired, fillings and spreads may be frozen separately in frozen food containers for later use.

All sandwich spreads do not freeze satisfactorily. Jelly, mayonnaise, and salad dressings used as spreads soak into the bread. Hard-cooked egg whites develop off-flavors and change in texture. Do not freeze lettuce, celery, tomatoes, and carrots. Add these to the lunch after it has been taken from the freezer. The lettuce and tomatoes may be slipped into the sandwiches at the time of eating. Frozen slices of bread may be used to make sandwiches.

Party Sandwiches and Hors d'Oeuvres—Fancy party sandwiches and hors d'oeuvres can also be frozen. Although the fillings and spreads will be different from those used in lunch sandwiches, the rules for making, packaging, freezing, and storing are the same.

Packaging—Wrap lunch sandwiches separately in good wrapping material. Pack party sandwiches in layers with two sheets of waxed paper in between. Pack the sandwiches in containers for protection from crushing. Label and date.

Length of Storage—The storage life for most sandwiches is about three weeks. Do not refreeze sandwiches.

Frozen Foods for Lunches

During the fruit season, freeze sauce and juice in individual half-pint frozen food containers to add vitamins and variety to the lunch box. Pack complete lunches including foods such as sandwiches, sauce, juice, cakes, and cookies. Pack similar foods in one box and make up the individual lunches as needed, or pack the individual lunches separately and place in freezer. Pack in boxes for protection from crushing. Label and date.

Thawing the Lunches—The lunches will be completely thawed in three to four hours at room temperature. Thawed lunches are more appetizing because the sandwiches will be fresh and not soggy. The baked foods will be moist and fresh. The sauce or juice will be refreshingly cool. Sandwiches should be eaten soon after thawing to prevent spoilage.
HOME FREEZERS are gradually becoming an important part of modern household equipment. They make possible more extensive use of frozen cooked foods, ice cream, frozen leftovers and other items for which a special trip to the locker plant would not be practical. These items play an important role in saving money and time for the homemaker. A home freezer is especially useful for freezing small lots of fruits and vegetables without delay.

It is desirable to ground the metal case of a freezer kept in a basement.

A space of at least 1 inch should be left at the top of chest type home freezers, because it is difficult or even impossible to keep the top packages at the desired temperature when the storage space is overcrowded. See page 13 for amount of food that may be stored per cubic foot.

### Size—Power Used

Most people buy units with too little storage space. For a rural family at least 5 cubic feet of storage space should be allowed for each person if all the frozen food is to be stored at home. Farm families can use as much as 8 cubic feet per person if maximum use of frozen foods is made. Those who use a home freezer to supplement a rented locker will need less storage space at home. In fact, the use of a home freezer together with rental of a locker at a good locker plant is an excellent combination.

In general, non-rural families who use any appreciable quantity of frozen food find that an 8 to 12 cubic-foot size fulfills their *minimum* need for space. Some families prefer a small home freezer in the kitchen and a larger unit elsewhere in the house where more space is available.

Electricity used varies considerably. Average use per month shown below (less may be expected in cool locations):

- 6 cu. ft. size........ 50 kw-hrs.
- 12 cu. ft. size........ 90 kw-hrs.
- 18 cu. ft. size........ 110 kw-hrs.

### Defrosting

Scrape off accumulated frost as soon as it becomes about one quarter of an inch thick. This operation may be necessary 2 to 3 times a year. First, clear a space by moving packages to other parts of the freezer. Lay a piece of paper on the bottom and scrape off the frost onto the paper, using a stiff-bristled brush or smooth wooden or plastic paddle. Do not use a metal scraper. Do not shut off electricity.

After long intervals it may be desirable to defrost the freezer, to melt ice which cannot be scraped off, or to remove sirup or other food that may have leaked or been spilled. In cold weather, the food may be placed outdoors during defrosting. Or it may be piled in a heap and covered with a heavy blanket. Thawing of frost may be hastened by placing a fan or pans of lukewarm water in the freezer as soon as the electricity has been shut off. When thawing is completed wash the inside with warm baking soda solution (3 tablespoons baking soda to 1 quart water). Wipe dry, and turn on the electricity. Replace the food only after any remaining moisture inside has frozen, so that packages will not stick to the lining.
Power Failure

Keep the cabinet closed in the event of power failure or mechanical breakdown. Relatively little thawing is likely to occur during the first 12 to 20 hours if the freezer is fairly full of food stored at about 0°F.

If the shutdown of power is likely to continue for longer than 12 to 20 hours, the frozen food should, if possible, be moved to a locker plant or other place where low temperature storage is available. Most locker plants will provide this service in an emergency. If much of the food thaws out, the freezer might not be capable of refreezing a large quantity of food before spoilage starts.

Dry ice may be used to prevent thawing. A 50-pound cake of dry ice placed in a freezer fairly soon after power failure will prevent thawing of the food for 2 to 3 days. Do not fasten the freezer cover with clamp or lock when dry ice is used.

Records indicate that in large-size freezers filled with frozen foods, it may take 50 hours or more for food in the top layer and 85 hours or more for the rest to reach 32°F.

Refreezing Foods...

DEFROSTED FOODS should not be eaten or refrozen after they have passed through slow temperature changes and reached 50°F in a home freezer after power failure. The time required to reach this temperature, however, is much longer than most people imagine. In large-size freezers fairly full of food it usually takes several days. Packages that still contain some ice crystals may be refrozen without risk.

Any risks that may be incurred arise from the fact that thawed foods spoil faster than fresh foods and thus thawed foods may spoil before being refrozen. Refreezing, itself, is not harmful. In fact, it is not uncommon practice in the home, if the need arises, to refreeze for short periods small packages of meat or other foods that do not toughen or lose texture on refreezing.

MEATS, POULTRY, FISH

If the product temperature has remained below 45°F, the food is probably still in good condition. Incipient spoilage usually can be detected by color and odor. Thawed meats and cut poultry lose some juices.

Shellfish

Oysters and other shellfish spoil quickly and it is difficult to determine by odor or appearance whether they are dangerous to eat. For this reason, it is unwise to refreeze shellfish that have completely defrosted.

FRUITS

When fruits start to spoil they ferment. This destroys their flavor but does not make them dangerous to eat. Thawed fruits may be refrozen, and if it is found that table quality has been impaired they can be made into jams, jellies, and preserves. Thawed fruits usually shrink to some extent and some will become mushy.

VEGETABLES

Thawed frozen vegetables spoil sooner than fresh vegetables. For this reason, it is unwise to refreeze vegetables that have become completely defrosted, unless the product temperature has remained below 45°F. Thawing and refreezing will toughen some vegetables, especially peas.

FRUIT JUICES

Fruit juices may be refrozen with little or no change in quality.
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