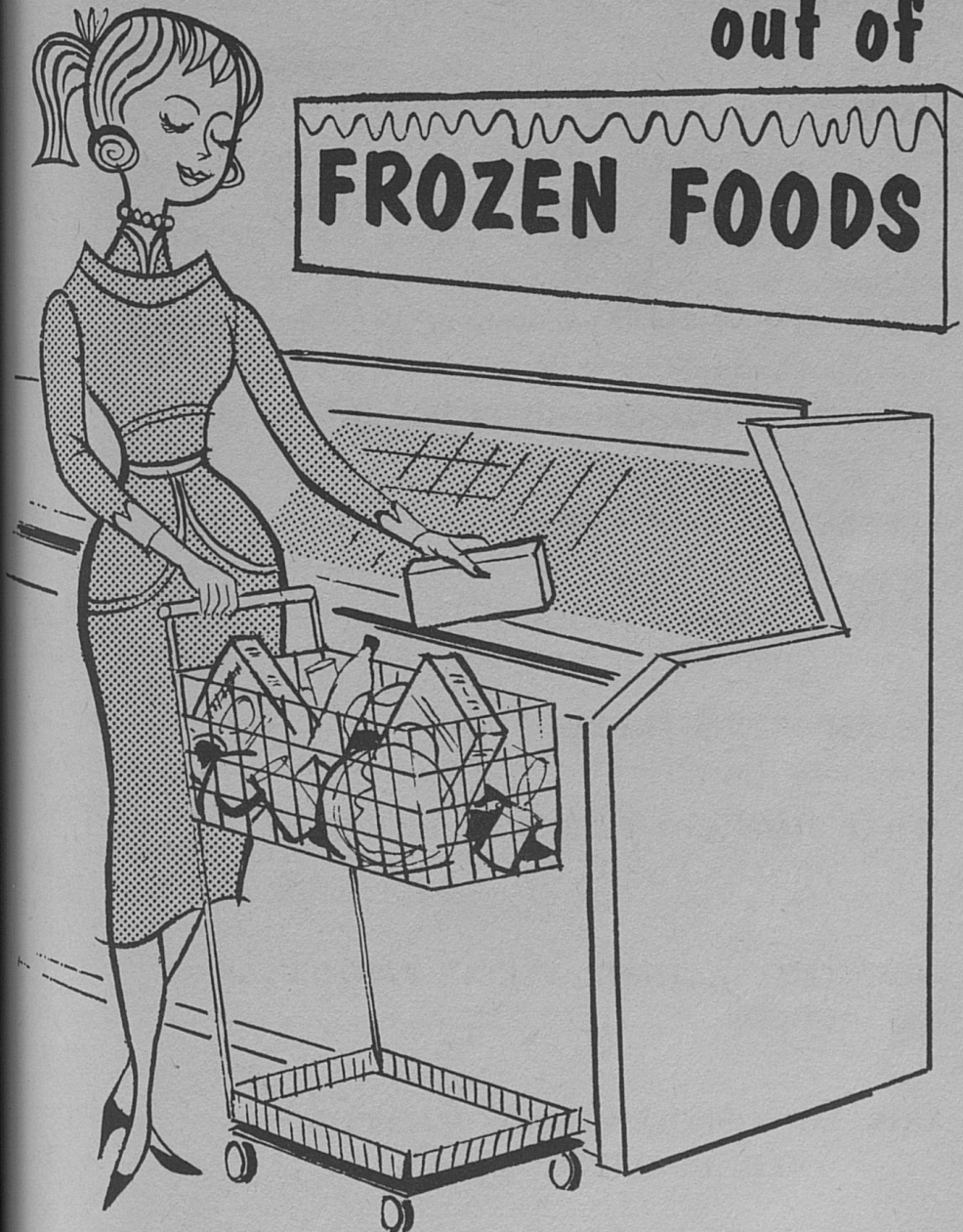


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getting the most out of

FROZEN FOODS



*(A reprint of Leaflet C-12 of the New England Extension Services
Marketing Education Program)*

**UNIVERSITY OF KENTUCKY
COOPERATIVE EXTENSION SERVICE
AGRICULTURE AND HOME ECONOMICS**

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THIS PUBLICATION is designed as a guide for consumers in the selection, storage, and care of frozen foods. It contains an explanation of the important effects of time and temperature on quality, guides for selection of frozen foods at the retail store and suggestions on their care after purchase. Tables indicating storage life for various foods are included.

Much of the material in the publication is based on results of research by many people and organizations, including that done by the Western Utilization Research and Development Division, Agricultural Research Service, United States Department of Agriculture.

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MANY FOODS AVAILABLE IN FROZEN FORM

Frozen foods are popular. They provide convenience, value and diversity in meals, and are increasing in supply and variety

More than one thousand different frozen food items are being produced commercially. They include fruits, vegetables, fruit juices, meats, poultry, fish, shellfish, ice cream and other dairy products, a variety of baked goods, and many cooked and partly cooked foods and food combinations.

Of all frozen foods, those sold in greatest volume include orange juice concentrate, peas, strawberries, French-fried potatoes, pot pies, snap beans, lima beans and dessert pies.

Prepared foods which are sold in frozen form range from hors d'œuvres to desserts. They include complete dinners of many kinds. Of the prepared foods, those sold most widely are French-fried potatoes, poultry, meat pies, fish sticks and dessert pies.

FROZEN FOODS NEED SPECIAL CARE

The introduction of frozen foods, production of improved household equipment for freezing and storing, and the resulting increase in their use have changed consumer buying habits. Many consumers need to change their methods of selecting, handling and using food to meet the quality requirements of frozen foods.

Proper temperatures, correct care and operation of freezing and holding compartments, and the effects of time and temperature on quality are critical factors in getting the most in value, eating quality and satisfaction from today's wide range of frozen foods.

FROZEN FOODS ARE CONVENIENT TO USE



Much of the popularity of frozen foods results from the convenience they provide modern homemakers who put a premium on saving time and labor.

Frozen foods do not require cleaning, peeling and the cutting out of waste. Many prepared items require little or no cooking.

Frozen Foods Extend Seasons

Frozen foods include a variety of products which have fresh color, flavor and appetite appeal. They provide a supply of "seasonal" products the year 'round, and many of them are economical.

SELECTING FROZEN FOODS IN THE STORE



Quality of frozen foods available in retail food stores depends on many people and many factors between harvest time and the time when the foods are sold and eaten.

Freezing does not improve the quality of foods. It cannot add quality that was not there originally. So, foods for freezing must be of good quality. Then the harvesting, preparation for freezing and the actual freezing must be carried out quickly and carefully in order to maintain quality, color and flavor of the foods.

RE

MANY SHARE RESPONSIBILITY FOR QUALITY

The original quality of a frozen food is the responsibility of the processor. But many other people share responsibility for maintaining that quality until the food is used. There must be care in transportation to the warehouse, in holding the foods in the warehouse, in delivering them to the retail store, in displaying them in the store and in handling and storing them at home.

One of the most critical places for maintaining quality is the retail store. There, proper handling and merchandising methods are essential if the frozen foods are to retain their quality.

Proper handling and storage also are essential after the frozen food is purchased if it is to provide the most satisfaction.

GUIDES TO QUALITY

Consumers face difficulties in determining the quality of the frozen foods they buy. The fact that a package of frozen food is cold and hard is no indication that high quality has been maintained. Here are a few suggestions to guide you in buying good quality frozen foods:

- **Know the Brands**

Many processors have rigid quality standards for their branded products.

Brands are a good guide to original quality but no guarantee that the quality still is high when you get the frozen food.

Lack of care in handling and transporting frozen food can result in loss of quality after the food leaves the processing plant.

• **Know the Store**

There are wide differences in the ways that retailers handle frozen foods. There are recommended practices for handling and displaying frozen foods. Here are some questions to ask yourself about a store in deciding whether it follows good practice in handling frozen foods. **Does your retailer:**

Buy good quality frozen foods?

Insist that frozen foods be kept under refrigeration during delivery to his store?

Move frozen foods quickly from the delivery truck to the store freezer?

Remove frozen food packages from their shipping containers before placing them in the display cabinet?

Keep frozen food cabinets at the proper temperature of zero degrees Fahrenheit or below?



Have easy-to-read temperature indicators in the frozen food cabinets so both retailer and customer can see that the foods are being held at correct temperatures?

Keep frozen foods below the "fill" line (line on the cabinet above which the foods should not be stocked) in the cabinets so that the food is kept at a low enough temperature?

Have a procedure for rotating frozen foods so that none of the packages stay in the cabinet too long?

Make a special effort to remove damaged frozen food packages so that they do not stay in the cabinet a long time with resultant loss of quality?

See that frozen foods never are sold from display tables or counters where they cannot be kept under refrigeration?

If the store in which you shop follows these practices it is a good store in which to buy frozen foods.

Tell Your Retailer If You Get Poor Quality

Even when the retailer does a good job of handling frozen foods, it is possible to get foods of poor quality because they were not handled properly before reaching the retail store.

Your food store manager wants to know of any dissatisfaction with his frozen foods. He can take action then to insure that the foods sold in his store are of the quality desired by his customers.

KNOW YOUR OWN RESPONSIBILITY FOR QUALITY

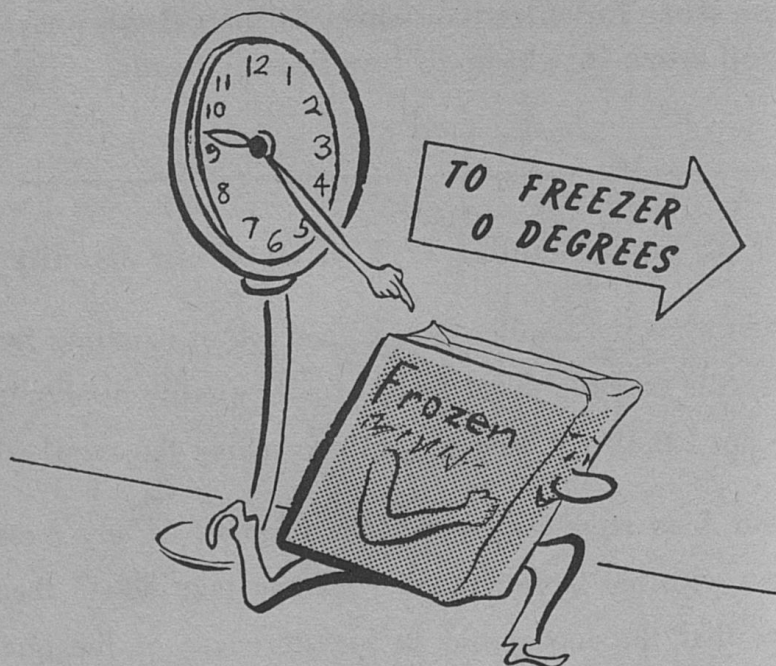
All the results of good care in preparation, processing and handling of frozen foods can be lost through careless handling and storage of the products after they are bought.

Here are some suggestions to prevent loss of quality while you are handling frozen foods:

Select frozen foods just before going to the checkout stand.

Put them in an insulated freezer bag or in a double paper bag. Many stores make these bags available at the frozen food cabinets or at the fresh produce counter. If not, ask the checker to place the frozen foods in a separate bag.

Take frozen foods home as soon as possible and put them in the freezer, freezer compartment or the ice cube compartment unless the food is to be used immediately.



Attention to these points will help to maintain quality of the frozen foods you buy.

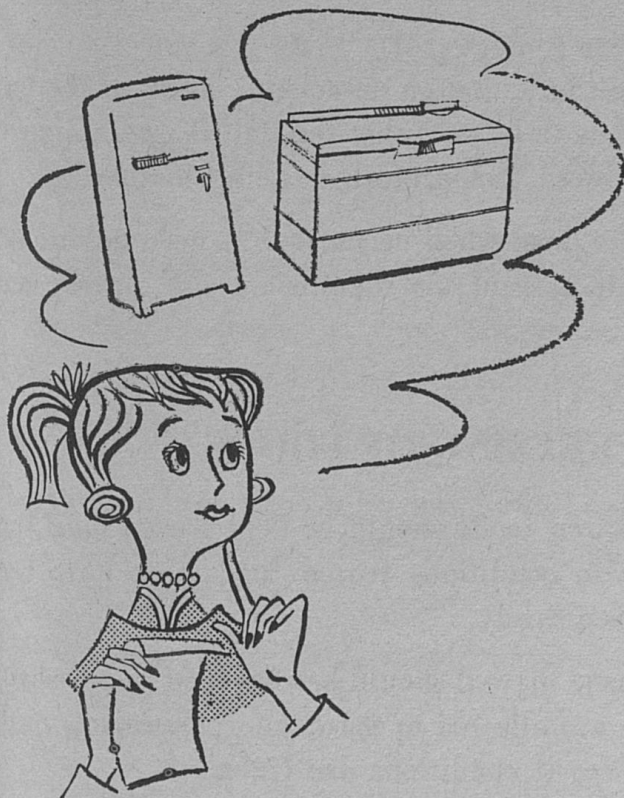
HANDLING FROZEN FOODS IN THE HOME

As soon as frozen foods have been brought home they should be put in a good refrigerated storage place. Several types of frozen food storage places are available—the refrigerator ice cube compartment, the freezer compartment, a refrigerator-freezer combination, or a home freezer.

THE REFRIGERATOR ICE CUBE COMPARTMENT

- The temperature in the ice cube compartment will range between 10 and 25 degrees in most refrigerators.
- Frozen foods stored in this kind of storage place should be held only for short periods of time.
- Use foods stored in this compartment within a week.

ACROSS THE TOP FREEZER COMPARTMENT



- Many homes have refrigerators with a freezer compartment across the top or bottom. This provides lower temperature than the ice cube compartment.

This separate enclosed space within the main refrigerator provides a temperature range from zero to 15 degrees F.

- Since these temperatures are nearer the recommended level, frozen foods may be stored for longer periods in this type of compartment. But because of temperature fluctuation within the unit and the limited amount of space, most frozen foods stored in this type of unit should be used within three months.

COMBINATION REFRIGERATOR-FREEZER AND HOME FREEZER

- Both the combination refrigerator-freezer (which has a separate freezing compartment, door and control) and the chest or upright home freezer usually provide storage conditions of zero degrees F. or below.
- Recommended storage periods for the various types of frozen foods at zero-and-below temperatures are listed on pages 19 through 22.

As with all refrigeration units, an occasional check of the temperature should be made to be sure that the unit is operating correctly and that the desired temperature is being maintained.

Defrosting should be done when necessary, as accumulation of frost on the units will prevent the maintenance of proper temperatures.

REFREEZING OF FOODS

For best quality, frozen foods should be kept frozen until time for use. Under certain conditions frozen foods that have been thawed may be refrozen safely.

Frozen foods that have thawed should be regarded as perishable products. When they are allowed to thaw, microorganisms in the food will cause spoilage if conditions are right.

The length of time that the food is in the thawed state, and the temperature it reaches are the critical factors which determine whether a thawed food should be refrozen.

If food has thawed partially for known reasons (such as being left in the refrigerator instead of the freezer overnight, temporary power failure in the freezer or having thawed while being brought home from the store) it may be refrozen safely, if it still feels cold and contains ice crystals and you know it has been thawed for only a brief time.

The safety as well as the quality of frozen foods, especially the precooked or prepared items, may be affected by growth of bacteria if the foods are kept at too high a temperature for too long a period of time. Appreciable growth of bacteria can occur even at usual household temperatures. It will occur much more rapidly in thawed foods left at room temperatures. Special caution must be observed with such products as pot pies, TV dinners, and other foods containing gravies, sauces, stuffing, etc.

THAWING FROZEN FOODS

Many frozen foods are cooked from the frozen state. Directions given by the packer for cooking frozen foods should be followed.

If frozen foods are to be thawed it may be done in these ways:

Normal Method—at room temperature.

Fast Method—in ice water or cool, running water.

Slow Method—in the refrigerator.

The nature of the food to be thawed will determine the method used in certain instances. But often time and space factors will govern the method used.

Once thawed, frozen foods should be used as soon as possible to insure the best flavor, color and texture.

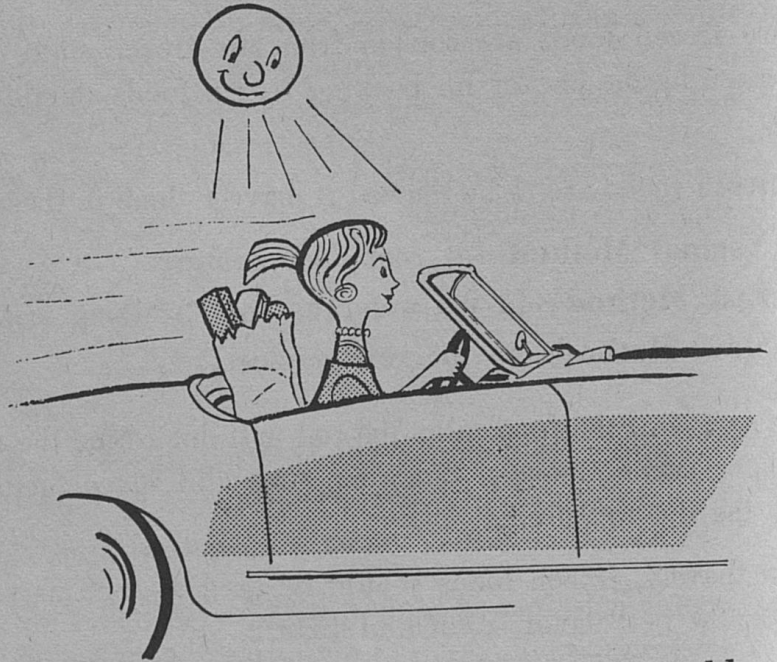
For large roasts, turkeys, and other poultry, thawing in the

refrigerator is the best method. It keeps the thawed part cool while the center is defrosting.

TRANSPORTING FROZEN FOODS

Many people transport frozen foods from home to summer cottage, from store to camp, or on long trips for picnics. To keep the food frozen several methods may be used:

- For short trips use an insulated ice cream bag.
- For longer trips use an insulated container with dry ice.
- If such a container is not available, a cardboard carton well lined with newspapers will serve. Line the box with several sections of newspapers on the sides and bottom. Pack the frozen foods tightly in the center with dry ice. Then cover them with several sections of newspaper. The tighter you pack the food the less thawing there will be.



Remember, Heat Lowers Quality Quickly

WHAT TIME AND TEMPERATURE DO TO FROZEN FOODS

Much care is needed to maintain the quality of frozen foods because of the effects time and temperatures have on them.

- **Low Temperature Is Necessary.**

Just as fresh foods lose color, flavor, texture and nutritional value at high temperatures, so frozen foods will lose these qualities if the temperature is not kept at zero degrees F. or lower. In addition to losing flavor, foods may develop off-flavors under adverse time and temperature conditions.



- **Temperatures merely below freezing (32° F.) are not low enough.** A package of frozen food can be cold and hard, but if the temperature is not low enough the quality is not maintained.

Research shows that as the temperature increases from zero degrees F. and below the rate at which food loses quality is increased. At 15 degrees F. these deteriorating changes take place several times as rapidly as at zero degrees. At 25 to 30 degrees F. the changes occur several times as rapidly as at 15 degrees F.

A rise of 5 to 10 degrees in temperature between zero and 30 degrees F. speeds the loss of quality from two to five times as rapidly as when food is stored at zero degrees F.

Since most products will be cold and hard at 20 to 25 degrees F., the fact that food is frozen hard and cold is no sign that quality has been maintained.

Permitting the temperature of a frozen food to rise to 25 or 30 degrees F. for even one day does more damage to its eating quality and nutritional value than holding it at zero degrees F. for a whole year.

- **Temperature Damage Cannot Be Corrected**

Once damage occurs from too high a temperature, reducing the temperature in the freezer or holding compartment will not correct the damage. Temperature damage stays with the food. Even small changes in color or flavor occurring early in the life of frozen food will remain, regardless of how well the food is handled afterward.

- **Damage to Quality Accumulates**

Damage to quality in frozen foods adds up. Mild damage accumulates. Damage may become severe through accumulations of mild damage or from a single occasion of greater damage.

It is not the highest temperature to which frozen foods have been subjected that determines the amount of damage. It is the total of high temperatures.

HOW TEMPERATURE AFFECTS PARTICULAR FROZEN FOODS

Frozen foods differ greatly in their reaction to fluctuations in temperature. Here are some of the things that happen to different products when they suffer temperature damage:

Frozen Fruits

Most fruits are damaged quickly by high storage temperatures. Changes can include browning of peaches, loss of flavor in strawberries, loss of color in raspberries, and darkening and toughening of the skin in cherries.

At 30 degrees F. some of these changes can occur in several days. At 20 degrees they can occur in two weeks. **But if the fruits are stored at zero degrees F. or below they remain in good condition for a year or more.**

Frozen Concentrated Juices

Quality loss in frozen juices, especially orange juice, increases as the temperature rises. The most marked change is indicated by the separation into thick and thin portions when the juice is mixed with water. Another change is loss of flavor.

Storage at zero degrees F. and below minimizes these changes.

Frozen Vegetables

When frozen vegetables are subjected to temperatures above zero degrees F. they first show quality loss through color changes and then in loss of flavor. Green snap beans can change in color from bright green to a brownish green after three days at 30 degrees F. Peas will change to a grayish-green in three weeks at 20 degrees F.

Frozen Poultry Products

In frozen poultry, loss of flavor doubles for each rise of 10 degrees in temperature. But poultry at zero degrees F. or below has a storage life of up to one year.

Poultry products may develop off-flavors when held at temperatures above zero degrees F.

Other Frozen Products

Other types of frozen foods—such as baked goods, prepared foods, meats, fish and shellfish—lose quality when subjected to temperatures above zero degrees. **While the storage life of different products varies, it can be stated generally that for each rise of 10 degrees in temperature the storage life is cut in half.**

HOW LONG FROZEN FOODS MAINTAIN THEIR QUALITY

The following tables are based on results of research work conducted in many parts of the United States. They show the length of time that frozen foods may be stored without noticeable loss of quality.

Times shown in the tables apply only when the foods are stored at zero degrees F.

Foods stored at 10 degrees F. have about a fourth to a half of the storage life listed.

Those stored at 10 degrees below zero will retain their quality for periods longer than those shown in the tables.

Many foods have a storage life of more than 12 months when held at zero degrees F. or below. Longer periods have not been shown in the tables because **keeping an item in the freezer for more than 12 months is uneconomical use of freezer space.**

Times shown are for foods that are of good quality when put into storage.

APPROXIMATE STORAGE LIFE OF VARIOUS FOODS

At Zero Degrees F.

Fruit	No. of Months at Zero Degrees F.
Apricots	12
Peaches	12
Raspberries	12
Strawberries	12

Vegetable	No. of Months at Zero Degrees F.
Asparagus	8 to 12
Beans, Snap	8 to 12
Beans, Lima	12
Broccoli	12
Brussels Sprouts	8 to 12
Cauliflower	12
Corn, on the cob	8 to 10
Corn, cut	12
Carrots	12
Mushrooms	8 to 10
Peas	12
Spinach	12
Squash	12

STORAGE LIFE OF VARIOUS FOODS

Meat	No. of Months at Zero Degrees F.
Beef	
Roasts, Steaks	12
Ground	8
Cubed, Pieces	10 to 12
Veal	
Roasts, Chops	10 to 12
Cutlets, Cubes	8 to 10
Lamb	
Roasts, Chops	12
Pork	
Roasts, Chops	6 to 8
Ground, Sausage	4
Pork or Ham, Smoked	5 to 7
Bacon	3
Variety Meats	Up to 4
Poultry	6 to 12
Fish	No. of Months at Zero Degrees F.
Fatty Fish	
(Mackerel, Salmon, Swordfish, etc.)	3
Lean Fish	
(Haddock, Cod, etc.)	6

STORAGE LIFE OF VARIOUS FOODS

Shellfish	No. of Months at Zero Degrees F.
Lobsters and Crabs	2
Shrimp	6
Oysters	3 to 4
Scallops	3 to 4
Clams	3 to 4

Pre-Cooked Foods

Item	No. of Months at Zero Degrees F.
Bread	
Quick	2 to 4
Yeast	6 to 12
Rolls	2 to 4
Cake	
Angel	4 to 6
Gingerbread	4 to 6
Sponge	4 to 6
Chiffon	4 to 6
Cheese	4 to 6
Fruit	12
Cookies	4 to 6
Combination Dishes	4 to 8

STORAGE LIFE OF VARIOUS FOODS

Item	No. of Months at Zero Degrees F.
Pies	
Fruit	12
Mince	4 to 8
Chiffon	1
Pumpkin	1
Potatoes	
French Fries	4 to 8
Scalloped	1
Soups	4 to 6
Sandwiches	2



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F.

POINTS TO REMEMBER

- **Select Frozen Foods Carefully**
- **Take Them Home as Soon as Possible**
- **Store Them at Zero Degrees if Possible**
- **Use Them Promptly**



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