

Refrigerator and Freezer Safety

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Objectives

The objectives of this study topic are:

- to teach participants the appropriate temperatures for storing food in the home refrigerator and freezer
- to emphasize the importance of monitoring the unit's temperature
- to discuss other appliance maintenance factors
- to discuss proper food storage in the refrigerator and freezer

Before the lesson

Study the handout. Obtain a refrigerator/freezer thermometer to show the group members. Consider purchasing a thermometer to use as a door prize. You may be able to locate a source willing to donate thermometers for group members, or the club may be willing to purchase thermometers from its treasury.

Other related study topics include *Risky Business: Keeping Food Safe* (WL 118 and WLG 118) and *Food Safety in the Home* (WL 116 and WLG 116). You may also wish to review these handouts before teaching the lesson.

Getting started

Distribute a copy of the participant handout to each group member. Ask them if they have a thermometer in their refrigerator and freezer. Ask them if they know what temperature is safe for storing food in home refrigerators. Bring an appliance thermometer for group members to see. Discuss the points outlined in the participant handout.

Introduction

A refrigerator is one of the most important pieces of kitchen equipment for keeping foods safe. These electric units are so commonplace today, we forget that a refrigerator was once little more than a box with a block of ice used to supply a rather undependable source of cold air. If the power goes off or the unit fails, we are instantly reminded of its importance to our daily lives and its purpose of keeping food safe for our families to eat.

The science of refrigeration has evolved from prehistoric times when man found that his game would last longer if stored in the coolness of a cave or packed in snow. Ice was harvested in the winter to be used throughout the year. Scientists learned that adding certain chemicals, such as sodium nitrate or potassium nitrate, to water would cause the temperature to fall. In the last quarter of the 19th century, mechanical refrigeration—a compressor with a refrigerant—was developed. Within the last decade, manufacturers changed the type of refrigerant used to comply with a Clean Air Act. New scientific discoveries will continue to be made, changing the way food is stored at home.

Why do we refrigerate food?

Food is refrigerated to slow bacterial growth. Bacteria grow rapidly when they have food, moisture, and favorable temperatures. Amazingly, bacteria can increase in numbers by doubling in as little as 20 minutes. The most favorable temperatures for bacterial growth are between 40° Fahrenheit (F) and 140° F. Therefore, food must be kept refrigerated at temperatures below 40° F.

Food in the refrigerator will gradually spoil if left in the refrigerator for an extended period. Spoilage can be seen when foods develop an uncharacteristic odor or color, and they may become slimy or sticky. Some bacteria will cause molds to grow and become visible. Keeping your refrigerator at the recommended temperature will help control rapid growth of bacteria.

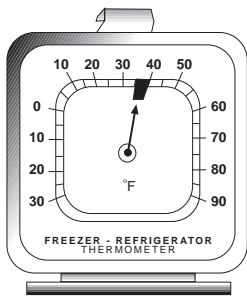
Why do we freeze food?

Freezing slows the movement of molecules, which causes bacteria to become dormant. This is good while the food is frozen; however, once thawed, the bacteria can resume growth. This is why it is important never to refreeze foods. Food in the freezer does not spoil as quickly as food in the refrigerator, but the food product will lose quality and flavor if stored too long.

Food storage in the refrigerator

Temperature: The temperature in your refrigerator should stay in the range of 34° F to 40° F (1° C to 3° C) or colder. If the temperature in your refrigerator goes above 40° F, there is a greater chance of rapid food spoilage and bacteria growth.

Monitor the temperature: A thermometer is important in monitoring the temperature in your refrigerator. Refrigerator thermometers, which



are relatively inexpensive, are designed specifically to be accurate at cold temperatures. To test each area for temperature control, place the thermometer in different locations throughout the refrigerator. If the temperature is too high

in certain locations, check to determine if you may have containers or cartons blocking the air circulation. Once you have determined that the temperature in the entire unit is in the appropriate range, it is a good idea to place the thermometer near the center of the refrigerator in a convenient and easy-to-read location. Make

a habit of checking the temperature regularly, preferably at least once a week. (In newer units, the temperature in frostfree and self-defrosting refrigerators is fairly uniform throughout the unit, including the storage area in the door. However, it's still a wise practice to monitor the temperature regularly.)

Maintain the temperature: Find the refrigerator setting that keeps the temperature within the range of 34° F to 40° F throughout the refrigerator. Be sure that the refrigerator doors are closed tightly at all times. Do not open the doors more often than necessary and close them as soon as possible. (When the unit's door is opened frequently especially on warm days, or when thick frost accumulates on the freezing unit, the refrigerator's temperature will rise.) Also, it is important to remember that cool air moves downward in the refrigerator, forcing warmer air near the bottom to rise. This air circulation is essential in maintaining the appropriate temperature throughout the unit. Therefore, the placement of food is also important. Do not overpack the shelves with food. The refrigerator air needs to circulate to keep every food item at its optimum temperature.

Food storage: When air circulates throughout the unit, the cooler air moves downward and forces the warmer air near the bottom to rise. Cover foods to retain moisture because the air motion will dry out any uncovered or unwrapped food items. Wrapping also prevents them from picking up odors from other foods. Raw meat, poultry, and seafood should be in a sealed container or wrapped securely to prevent raw juices from contaminating other foods. Do not overpack the shelves with food so that the air can move throughout the unit.

When preparing leftovers to store in the refrigerator, hot food should be rapidly chilled in an ice or cold water bath before placing it in the unit. A large pot of food like soup or stew should be divided into small portions and put in shallow containers before being refrigerated. A large cut of meat or whole poultry should be divided into smaller pieces and wrapped

separately or placed in shallow containers before refrigerating. This helps ensure the temperature is quickly reduced to a safe storage temperature of 40° F or less.

Keeping the refrigerator clean: Wipe up spills immediately, wash surfaces throughout with hot, soapy water, and rinse. Regularly (at least weekly), throw out perishable foods that should no longer be eaten. (A general rule of thumb for cooked leftovers is four days.) To keep the refrigerator smelling fresh and help eliminate odors, place an opened box of baking soda on a shelf. The exterior may be cleaned with a soft cloth and mild liquid dishwashing detergent or cleansers and polishes made for appliances. The front grill should be kept free of dust and lint to permit air to flow freely to the condenser. Several times a year, the condenser coil should be cleaned with a brush or vacuum cleaner. This will remove dirt, lint, or other accumulations to ensure efficiency and top performance.

Freezer Temperatures

Frozen foods should be kept at **0° F (-17° C)**. The temperature in the freezer should not reach higher than 5° F (-15° C). If your freezer cannot keep ice cream brick-solid, then the temperature is above the recommended level.

Place a thermometer in your freezer to test the temperature. Checking the temperature of your freezer frequently will alert you to any thawing problems with your frozen food. It's a good idea to purchase a second refrigerator/freezer thermometer to leave in the freezer section to help you develop the habit of regularly monitoring the temperature. Refrigerator/freezer thermometers

are relatively inexpensive and are a good food safety measure.

A freezer unit that does not have a separate outside door will not keep food at the optimum freezing temperature. In this case, keep frozen foods no longer than a week. A freezing unit that has a separate door will have lower temperatures, and food can be stored for longer periods.

Use freezer wrap, freezer bags, aluminum foil, or other moisture- and vapor-proof packaging to overwrap meat and poultry packages for the freezer. This will prevent freezer burn and protect the food. Date food packages with an expiration date according to maximum storage time recommended. Longer storage is not dangerous, but flavors and textures will deteriorate with prolonged storage.

Place foods to be frozen in the coldest part of the freezer. Freeze no more than 3 pounds per cubic foot of freezer space within 24 hours. Keep the freezer full for best results. It is also helpful to keep a written inventory of freezer contents. This inventory not only reminds you of food items you have available, but it also provides you a detailed record of contents for insurance purposes or replacement value if you have losses caused by a power outage.

Sources

Temperatures in Home Refrigerators in Selected West Virginia Homes, Brown, Gianato, Hunley, Layne, Summers, and Leary, WVU Extension Service, 1998.

Refrigeration and Food Safety, Food Safety and Inspection Service (FSIS), United States Department of Agriculture, January 1999.

Cold Storage Chart

<i>Product</i>	<i>Refrigerator (40 degrees F)</i>	<i>Freezer (0 degrees F)</i>
Eggs, fresh, in shell	3 weeks	Don't freeze
Eggs, raw yolks, white	2-4 days	1 year
Eggs, hard-cooked	1 week	Don't freeze well
Liquid pasteurized eggs or egg substitutes, opened	3 days	Don't freeze
Liquid pasteurized eggs or egg substitutes, unopened	10 days	1 year
Mayonnaise, commercial, refrigerated after opening	2 months	Don't freeze
TV dinners, frozen casseroles	Keep frozen until ready to prepare	3-4 months
Egg, chicken, tuna, ham, macaroni salads	3-5 days	Do not freeze well
Prestuffed pork and lamb chops		
Chicken breasts stuffed with dressing	1 day	Do not freeze well
Store-cooked convenience meals	1-2 days	Do not freeze well
Commercial brand vacuum-packed dinners with USDA seal	2 weeks, unopened	
Vegetable or meat-added soups and stews	3-4 days	2-3 months
Hamburger and stew meats	1-2 days	3-4 months
Ground turkey, veal, pork, lamb, and mixtures	1-2 days	3-4 months
Hotdogs, opened package	1 week	
Hotdogs, unopened package	2 weeks	
Lunch meats, opened	3-5 days	1-2 months, in freezer wrap
Bacon	7 days	1 month
Sausage, raw from pork, beef, turkey	1-2 days	1-2 months
Smoked breakfast patties, links	7 days	1-2 months
Hard sausage-pepperoni, jerky sticks	2-3 weeks	1-2 months
Corned beef in pouch with pickling juices	5-7 days	Drained, wrapped, 1 month
Ham, canned-label says keep refrigerated	6-9 months	Don't freeze
Ham, fully cooked-whole	7 days	1-2 months
Ham, fully cooked-half	3-5 days	1-2 months
Ham, fully cooked-slices	3-4 days	1-2 months
Steaks, beef	3-5 days	6-12 months
Chops, pork	3-5 days	4-6 months
Roasts, beef	3-5 days	6-12 months
Roasts, pork, and veal	3-5 days	4-6 months
Variety meats-tongue, brain, kidneys, liver, chitterlings	1-2 days	3-4 months
Leftover cooked meat and meat dishes	3-4 days	2-3 months
Leftover gravy and meat broth	1-2 days	2-3 months
Chicken or turkey, whole	1-2 days	1 year
Chicken or turkey pieces	1-2 days	9 months
Leftover baked or fried chicken	3-4 days	4 months
Leftover poultry dishes	3-4 days	4-6 months
Leftover pieces covered with broth, gravy	1-2 days	6 months
Leftover chicken nuggets, patties	1-2 days	1-3 months

Source: *Chill: When in Doubt – Throw it Out!*, Fight Bac Campaign, USDA. Consistent with United States Department of Agriculture and United States Food and Drug Administration.