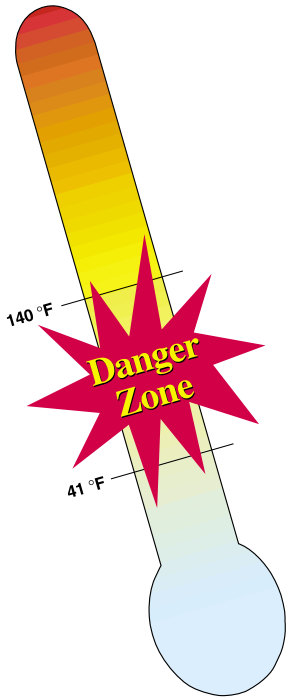


Temperatures

Lesson Two: Temperatures

Purpose

The purpose of Lesson Two is to teach Summer Food Service program staff and volunteers the importance of moving foods quickly through the temperature danger zone and how to properly use a thermometer.

Supporting Materials for this Lesson

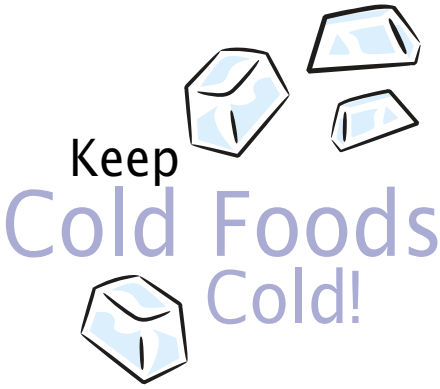
Supplies

For staff and volunteers:

- Thermometers (enough so that every participant can practice taking temperatures
- Potato salad
- Milk carton
- Juice carton
- Sandwich with filling
- Cooked hamburger

For children's lessons:

- Crayons



Handouts

For staff and volunteers:

- Handout 1: Minimum Safe Internal Temperatures
- Handout 2: Tips for Moving Food Quickly Through the Danger Zone
- Handout 3: Checklist for Using a Food Thermometer

For children:

- Handout 4: Thermy™ Coloring Page

NFSMI Posters

- Keep Hot Food Hot! Cold Foods Cold!
- Use That Thermometer!

Educational Objectives

At the completion of this lesson, staff and volunteers will be able to:

- Identify the temperature danger zone
- Explain why it is important to move food quickly through the danger zone
- Explain how to move food quickly through the danger zone
- Demonstrate how to properly use a thermometer
- Introduce children to the importance of food thermometers

Key Words

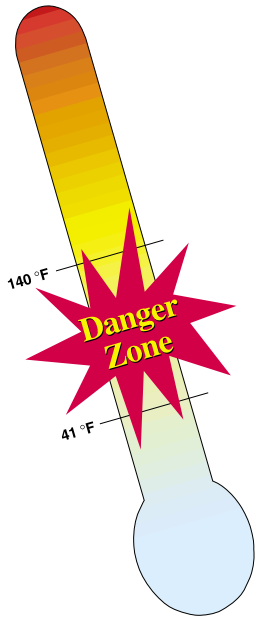
Bacteria – The plural of the Latin word "bacterium." A bacterium is a living organism made up of a single cell. Bacteria and other microorganisms are everywhere. Bacteria are considered "vegetative" because they can grow and reproduce. Under certain conditions, they will reproduce very rapidly. Some bacteria, called pathogens, cause disease. Others discharge poisons, called toxins, as they multiply. These toxins can be very dangerous to humans.

Microorganisms – Molds, bacteria, and yeasts that grow in and on food and can make food unsafe.

Clean - No visible sign of soil.

Danger Zone - The temperature range above 41 °F and below 140 °F.

Sanitize - To use either a chemical or heat on a clean surface to reduce the number of bacteria or other contaminants to a level that is not harmful.



Lesson Content

The Danger Zone

Cooking food to a safe internal temperature is an essential step in the food safety process. When food is to be served hot, it should be kept in hot holding equipment above 140 °F. Cold food should be kept below 41°F in a refrigeration unit or surrounded by ice. When foods are in the danger zone, harmful micorganisms that cause contamination can grow very rapidly. Keep the internal temperature of food below 41°F or above 140 °F.

> Note: Be sure to follow all State and local public health department or State agency regulations regarding temperatures.

Distribute Handout 1: **Minimum Safe Internal Temperatures** and discuss the importance of following these temperature guidelines.

Moving Foods Quickly Through the Danger Zone

It is very important to move foods quickly through the danger zone to prevent the growth of harmful micorganisms. Hot foods that are to be chilled must be chilled rapidly. Bulk hot foods (amounts greater than 1/2 gallon or 2 pounds) can be cooled more rapidly by putting the food into shallow pans in the refrigerator and stirring frequently. An ice bath can be used to speed the cooling process. Fill a clean and sanitized sink with ice. Add water to fill air spaces. Remove food to be chilled from the heat source. Insert container with food into ice bath so food is level with the ice. Stir every 10-15 minutes. Drain water and add ice as it melts. Use a thermometer to measure the temperature until it reaches 41°F. Then place the food in the refrigerator.

Foods can also be chilled rapidly using a blast chiller. The blast chilling process uses a high-powered refrigeration system to blast cold air over the food product at high speed reducing the temperature quickly and safely.

Remember, cold foods must be kept cold below 41°F. When reheating previously cooked food, be sure to bring to an internal temperature of 165 °F for 15 seconds. Use a thermometer to determine the internal temperature of food at every stage in the foodservice process: receiving, storage, preparation, cooking, holding, serving, reheating, and chilling.

> Note: During any point of the food production process when food could be in the temperature danger zone, the internal temperature must be documented. Follow State and local public health department recommendations to control time and temperature at each stage of food production.

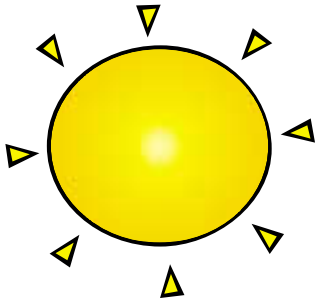
Follow these tips for moving food quickly through the danger zone:

- Chill heated or cooked bulk foods in shallow pans
- Stir frequently
- Stir with an ice paddle
- Use an ice bath
- Take and write down internal temperatures often
- Use a blast chiller, if available

NEVER cool food at room temperature. Stirring accelerates cooling and helps to ensure that cold air reaches all parts of the food. Some manufacturers make cold paddles just for cooling food; they can be filled with water and frozen. If a cold paddle is used to stir a food, it should be washed and sanitized after use. Do not overpack the refrigerator; cold air must circulate to keep food safe.

Food Safety Tips for Hot and Cold Foods

Foods are sometimes brought to the serving site in bulk and served to children. In other cases, individual lunch bags are given to the children. Here are some suggestions for keeping hot and cold foods safe.



Hot Foods

- Use hot–holding equipment whenever possible
- Use insulated containers to transport food

Cold Foods

- Pack individual sandwiches in insulated lunch bags with a frozen gel pack OR with a frozen juice box.
- Freeze sandwiches overnight. They will thaw by lunchtime, but will stay cold and safe.
- Use a cooler to keep perishable foods cold packed with several inches of ice, ice packs, or containers of frozen water.
- Pack perishable foods directly from the refrigerator or freezer into the cooler.
- Pack beverages in one cooler and perishable foods in another.
- Store the cooler in a building, if possible or in a shady spot out of the sun.
- Keep the cooler closed as much as possible and cover it for additional insulation.
- Place an appliance thermometer inside the cooler to check the temperature.
- Store all foods in airtight containers to avoid contact with any melting ice water.
- Keep all perishable foods cold right up until serving time.

Hot and Cold Foods

- Keep hot foods and cold foods at appropriate temperatures.
- Check and write down temperatures of foods before serving.

Distribute Handout 2: **Tips for Moving Food Quickly through the Danger Zone** to reinforce the importance of chilling foods rapidly. Post the handout in the facility.

Guidelines for Using a Thermometer

The two most common types of food thermometers used to determine the internal temperature of foods are:

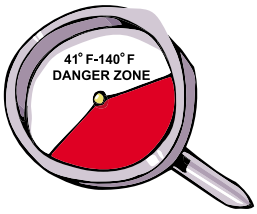
- A bi-metallic stemmed thermometer with an instant-read dial that measures temperatures from 0 °F to 220 °F

  This type of thermometer is most commonly used in foodservice operations. It should have an adjustable calibration nut and an easy-to-read temperature marking. A dimple marks the end of the sensing area.

- A digital thermometer that measures temperature with a metal probe and displays the temperature on a digital readout

  This type of thermometer is available in various styles from a pocketsize up to a panel-mounted display. Many digital thermometers have interchangeable temperature probes used to measure temperature of different items.

Follow these guidelines for using a thermometer properly:



- Clean and sanitize the stem of the thermometer after every use. Use a sanitizing solution or a sanitizing wipe. Allow to air dry.
- Store in a clean and sanitized case.
- Sanitize the clean case by immersing in a sanitizing solution.
- Check and change batteries in digital thermometers on a routine basis.
- Measure the internal temperature of a food by inserting the stem of the thermometer into the center and thickest part of the food.
- Check the temperature of foods in several places.
- Clean and sanitize the thermometer before inserting it into a different food.
- Use the food thermometer to check the temperature of refrigerated foods during the receiving process. Refrigerated foods should be delivered at or below 41 °F, except as specified in laws governing milk, shell eggs, and molluscan shellfish.
- Write down all temperatures so that there will be a record.
- Test the temperature of the milk or juice by opening a carton and inserting the thermometer at least two inches into the liquid. Avoid touching the bottom or sides of the container.

How to calibrate a food thermometer:

Use either of these methods to calibrate food thermometers.

Ice-Point Method

The ice-point method is used most often unless a thermometer cannot register a temperature of 32 °F (0 °C).

1. Fill a glass with crushed ice. Add water until the glass is full.
2. Place the thermometer in the center of the glass of ice water, not touching the bottom or sides of the glass.
3. Stir or shake the glass of ice water to assure even temperature distribution throughout. Wait until the indicator stops.
4. The temperature should register 32 °F. If it does not, adjust the calibration nut by holding it with pliers or a wrench and turning the face of the thermometer to read 32 °F. If using a digital thermometer with a reset button, adjust the thermometer to read 32 °F while the metal probe is in the ice water, or replace the battery.

Boiling-Point Method

This method may be less reliable than the ice-point method because of variation due to high altitude.

Use this method to calibrate food thermometers with scales beginning at 32 °F.

1. Using a deep pan, bring water to a boil.
2. Place the thermometer in the center of the boiling water, not touching the bottom or sides of the pan. Wait until the indicator stops.
3. The temperature should register 212 °F. If it does not, adjust the calibration nut by holding it with pliers or a wrench and turning the face of the thermometer to read 212 °F. If using a digital thermometer with a reset button, push it while the metal probe is in the boiling water, or replace the battery. Follow work safety procedures.
4. The boiling point of water is lower at high altitudes. For each 550 feet above sea level, the boiling point of water is 1°F lower than the standard of 212 °F. For example, in a kitchen located at 5,500 feet above sea level, water would boil at 202 °F. The pointer on a dial food thermometer inserted into boiling water would need to be adjusted to the temperature 202 °F at the higher altitude of 5,500 feet.

Activity 1 Staff and Volunteers

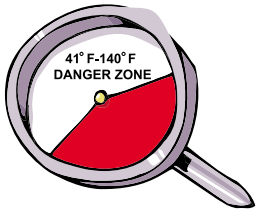
Using a Thermometer

Provide several different foods for temperature testing in this activity such as cooked foods, salads, sandwiches, milk and juice. Demonstrate the correct way to take the internal temperature and the proper way to use a thermometer. Provide each staff member or volunteer with a thermometer and alcohol swab. Have each person take and record several temperatures. Explain procedures and provide helpful suggestions for taking temperatures and cleaning and sanitizing the thermometers. Discuss the internal temperature for some common foods. Distribute the NFSMI poster **Keep Hot Foods Hot! Keep Cold Foods Cold!**

Note: If it is not possible to prepare the foods needed just for this activity, consider conducting the activity on days when these foods are being served.

Activity 2 Staff and Volunteers

Distribute Handout 3: **Checklist for Using a Food Thermometer**. Ask the training participants to fill out the checklist to evaluate their skills in using thermometers. Discuss the results in a general way.



Remember:

1. Always use a food thermometer when you cook.
2. The color of cooked meat - whether it's pink or brown inside-can fool you.
3. Place the thermometer in the thickest part of most foods, away from any bones and fat.
4. Cook food to a safe internal temperature.
5. Check the temperature in several places to be sure the food is cooked evenly.
6. Wash the food thermometer with hot, soapy water after using it.

Engage the training participants in a discussion about the six principles. Ask the participants to unscramble the words in Thermy™ Rules! Discuss the answers. Answers to the scramble are at the bottom of the page. Remind staff and volunteers to sanitize the food thermometer with a sanitizing solution or with an alcohol swab.

Focus on Children

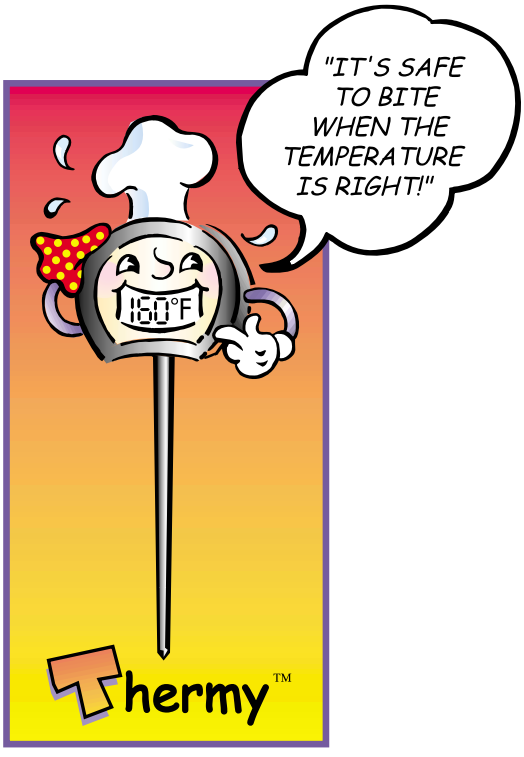
Children can learn basic principles of food safety at a young age. Learning these principles at an early age can help ensure that they will practice them for a lifetime.

Activity 1 Children

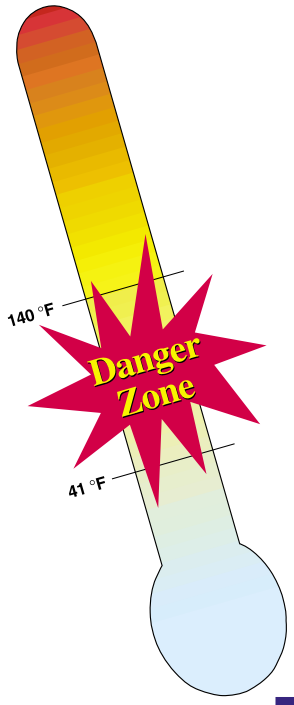
Thermy™ Coloring Page

(This activity is appropriate for children in grades K-3.)

Distribute Handout 4: **Thermy™ Coloring Page** to the children.
Discuss the importance of cooking foods to the right temperature and teach the children the phrase "It's Safe to Bite When the Temperature is Right!" Allow time for the children to color Thermy™. Post the coloring pages in a common location or encourage the children to take the coloring sheets home.



Food Safety and Inspection Service, USDA



Handouts

Minimum Safe Internal Temperatures

Product	Internal Temperature
Poultry, stuffing, stuffed meats, stuffed pasta, casseroles, leftovers	165 ˚F for 15 seconds
Pork, bacon	145 ˚F for 15 seconds
Injected meats	155 ˚F for 15 seconds
Ground or flaked meats including hamburger, ground pork, flaked fish (patties or sticks), sausage, gyros	155 ˚F for 15 seconds*
Beef and pork roasts	145 ˚F for 4 minutes*
Ham (a cured pork roast)	145 ˚F for 4 minutes
Beef steaks, veal, lamb, commercially raised game animals	145 ˚F for 15 seconds
Fish	145 ˚F for 15 seconds
Shell eggs for immediate service	145 ˚F for 15 seconds
Any potentially hazardous food cooked in a microwave oven	165 ˚F for 15 seconds; Let food stand for 2 minutes after cooking to obtain temperature equilibrium
Vegetables to be served hot	140 ˚F or above
Leftovers to be reheated (example: leftover spaghetti with meat sauce)	165 ˚F for 15 seconds; Let food stand for 2 minutes after cooking
Convenience products that include a potentially hazardous food, such as hamburger patties, chicken nuggets, burritos, and pizza	165 ˚F for 15 seconds
Ready-to-eat food taken from a commercially processed, hermetically sealed container or from an intact package (examples: hot dogs, chicken nuggets)	140 ˚F (heat rapidly to this temperature for hot holding)

*For alternative times and temperatures, see the FDA Food Code 2001 http://www.cfsan.fda.gov/~dms/fc01-toc.html

Do not serve wild game in FNS Child Nutrition Programs.
All game must be purchased from a USDA meat inspected establishment.
Wild game is not allowed for use in FNS Child Nutrition Programs.

U. S. Department of Agriculture, Food and Nutrition Service, with the National Food Service Management Institute. (2002), Serving it safe. 2 Ed. University, MS: National Food Service Management Institute.

Tips for Moving Foods Quickly Through the Danger Zone

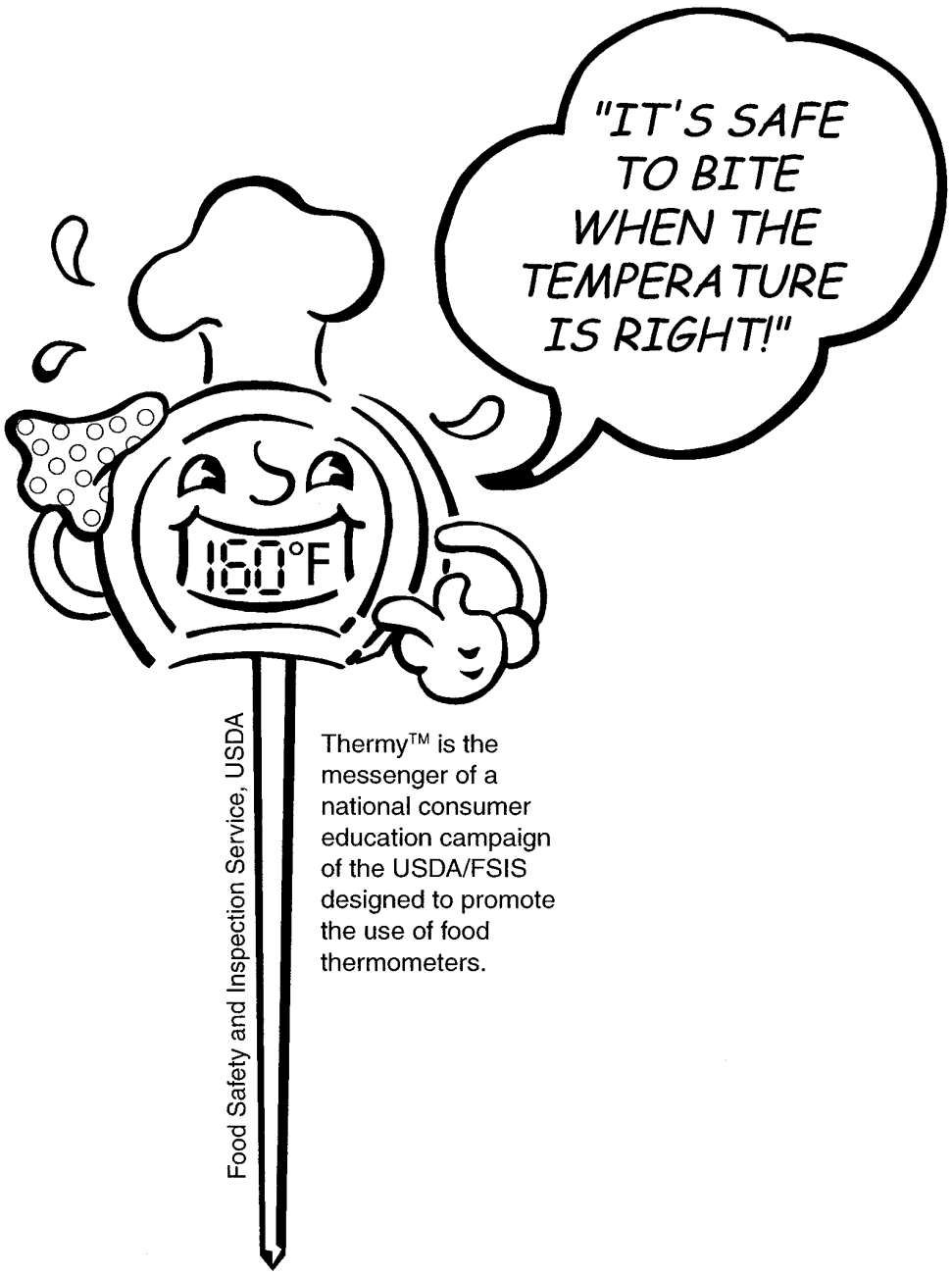
- Chill heated or cooked bulk foods in shallow pans
- Stir frequently
- Use an ice paddle to stir
- Use an ice bath
- Take and write down internal temperatures often
- Use a blast chiller, if available
- Don't overpack the refrigerator; cold air must circulate to keep food safe

Checklist for Using a Food Thermometer

Complete the following checklist to see how your thermometer use skills measure up.

	OK	Need to Improve
▪ I clean and sanitize stem of the thermometer after every use.	❒	❒
▪ After washing the stem, I sanitize the stem with a sanitizing solution or a sanitizing wipe. I allow it to air dry.	❒	❒
▪ I store the thermometer in a clean and sanitized case.	❒	❒
▪ I sanitize the clean case by immersing it in a sanitizing solution.	❒	❒
▪ For digital thermometers, I check and change batteries on a routine basis.	❒	❒
▪ I measure the internal temperature of a food by inserting the stem of the thermometer into the center and thickest part of the food.	❒	❒
▪ I check the temperature of foods in several places.	❒	❒
▪ I clean and sanitize the thermometer before inserting it into a different food.	❒	❒
▪ I use the food thermometer to check the temperature of refrigerated foods during the receiving process. (Refrigerated foods should be delivered at or below 41°F except as specified in laws governing milk, shell eggs, and molluscan shellfish.)	❒	❒
▪ I write down all internal temperatures so that there will be a record.	❒	❒
▪ I test milk or juice by opening a carton and inserting the thermometer at least two inches into the liquid. I avoid touching the bottom or sides of the container.	❒	❒

Thermy™



Thermy™ is the messenger of a national consumer education campaign of the USDA/FSIS designed to promote the use of food thermometers.