

4

Taking and Documenting Temperatures

Lesson Objectives

1. Take and record temperatures during steps in the food flow process: receiving, storing, preparing/cooking, holding, transporting, serving, cooling, reheating, and cleaning/sanitizing.
2. Document temperatures using appropriate forms.
3. Identify appropriate corrective actions to be taken if appropriate temperatures are not met.
4. Clean, sanitize, and store thermometers properly.

Getting Ready

Materials

- VCR and monitor
- Videotape, *Your Guide to Thermometers in Foodservice*
- Thermometer Toolkit
- Copies of Handouts 7, 8, 9, and 10 for each participant (or single transparency/slide) (pages 48, 49, 50 and 51)
- Copies of Handout 11 for each participant (page 52)
- Flip charts
- Marking pens
- 3 x 5 in. index cards with a “thermometer type” written on each for every participant
- Thermometers or pictures of thermometers—types to include:
 - Bimetallic stemmed
 - Bimetallic stemmed, oven safe, meat
 - Digital stemmed (thermistors)
 - Thermocouple (digital)
 - Infrared
 - Single use indicators—T-Stick®, adhesive
- Various food items for taking temperatures, for example:
 - Frozen food item
 - Cooked meat items (roast, chicken parts, hamburger patties, chicken nuggets)
 - Cold milk
 - Reheated casserole
- Signs/Flipchart paper
 - “Receiving,” “Storing,” “Preparing/Cooking,” “Holding,” “Transporting,” “Serving,” “Cooling,” “Reheating,” and “Cleaning/Sanitizing”
 - “Heat It Up!” signs to be used with Trainer Resource 2

Note to Trainer

All employees may not need all components. The trainer can select sections most appropriate to individuals being trained.

There are several things to do before the lesson segments:

- Prepare various food items to use for practice taking temperatures (roast, chicken parts, hamburger patties, chicken nuggets, casserole)
- Prepare signs for use in activities

Lesson Format

Lesson 4 can be taught as one lesson or as multiple short lessons. If all material and activities in the lesson are covered, the lesson will take about 2 hours to complete. This approach would be appropriate for an in-service training day.

If time is limited, the lesson could be broken down into the smaller units. Possible divisions for shorter lessons:

Taking Food Temperatures, Key Point 1	30 minutes
Taking Storage/Work Area Temperatures, Key Point 2	10 minutes
Taking Equipment Temperatures, Key Point 3	10 minutes
Cleaning and Sanitizing Thermometers, Key Point 4	8 minutes
Storing Thermometers, Key Point 5	7 minutes
Documenting Temperatures, Key Point 6	15 minutes
Taking Corrective Action, Key Point 7	25 minutes
Summarizing Lessons 1-4	20 minutes

Lesson Content



Taking Food Temperatures

Key Point

1

Temperatures of food need to be taken at each step: receiving, storing, preparing/cooking, holding, transporting, serving, cooling, reheating, and cleaning/sanitizing.

Estimated time: 30 minutes

Stress that each step of the food flow is a control point. A control point is any step where a physical, chemical, or biological hazard can be controlled. Temperature control is one of the main methods for controlling biological hazards. Biological hazards include bacteria, viruses, parasites, fungi, and plants and fishes that carry harmful toxins. Temperature and time control is the main method for controlling biological hazards.

Review the temperatures, types of thermometers to use, and methods for taking temperatures at each step. The method for taking food temperatures varies by food product type.

- **Roasts**—the thermometer should be placed at the midway point in the roast, being careful to avoid any bone. Take a temperature in several places.
- **Poultry**—the thermometer should be placed in the thickest area of the poultry part being checked, being careful to avoid any bone.
- **Thin Foods**—for thin foods such as a hamburger patty, chicken patty, chicken nugget, or chicken breast, use of a digital stemmed thermometer (thermistor) or thermocouple (digital) is recommended for taking temperatures because they are tip sensitive. To avoid burns, remove the food item to a clean plate or spatula and insert the food thermometer.
- **Combination Dishes**—the thermometer should be placed into the thickest part of casseroles and other combination dishes, and temperatures should be checked in several places.

Inserting thermometers correctly into products is important to obtaining an accurate internal temperature reading. Follow manufacturer's instructions. Bimetallic stemmed thermometers have a dimple that indicates the end of the sensing region. These thermometers must be inserted 2 to 3 inches into the food product to obtain an accurate reading. Most digital stemmed thermometers (thermistors) and thermocouples (digital) are "tip sensitive" meaning that an accurate reading can be obtained by inserting the tip end. That is why these thermometers may be used for taking temperatures of thin foods.

Insert thermometer and wait at least 15 seconds to get an accurate internal temperature reading.

Thermometers and Methods for Taking Food Temperatures

Step	Temperature	Types of Thermometers	Methods
Receiving	Frozen foods: at or below 32 °F (frozen solid with no indication of thawing)	Bimetallic Stemmed Digital Stemmed (thermistor) Thermocouple (digital) Infrared	Place thermometer between two frozen items to get surface temperature. Point infrared thermometer to surface of product.
	Refrigerated foods: 33 °F to 41 °F	Bimetallic Stemmed Digital Stemmed (thermistor) Thermocouple (digital)	1. Insert thermometer into product being checked. 2. Fold bagged items in half and place thermometer between halves.
Storing	Frozen foods: at or below 0 °F	Bimetallic Stemmed Digital Stemmed (thermistor) Thermocouple (digital) Infrared	Place thermometer between two frozen items to get surface temperature. Point infrared thermometer to surface of product.
	Refrigerated foods: 33 °F to 41 °F	Bimetallic Stemmed Digital Stemmed (thermistor) Thermocouple (digital)	1. Insert thermometer into product being checked. 2. Fold bagged items in half and place thermometer between halves.
	Dry Storage: 50 °F to 70 °F	Wall Thermometer	Mount thermometer on wall away from door.
Preparing/ Cooking	End-point cooking temperatures Ready-to-eat foods: 135 °F for 15 seconds Pork: 145 °F for 15 seconds Ground beef: 155 °F for 15 seconds Poultry, soups, casseroles: 165 °F for 15 seconds	Bimetallic Stemmed Digital Stemmed (thermistor) Thermocouple (digital) T-stick®	<u>Method Varies by Food</u> ■ Whole roasts—take temperature in center of roast. ■ Hamburgers—use digital stemmed thermometer (thermistor). ■ Casseroles—take the temperature in at least three places, with one being in the center of the container.
Holding	Hot foods: at 135 °F or above Cold foods: at or below 41 °F	Bimetallic Stemmed Digital Stemmed (thermistor) Thermocouple (digital) T-stick®	1. Insert thermometer into item being checked. 2. Check multiple locations.

Thermometers and Methods for Taking Food Temperatures (continued)

Step	Temperature	Types of Thermometers	Methods
Transporting	Hot foods: at 135 °F or above Cold foods: at or below 41 °F	Bimetallic Stemmed Digital Stemmed (thermistor) Thermocouple (digital) T-stick®	1. Insert thermometer into item being checked. 2. Check multiple locations. 3. Take temperatures before food is transported and once it arrives at the service site.
Serving	Hot foods: at 135 °F or above Cold foods: at or below 41 °F	Bimetallic Stemmed Digital Stemmed (thermistor) Thermocouple (digital) T-stick®	1. Insert thermometer into item being checked. 2. Check multiple locations
Cooling	Two-stage Cooling ■ 135 °F to 70 °F in 2 hours ■ 70 °F to 41 °F in 4 additional hours or less	Bimetallic Stemmed Digital Stemmed (thermistor) Thermocouple (digital)	Insert thermometer into the center of the food being checked.
Reheating	Reheat leftovers: 165 °F for 15 seconds	Bimetallic Stemmed Digital Stemmed (thermistor) Thermocouple (digital) T-stick®	Insert thermometer in at least three places, with one being in the center of the food being reheated.



ACTIVITY IDEA

Post signs at the front of the room in the following order: receiving, storing, preparing/cooking, holding, transporting, serving, cooling, and reheating. Give each participant an index card with a type of thermometer written on it. Mention a type of food at each step and have participants hold up the card with appropriate thermometers and give the appropriate temperature (NOTE: This is a review from Lesson 1 and ties that information with the steps).

ACTIVITY IDEA

Show the fourth segment of the videotape, *Your Guide to Thermometers in Foodservice*.

ACTIVITY IDEA

Provide participants with thermometers that are used in their school. Have them practice taking temperatures of different foods at different steps in the food flow.



Taking Storage/Work Area Temperatures

Key Point 2

Temperatures of storage and work areas should be monitored to ensure food safety.

Estimated time: 10 minutes

Temperatures of storage and work areas must be monitored daily. The standards for storage areas should be maintained as indicated below:

- Storeroom for dry goods: 50 °F to 70 °F
- Refrigeration equipment—walk-in refrigerators, reach-in refrigerators, milk coolers: at or below 41 °F
- Freezers: at or below 0 °F



ACTIVITY IDEA

Ask participants to identify the appropriate temperature for the storeroom, refrigerators, and freezers. Ask participants what they should do if a storage area is not at the appropriate temperature.

Some possible answers are: inform the manager or supervisor, contact the school maintenance department, or contact an outside vendor. NOTE: The appropriate answer will vary by district.



Taking Equipment Temperatures

Key Point 3

Temperatures of equipment used in foodservice must be monitored to ensure that foods are stored, cooked, and held at appropriate temperatures.

Estimated time: 10 minutes

There are four main types of equipment for which temperatures must be monitored:

1. **Storage**
 - a. Refrigerators: 35 °F to 41 °F
 - b. Milk Coolers: 35 °F to 41 °F
 - c. Freezers: at or below 0 °F
2. **Cooking**—Ovens: temperature on dial setting
3. **Holding Equipment**
 - a. Hot Holding Cabinets: at 135 °F or above
 - b. Cold Holding Cabinets: at or below 41 °F
4. **Dish Machine:** 180 °F final rinse temperature for high temperature dish machines (water must be at least 160 °F when it comes in contact with the surface of the tray, dish, or other item being sanitized). Follow manufacturer's instructions.

NOTE: Not all schools have a high temperature dish machine. Omit this piece of equipment from your discussion if your school or district uses disposables, does not have a dish machine, or has a dish machine that uses chemical sanitizers.



ACTIVITY IDEA

Ask participants to identify the appropriate temperature for the following equipment: refrigerators, milk coolers, freezers, hot holding cabinets, and cold holding cabinets.

Discuss the importance of maintaining equipment at the proper temperature and how temperatures of equipment are monitored in their facilities. Discuss whether changes are needed in procedures for monitoring or documenting temperatures.

Cleaning and Sanitizing Thermometers



Key Point 4

Proper cleaning and sanitizing of thermometers before and after use reduces potential for cross contamination.

Estimated time: 8 minutes

Discuss the importance of cleaning thermometers before sanitizing to ensure that sanitizing is effective. To clean and sanitize thermometers, the following steps should be followed:

1. Wash probe of thermometer by hand with warm, soapy water. Do NOT immerse dial in water.
2. Rinse the probe with clean, warm water.
3. Sanitize the probe with an approved food contact surface sanitizing solution or with alcohol swabs.
4. Air dry. Air drying minimizes the risk of contamination of the probe.
5. Store in clean case or sleeve.



ACTIVITY IDEA

Give each participant a thermometer (suggested types: bimetallic stemmed, digital stemmed [thermistor], thermocouple [digital]). Have them demonstrate the proper method for cleaning and sanitizing and then take a temperature of a food product. Cleaning and sanitizing should be completed before and after taking a food temperature.



Storing Thermometers

Key Point 5

Thermometers should be stored properly to ensure that they are not damaged.

Estimated time: 7 minutes

Review why it is important for thermometers to be stored correctly.

Discuss some potential methods for storing thermometers:

1. Separate drawer or section of a drawer.
2. Thermometer dispensers with sanitizing solution.
3. Silverware container from dish machine may be placed in work area upside down and thermometers can be placed in holes. This prevents thermometers from rolling off the countertop, yet keeps them handy for use.



ACTIVITY IDEA

Ask participants to develop a plan for storing thermometers in their operation. Discuss what needs to be done to implement the plan.



Documenting Temperatures

Key Point 6

Temperatures should be documented when they are taken. Remember, if a temperature has not been documented, it has not been taken!

Estimated time: 15 minutes

Discuss the importance of regular monitoring and documenting of temperatures.

Documentation:

1. Ensures food is cooked to the appropriate internal end point temperature.
2. Shows that school foodservice employees are diligent in their jobs and are concerned about the health of children.
3. Contributes to an overall food safety management system that includes Hazard Analysis and Critical Control Point (HACCP) principles.
4. Provides a record for verification.
5. Ensures overall quality of food served.



ACTIVITY IDEA

Post signs at the front of the room in the following order: **receiving, storing, preparing/cooking, holding, transporting, serving, cooling, reheating,** and **cleaning/sanitizing.** For each area, ask participants to give some examples of temperatures that should be documented. Write participants' responses on the signs.

Review participants' responses. The following items should have been mentioned. If they are not, remind employees of documentation requirements.

Area	Recommended Temperature Documentation
Receiving	Frozen Foods Refrigerated Foods
Storing	Refrigerators Freezers Milk Coolers Storeroom Refrigerated Foods
Preparing/Cooking	End-Point Cooking Cooking Equipment
Holding	Holding Cabinets Hot Foods Cold Foods
Transporting	Hot Foods Cold Foods
Serving	Hot Foods Cold Foods
Cooling	Hot Foods through the Cooling Process
Reheating	Hot Foods
Cleaning/Sanitizing	Dish Machine Final Rinse (if high temperature machine is used)

Stress the importance of documenting the process of calibrating thermometers (as discussed in Lesson 3).



ACTIVITY IDEA

Show transparency of one (or more, depending on time) documentation form (Handout 7 Refrigerator/Freezer Temperature Record, Handouts 8 and 9 Production Records, or Handout 10 Service Temperature Log). **Or** distribute a copy of forms to each participant. Review the type of information documented: date, menu item, time, temperatures, initials of individual who documented information, and corrective action if needed.

Taking Corrective Action



Key Point

7

Temperature standards, developed based on science, ensure the safety of food. If appropriate temperatures are not met, corrective action must be taken to ensure food safety.

Estimated time: 25 minutes

The *2001 Food Code* identifies temperatures that will help to ensure safe foods. Appropriate corrective action is needed if these temperatures are not met.



ACTIVITY IDEA

Ask participants to brainstorm situations when the correct temperature might not be found. List those situations on a flip chart. Such situations may include: improper functioning of refrigerator, freezer, or milk cooler; food that is left out and not stored properly; broken dish machine booster heater; cooling.

Divide participants into pairs. Distribute a copy of Handout 11, *Scenarios for Temperature Corrective Action*, and assign one scenario to each pair. Have participants read the scenario and discuss possible corrective actions that they would take in the situation presented. Ask each pair to share their scenario and response. Review the list participants developed. Discuss other situations that may occur in your operation that were not covered in scenarios.

Summarizing Lessons 1–4

Estimated time: 20 minutes



ACTIVITY IDEA

An interactive game has been developed to use as a review of concepts covered in these lessons. “Heat It Up!” is Trainer Resource 2. Prepare and post the category and temperature degrees with the questions on the back of 8 ½ x 11 in. sheets of paper. Have fun!

Example

Category: Measure Up!

Degrees: 10

Question: What is one of the steps in which temperatures of food should be taken?

Answer: Receiving, Storing, Preparing/Cooking, Holding, Transporting, Serving, Cooling, Reheating, or Cleaning/Sanitizing.

HANDOUT 7

Refrigerator/Freezer Temperature Record

School _____ Month, Year _____

Day	Time	Recorded by	Refrigerator		Freezer		Corrective Action
			External	Internal	External	Internal	
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
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18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							

Optimal Ranges: 35 °F to 41 °F for refrigerators and at or below 0 °F for freezers

Production Record for Food-Based Menu Planning

District: _____ Date: _____ Number of Meals Served: _____

School: _____ Manager: _____ Seconds: _____

Adults: _____

Offer vs. Serve Implemented? Yes No **Total** _____

Breakfast Lunch

Menu	Recipe # or Product Description	Temp (°F)	Time	Quantity Prepared	Grades		Grades		Totals	
					Serving Size	Planned Servings	Serving Size	Planned Servings	Leftover	Used
Meat/Meat Alternate										
Vegetables										
Fruits										
Grains/Breads										
Milk										
Other										

NOTE: Temperatures recorded on this sheet are end-point cooking temperatures. The temperature for each batch prepared should be checked. Service temperatures are recorded on the **Service Temperature Log**.

Production Record for Nutrient Standard Menu Planning

District: _____ Date: _____ Number of Meals Served: _____
 School: _____ Manager: _____ Seconds: _____
 Offer vs. Serve Implemented? Yes No Adults: _____
 Breakfast Lunch Total _____

Menu Item	Recipe # or Product Description	Temp (°F)	Time	Quantity Prepared	Grades		Grades		Totals	
					Serving Size	Planned Servings	Serving Size	Planned Servings	Leftover	Used
Entree										
Side Dishes										
Milk										
Other										

NOTE: Temperatures recorded on this sheet are end-point cooking temperatures. The temperature for each batch prepared should be checked. Service temperatures are recorded on the **Service Temperature Log**.

Scenarios for Temperature Corrective Action

The following scenarios are representative of situations that could occur in school foodservice. When temperatures are incorrect in situations like these, corrective action would be required.

- 1.** The bi-weekly milk delivery was made and you took a random carton of milk and checked the temperature with a bimetallic stemmed thermometer. The milk temperature registered at 43 °F. What corrective actions would you take?
- 2.** The foodservice director purchased a new infrared thermometer and asked you to check the surface temperature of all frozen meat products when they are received from the vendor. Today the vendor delivered several boxes of hamburger patties. You open one box to take the temperature. The temperature ranged from 32 °F to 35 °F, depending on location of the patties in the box. What corrective actions would you take?
- 3.** You come to work on Tuesday morning and take temperatures of refrigerators. One of the milk coolers was at 45 °F. What corrective actions would you take?
- 4.** Pork roasts were cooked first thing this morning for use in barbecue pork that will be served tomorrow. One cook put the roasts in the walk-in at 11:00 a.m. and documented the temperature to be 135 °F. At 1:30 p.m. you were asked to take the temperature of the roasts and you find that they range from 80 °F to 90 °F. What corrective actions would you take?
- 5.** You are setting up the serving line for the first group of students. You take temperatures of all food on the line and find that the fajita chicken meat is at 120 °F, 125 °F, and 130 °F in various spots in the pan on the service line. What corrective actions would you take?
- 6.** The foodservice director has started a new procedure for checking and recording the temperature of the final rinse in the dish machine using T-Stick® temperature indicators. The final rinse temperature was 181 °F on the gauge, but the 160 °F T-Stick® did not change color. What corrective actions would you take?

Suggested Answers for Handout 11

Scenarios for Temperature Corrective Action

1. There are multiple steps for corrective action for this situation:
 - Check the temperature of several random cartons of milk delivered to determine if they are at the appropriate temperature.
 - Report the situation to the foodservice director or manager, who will report the problem to the milk vendor.
 - Reject Delivery.
2. There are several steps that could be taken:
 - Open another box of patties and check several temperatures.
 - Report the situation to the foodservice director or manager. That person may take the following corrective action:
 - Reject the delivery.
 - Accept the delivery if the patties are going to be used within the next 1–2 days and can be stored in the refrigerator.
 - Contact the food distributor to let them know that temperature standards are not being met.
3. There are multiple steps to corrective action for this situation:
 - Check the temperature of several random cartons of milk in various positions in the milk cooler.
 - If milk in cartons is 41 °F or below when you take the temperature, move the milk to another cooler or refrigerator to prevent warming. Discard milk if above 41 °F.
 - Report the situation to the foodservice director or manager, who will report the problem to the school maintenance department, milk vendor, or outside equipment vendor (depending on ownership of milk cooler and maintenance arrangements).
4. The following corrective actions should be taken:
 - Reheat the pork roasts to 165 °F for 15 seconds.
 - Divide the roasts into quarters to facilitate cooling, or use blast chiller.
 - Check temperature in cooling process.
 - Report the situation to the foodservice director or manager.
5. The following corrective action should be taken:
 - Reheat the chicken to 165 °F for 15 seconds before serving.
 - Check temperature of holding equipment.
 - Report the situation to the foodservice director or manager so that food handling procedures can be checked and changed to ensure temperature maintenance.
6. The following corrective action should be taken:
 - Immediately recheck: If the color changes, then the rinse temperature is appropriate.
 - Continue washing dishes.
 - Report situation to foodservice director or manager.
 - If the color does not change after rechecking:
 - Report situation to foodservice director or manager, who will contact the maintenance department or outside vendor to repair the machine.
 - Discontinue using machine until it has been repaired.
 - Use disposable trays and silverware until machine has been repaired or use 3-compartment sink to sanitize trays and silverware.

Heat It Up! Game

The “Heat It Up!” game has been designed as a review of the information covered in Lessons 1–4. You can prepare **Category** signs (Measure Up!; When It’s Hot, It’s Hot; Brrr It’s Cold!; It’s Tool Time; and Write it Down!) and **Degree** signs (10, 20, 30, 40, and 50) with the **Answers** on the back of 8 x 11 in. sheets of paper. Note: Answers are in bold below. These signs could be taped to the wall or blackboard in the training area. When a participant selects a degree value, turn it over to reveal the answer. Participants will need to provide a correct “question” (or, you could provide the question and have participant give the correct answer). Some answers could have more than one question, but only one question has been provided. This may be played as one large group, or break the group into two teams that compete against each other. For fun, each team could select a team name. To keep score, post a large blank thermometer, start at 0 °F and add the number of degrees earned for each correct answer. The team with the highest temperature reading when all of the questions have been answered is the winner. Consider a prize of individual packages of red hots for the winning “Red Hot” team!

Measure Up!

- 10 **Receiving:** What is the first point in the food flow process where temperatures of food should be taken?
- 20 **Method for taking temperature of hamburger patties:** What is using a thermistor or thermocouple?
- 30 **The center:** What is the correct location for taking the end-point cooking temperature of a whole roast?
- 40 **Several random locations Or At least 3 locations including the center of the container:** Where should temperatures be taken in casseroles?
- 50 **50 °F to 70 °F:** What is the proper temperature range for storerooms for dry storage?

When It’s Hot, It’s Hot

- 10 **135 °F for 15 sec.:** What is the minimum holding temperature for hot food?
- 20 **165 °F for 15 sec.:** What is the temperature for reheating leftovers?
- 30 **155 °F for 15 sec.:** What is the temperature to which ground beef must be cooked?
- 40 **180 °F:** What is the recommended water temperature for final rinse in a high-temperature dish machine?
- 50 **160 °F:** What is the temperature that water must be when it comes in contact with surfaces for heat sanitizing?

Continued on next page

Heat It Up! Game (continued)

Brrr It's Cold!

- 10 **41 °F:** What is the low end of the temperature danger zone?
- 20 **35 to 41 °F:** What is the appropriate temperature for refrigeration units?
- 30 **-40 °F to 80 °F:** What is the temperature range for a freezer thermometer?
- 40 **at or below 41 °F:** What is the temperature at which cold foods should be kept?
- 50 **Time/temperature requirement for cooling:** What is from 135 °F to 70 °F in two hours, and from 70 °F to 41 °F in four additional hours or less?

It's Tool Time

- 10 **Alcohol Wipes:** What is one method of sanitizing thermometer probes?
- 20 **Most common and versatile thermometer:** What is a bimetallic stemmed thermometer?
- 30 **Thermocouple or Thermistor:** What is a thermometer that is digital (or rapid reading, tip sensitive)?
- 40 **Infrared thermometer:** What thermometer is used for taking surface temperatures of products such as frozen meats?
- 50 **T-Stick®:** What is a single-use indicator designed to measure one specific temperature?

Write it Down!

- 10 **Documentation:** What is the process of recording temperature information?
- 20 **Temperature log:** What is a form used for recording important temperatures?
- 30 **Date, time, initials:** What is information found on a documentation form?
- 40 **End-point cooking temperatures:** What is an example of a temperature that should be documented?
- 50 **Corrective action:** What must be done when a product does not reach the appropriate internal temperature?

