

Chapter 1

Food Safety



You need to become familiar with your kitchen surroundings and safe food practices in order to prepare healthy, safe foods in the lab, in foodservice facilities, and in your home. When preparing or handling food, you need to dress appropriately and be prepared to demonstrate safe food handling practices. You also need to be respectful of the kitchen environment you are working in by keeping everything clean and organized.

Dietitians, food service professionals, teachers, and anyone preparing, handling, or even eating food should be prepared to practice good food safety and sanitation. Whether preparing or handling food for a school, hospital, or nursing home, or just making food at home, eating out at a restaurant, or purchasing food in a grocery store, you need to be aware of how to keep your food safe. Learning basic food safety skills will help prevent you and your loved ones from getting **foodborne illness**.

 **THINK ABOUT IT**

◆ Describe a situation you have observed in your home, classroom, school cafeteria, or in a restaurant that might have posed potential problems concerning food safety and sanitation.

◆ List 3 things you would like to learn about food safety and sanitation or 3 questions you have relating to food safety and sanitation.

1.

2.

3.

LAB ASSIGNMENT:

Food Safety Inspection

The purpose of this unit is to review and fine-tune your food safety and sanitation skills so you are better prepared to demonstrate an understanding of food safety and sanitation concepts. A few examples of food safety and sanitation applications include personal hygiene, hand washing, sanitizing surfaces, cleaning and sanitizing equipment, and handling and preparing food properly. These food safety skills can provide the foundation for more advanced scientific learning about bacteria, fungi, parasites, and molds and how they impact the health of animals and humans.

Overview:

All students will complete a home food safety inspection. Your teacher may also ask you to complete a public foodservice facility inspection.

Evaluation Tool:

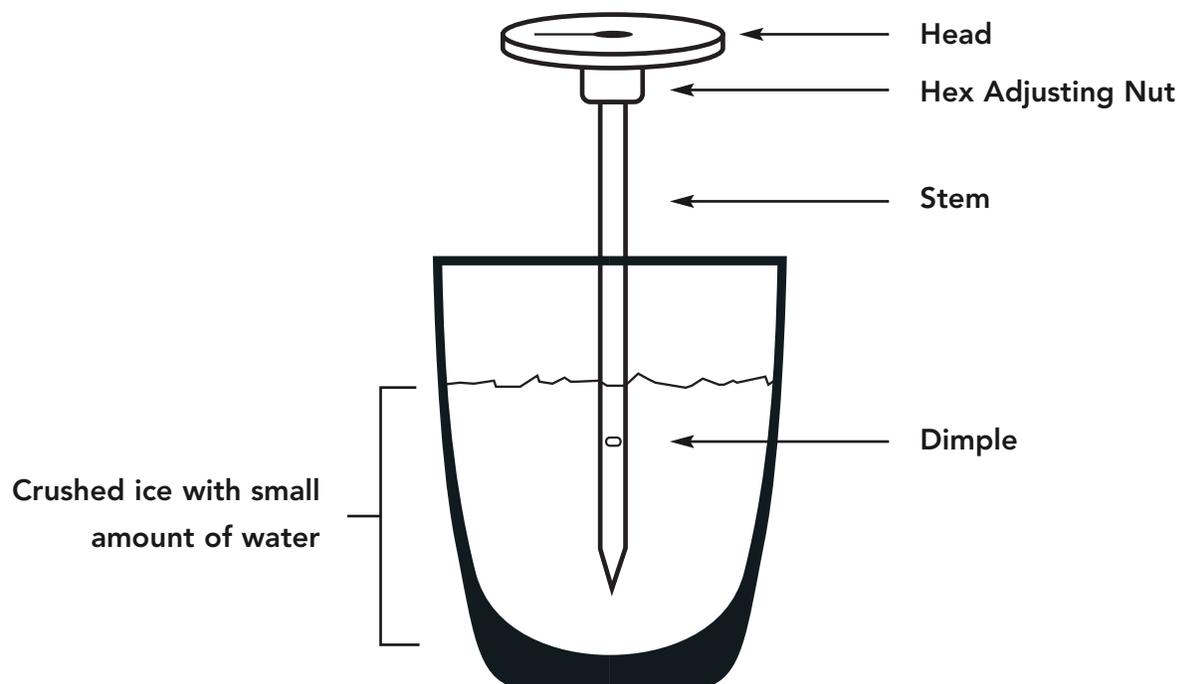
- Home Food Safety Inspection

Directions:

1. Read “Directions for properly testing temperatures” and practice calibrating your thermometer.
2. Complete the “Home Safety Inspection” form using the evaluation tool provided. For each item simply check “yes” or “no” in the appropriate column and write comments about potential problems and/or how they could be corrected.
3. Be sure to read “Food Safety Science” and “Food Safety Tips for Consumers” and complete the “Food Safety Questions.”
4. Your teacher may ask you to complete a public foodservice facility inspection utilizing the supplemental “Public Foodservice Facility Inspection” form.

Directions for properly testing temperatures:

1. To properly take temperatures with a **bi-metallic stemmed thermometer**, be sure to calibrate your thermometer first. The easiest way to calibrate your thermometer is with the ice-water method:
 - a. Fill a quart-size container with crushed ice and then add a small amount of clean tap water. You should have a lot of ice and only a little water.
 - b. Insert the thermometer so that the whole sensing area (from tip to dimple) is completely submerged for 30 seconds or until the indicator stops moving.
 - c. If the temperature is at 32° Fahrenheit, the thermometer is ready for use. If the temperature is not at 32° Fahrenheit, then hold the calibration nut (just below the temperature dial) securely with a wrench or other tool and rotate the head of the thermometer until it reads 32° Fahrenheit.
 - d. You should recalibrate the thermometer if you drop or bang it during use.
2. Before testing temperatures, be sure your thermometer is cleaned, sanitized, and properly dried.
3. Check the internal temperature at the thickest part of the meat or food item. Again, be sure the whole sensing area is inserted. The thermometer should not touch bone, fat, gristle, or the pan. For thin items such as hamburgers, insert the thermometer from the side into the middle of the meat.



HOME FOOD SAFETY INSPECTION

Date _____ Observer _____

Use this checklist to determine areas within your kitchen that need improvement.

(Developed by: Sara McLeod, MS, RDN, LDN, Modified Source: USDA Food and Safety Information and EFNEP, Revised Summer 2009, 2014)

Item	YES	NO	Comments	Corrective Action
Shopping				
I purchase refrigerated or frozen items last after selecting my non-perishables.				
I choose meat or poultry free from packaging tears and leaks.				
I check cans for dents or bulges and do not buy any damaged cans.				
I never buy food past the "sell by," "use-by," or other expiration dates.				
Storage				
I refrigerate perishable foods within 4 hours.				
I use a refrigerator thermometer and my refrigerator is 39° F or cooler.				
I use a freezer thermometer and my freezer is 0° F or cooler.				
I keep my non-perishable foods in a cool, clean, and dry space.				
I throw away any cans that are dented, leaking, bulging, or rusted.				
Clean				
I always wash my hands with hot water and soap for 20 seconds before, during, and after food preparation.				
I never handle/prepare food when I am sick.				
I have dish soap for washing dishes and separate hand soap for washing hands.				
I do not allow pets to walk on the countertops or other food preparation surfaces.				

HOME FOOD SAFETY INSPECTION (PAGE 2 OF 4)

Item	YES	NO	Comments	Corrective Action
Clean				
I promptly wash dirty dishes or place them in the dishwasher (never left out in my kitchen).				
The sink is free of any food particles.				
I sanitize the cloth, sponge, and/or dish towel.				
I wash cutting boards between every use.				
I sanitize cutting boards, utensils, and countertops with a sanitizing solution.				
The utensils I use for tasting are used only one time (never put back into a prepared food).				
I do not place cooked meat on a plate that once held raw meat without washing the plate first.				
I wipe down or wash the drawers of my refrigerator regularly.				
I use single-use paper towels to clean countertops and tables.				
No insects, droppings, or pests are present in my kitchen.				
Separation and Preparation				
I marinate meat and poultry in covered dishes in the refrigerator (never on the counter).				
I store cooked or ready-to-eat foods in my refrigerator above raw meat, poultry, and fish.				
I store cleaning supplies in a safe place away from food.				
I keep raw meats and their juices away from other foods.				
I keep raw and cooked food separated while shopping, preparing, and storing.-				
I wash fruits and vegetables before preparing or eating.				
I do not wash or rinse meat or poultry.				

HOME FOOD SAFETY INSPECTION (PAGE 3 OF 4)

Item	YES	NO	Comments	Corrective Action
Thawing				
I use the refrigerator to defrost foods (I never let foods defrost on the counter).				
I make sure juices from meats do not drip onto other foods.				
If I thaw frozen meat in the sink, it is in a leak-proof package or plastic bag, it is completely submerged in cold running water, and is left to thaw for no more than 4 hours.				
I use the defrost selection on my microwave for defrosting.				
I cook the meat immediately after defrosting in the microwave.				
I always remove the original Styrofoam or plastic wrapping before defrosting meat in the microwave.				
Cooking				
I use a food thermometer to determine if meat is done (I do not base doneness simply on color).				
I make sure my meats come to the appropriate temperatures.				
I cook eggs so the yolk and whites are firm, not runny.				
When using the microwave, I cover the dish, stir the food, and rotate the dish for even cooking and to prevent cold spots.				
I bring leftover foods to 165° F for 15 seconds or longer.				
When reheating sauces, soups, and gravies, I bring them to a boil or use a thermometer to ensure they reach 165° F for 15 seconds or longer.				
I avoid unpasteurized milk and products containing unpasteurized milk, raw/partially cooked eggs, raw/undercooked meat and poultry, unpasteurized juices, and raw sprouts.				
Leftovers				
I divide foods into shallow containers, use ice water baths as necessary to cool food rapidly, and refrigerate within 4 hours of preparation.				
I do not reheat leftovers more than once and I discard cooked leftovers after 3-4 days.				

HOME FOOD SAFETY INSPECTION (PAGE 4 OF 4)

Item	YES	NO	Comments	Corrective Action
Chilling				
I do not leave foods in the “temperature danger zone” (41-135° F) for more than 4 hours (or 1 hour when air temperature is over 90° F).				
I do not put large pots of warm food into the refrigerator to cool (I transfer contents of large pots to shallow containers and use ice water baths as needed to cool rapidly before putting in the refrigerator).				
I make sure cool air can circulate freely through my refrigerator (my refrigerator is not packed so full that air cannot circulate).				

POST-INSPECTION QUESTIONS

1. How many items received a “No” check mark?

2. The temperature danger zone (TDZ) rule from the Food Safety Inspection Service of the US Department of Agriculture states that foods should be thrown out if they are left in the TDZ for more than 4 hours (cumulative hours). Was this a problem for you?

LEARN MORE:

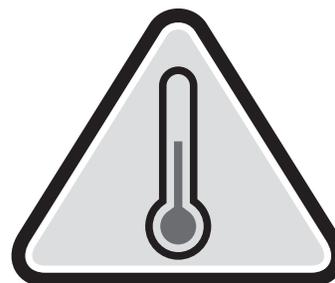
Food Safety Science

◆ Food safety hazards fall into three categories:

1. Biological hazards due to **microbes** that cause foodborne illness.
2. Chemical hazards from contamination with pesticides or cleaning supplies.
3. Physical hazards from foreign objects (such as broken glass) that accidentally get into or on food.

◆ Foods that allow microbes to grow rapidly are called potentially hazardous foods. **Potentially hazardous foods** typically are somewhat moist, contain protein, and have a neutral or slightly acidic pH. Meat, poultry, fish, milk, tofu, cooked beans, cut fruits and vegetables, cooked rice, baked potatoes, and sprouts are all examples of potentially hazardous foods.

◆ The **temperature danger zone** (TDZ) is the range of temperatures in which most microbes that cause foodborne illness multiply rapidly. To keep potentially hazardous foods safe from microbial growth, time in the TDZ should be minimized to less than four hours. It is important to note that exposure to lower temperatures (as in refrigerators or freezers) typically do not kill microbes; it only slows or temporarily stops their growth.



◆ The most common causes of foodborne illness include individuals:

1. Practicing poor personal hygiene (e.g. not washing hands, touching face and hair during food preparation)
2. Purchasing foods from unsafe sources
3. Failing to cook foods to safe temperatures
4. Holding foods in the TDZ for too long
5. Using contaminated utensils, cutting boards, countertops, etc.

◆ Generally, foodborne illnesses are classified into two groups:

1. *Foodborne infections* result when pathogens from contaminated food grow in the intestines (slow process).
2. *Foodborne intoxications* result when a person has eaten a toxin (fast process).

Food Safety Consumers Tips

- ◆ Wash hands frequently while in the kitchen to ensure food safety. To wash hands properly:
 1. Wet your hands with warm running water.
 2. Apply soap.
 3. Lather hands and arms for at least 20 seconds; pay special attention to areas between fingers and under fingernails.
 4. Rinse your hands thoroughly under running water.
 5. Dry your hands with a single-use paper towel.
 6. Use a second paper towel to turn off the faucet.
- ◆ Store and handle foods so that raw foods do not touch or drip fluids onto cooked or ready-to-eat foods.
- ◆ Avoid cross contamination by using color-coded cutting boards and thoroughly washing and sanitizing boards between uses. Red cutting boards are often designated for preparing raw meat, while green is commonly used for fresh produce. More extensive color-coded systems may use red for raw meat, yellow for raw poultry, blue for raw fish and seafood, green for fruits and vegetables, white for dairy, and brown for cooked foods. If you only have one cutting board available, be sure to cut breads, fruits, and vegetables first. Set the prepared items safely aside. Then wash & sanitize the board and prepare raw meat, poultry, or fish. Be sure to wash and sanitize the board between each use. Boards should be thrown away if they develop deep, hard to clean grooves.
- ◆ Clean and sanitize all food-contact surfaces (e.g. countertops, utensils, and cutting boards) that touch potentially hazardous foods before using them with cooked or ready-to-eat foods.
- ◆ To make a simple sanitizing solution, mix 1 tablespoon of unscented liquid chlorine bleach with 1 gallon of warm water or 1 teaspoon of bleach with 1 quart of warm water. Wash surfaces first to remove dirt and food particles, then spray or wipe them down with the solution and allow to air dry. Replace the sanitizing solution every day or sooner if it appears dirty.
- ◆ Use paper towels in the kitchen, when possible. Dish rags and sponges often remain damp for long periods of time, making them a likely place for microbes to flourish. If using rags or sponges, rinse out food particles and store in a sanitizing solution between uses. Once a week, soak sponges in a stronger sanitizing solution (3 tablespoons bleach to a quart of water) for two minutes and allow to air dry.
- ◆ Always cook foods to proper temperatures. Find recommended temperatures plus a wealth of other food safety tips on the USDA website.
- ◆ Store leftovers in small containers and refrigerate or freeze right away. Any leftovers that remain in the TDZ for four hours or more must be thrown away. Eat properly stored leftovers within 3-4 days and only reheat one time. Be sure to reheat leftovers to 165° Fahrenheit.

Food Safety Questions

1. Were there any items on the home inspection sheet that surprised you? Why?
2. Did you find problems in your home?
3. What can you change to make your home kitchen safer?
4. What food safety issues will you be more aware of when grocery shopping, preparing foods, storing leftovers, or even dining out?

LAB SUPPLEMENT:

Public Foodservice Facility Inspection

The purpose of this supplement is to familiarize you with food safety and sanitation issues and practices in public foodservice facilities. This supplement aims to provide insight into the role of public health departments in inspecting the food safety practices of foodservice facilities.

Overview:

Students will be responsible for contacting a foodservice facility and scheduling a visit to observe the facility's food safety practices. Students will need to arrange their own transportation. Completed foodservice facility inspection sheets must include the name of the facility and the contact person's name, signature, and contact information to verify the inspection.

Evaluation Tool:

- Public Foodservice Facility Inspection

Directions:

1. Choose a restaurant or school cafeteria to inspect. Call ahead to schedule an appointment. Be sure to explain that you would like to observe the facility and food safety practices for educational purposes and that your observations will not be shared publicly.
2. When you visit the restaurant or school cafeteria, make sure you meet with the manager first to ensure you are following the food safety and sanitation rules of the facility you are entering. These practices include wearing a hairnet and rubber-sole, closed-toed shoes in the food preparation area/kitchen. (Most facilities will be willing to give you a hairnet for this experience.) Be sure to dress cleanly and professionally and follow all other rules and practices the facility has in place.
3. Be sure you have read the "Directions for properly testing temperatures" and have completed the home inspection before you go to the facility.
4. Complete the public foodservice facility inspection by using the evaluation tool provided. Simply check "yes" or "no" to each item and write comments about potential problems and/or how they could be corrected.
5. Note: It is the responsibility of the cafeteria/restaurant manager and the local public health department to ensure that safe food-handling practices are taking place in the facility. Merely stand back and observe the operation; only provide comments to the manager if he or she requests information and you feel comfortable sharing your observations. While you are in the facility, you are expected to be appreciative and non-intrusive of the operations that are taking place.

PUBLIC FOODSERVICE FACILITY INSPECTION

Facility: _____ Contact Person: _____

Phone #: _____ Email: _____

Verification Signature: _____

Date _____ Observer _____

Use this checklist to determine areas in the operation requiring corrective action.

(Developed by: Melani Duffrin, PhD, RDN, LDN, Modified Source: USDA Publication FNS-295)

Item	YES	NO	Comments	Corrective Action
Personal Dress and Hygiene				
Employees wear proper clean uniform including proper closed toed shoes.				
Hair restraints are worn.				
Fingernails are short, unpolished, and clean.				
Jewelry on arms and hands is limited to plain ring such as wedding ring (rule includes medical identification jewelry).				
Gloves are changed between tasks. Hands are washed every time gloves are changed.				
Open sores, cuts or splints and bandages on hands are completely covered while handling food.				
Hands are washed thoroughly using proper hand-washing procedures before and after handling food, between tasks, before using food-preparation equipment, after toileting, and after touching any body part other than clean hands/arms.				
Eating or chewing gum is observed only in designated areas away from work spaces (except for appropriate tasting).				
Any drinks in preparation areas are covered with a lid and drunk with straw in a manner to prevent cross contamination, and are not placed on or above food preparation surfaces.				
Employees take appropriate action when coughing or sneezing.				
Disposable tissues are used and disposed of when coughing/blowing nose.				

PUBLIC FOODSERVICE FACILITY SAFETY INSPECTION (PAGE 2 OF 5)

Item	YES	NO	Comments	Corrective Action
Food Storage and Dry Storage				
Temperature is between 50° F and 70° F.				
All food and paper supplies are at least 6 inches from floor if stored on portable shelving or 12 inches from floor if stored on stationary shelving.				
All food is labeled with name and delivery date.				
The FIFO (First In, First Out) method of inventory is being practiced.				
There are no bulging or leaking canned goods in storage.				
Food is protected from contamination.				
All surfaces and floors are clean.				
Chemicals are stored away from food and other food-related supplies.				
Large Equipment				
Food slicer is clean to sight and touch.				
Food slicer is sanitized between uses when used with potentially hazardous foods.				
All other pieces of equipment are clean to sight and touch – such as equipment on serving lines, storage shelves, cabinets, ovens, ranges, fryers, and steam equipment.				
Exhaust hood and filters are clean.				
Large Equipment				
Thermometer is conspicuous and accurate.				
Temperature is accurate for piece of equipment.				
Unit is clean.				

PUBLIC FOODSERVICE FACILITY SAFETY INSPECTION (PAGE 3 OF 5)

Item	YES	NO	Comments	Corrective Action
Large Equipment				
Proper chilling procedures have been practiced.				
All food is properly wrapped, labeled, and dated.				
The FIFO (First In, First Out) method of inventory is being practiced.				
Food Handling				
Frozen food is thawed under refrigeration (preferable), completely submerged under cold (70° F or lower) running water, or in a microwave and cooked immediately.				
Food is not allowed to be in the "temperature danger zone" (41° F – 135° F) for more than 4 hours for foods held for immediate consumption or for more than 2 hours for foods held for customer "take-out"; foods held like this are labeled with discard time, and are sold, served or discarded within that time.				
Food is tasted using the proper method (clean utensil used only one time).				
Food is not allowed to become cross-contaminated.				
Food is handled with utensils and clean gloved hands.				
Utensils are handled to avoid touching parts that will be in direct contact with food.				
Reusable towels are used only for sanitizing equipment surfaces and not for drying hands, utensils, floor, etc.				
Utensils and Equipment				
All small equipment and utensils, including cutting boards, are sanitized between uses.				
Small equipment and utensils are air dried.				
Work surfaces are clean to sight and touch.				
Work surfaces are washed and sanitized between uses.				

PUBLIC FOODSERVICE FACILITY SAFETY INSPECTION (PAGE 4 OF 5)

Item	YES	NO	Comments	Corrective Action
Utensils and Equipment				
Thermometers are washed and sanitized between each use.				
Can opener is clean to sight and touch.				
Drawers and racks are clean.				
Small equipment is inverted, covered or otherwise protected from dust or contamination when stored.				
Hot Handling				
Unit is clean.				
Food is reheated to 165° F before placing in hot holding.				
Temperature of food being held is above 135° F.				
Food is protected from contamination.				
Cleaning and Sanitizing				
A three-compartment sink is used.				
The three-compartment sink is properly set up for warewashing (wash, rinse, sanitize).				
Chemical test kit or thermometer is used to check sanitizing rinse.				
The water temperature is accurate.				
If heat sanitizing utensils with mechanical equipment, the water reaches a minimum temperature of 180° F. If heat sanitizing manually, utensils are immersed in 171° F water				
If using chemical sanitizer, it is the proper dilution and utensils are immersed for at least 2 minutes.				
The water is clean and free of grease and food particles.				

PUBLIC FOODSERVICE FACILITY SAFETY INSPECTION (PAGE 5 OF 5)

Item	YES	NO	Comments	Corrective Action
Cleaning and Sanitizing				
The utensils are allowed to air dry.				
Wiping cloths are stored in sanitizing solution while not in use.				
Garbage Storage and Disposal				
Kitchen garbage cans are clean.				
Garbage cans are emptied as necessary.				
Boxes and containers are removed from site.				
Loading dock and area around dumpster are clean.				
Dumpster is closed.				
Pest Control				
No evidence of pests is present.				

POST-INSPECTION QUESTIONS

1. How many items received a “No” check mark?

2. Did any of the problems surprise you? Why?

3. What food safety issues will you be more aware of when working in a foodservice facility or dining out?

Food Safety Teacher Tips

Overview:

- ◆ This lab can be completed outside of the laboratory setting at the student's home.
- ◆ The food service facility investigation can be optional if students are unable to access facilities.
- ◆ If students do not have a home kitchen accessible, they can investigate the kitchen laboratory used for class or the assignment can be due later in the semester so they can have a chance to use their kitchen at home.
- ◆ When reviewing this laboratory with students, be sure to point out major safety concerns, such as improper temperatures and storage. These points can be used to introduce students to the laboratory setting.