

# Basic Food Production HAT2324

Unit 2 – Food preparation, service, storage, safety and security



# Food Safety and Sanitation:

- Most people wrote in the assignment that they believe that food safety, cleanliness and sanitation are the most important aspects of food production
- Customers who pay to use our services and products **expect** a safe product and service
- For food production, **a food-borne illness** is the most important challenge for us
- Before I will allow you to prepare and produce food, I would need to know that you understand the dangers and how to prevent them.
- This unit is about this 'Food Safety and Sanitation'

# The safe workplace – why?

- **Professionalism: we are working towards being a professional**
  - Pride in quality is reflected in your appearance and work habits: poor hygiene, poor grooming and personal care are not acceptable!
- Poor sanitation and safety can cost a lot of money.
- Poor food handling procedures and unclean kitchens cause illness, unhappy customers, and even fines, and lawsuits.
- Food spoilage raises food costs.
- Poor kitchen safety results in injuries, medical bills, and lost workdays.
- Finally, poor sanitation and safety habits show lack of respect for your customers, for your fellow workers, and for yourself

## Food Safety and Sanitation:

- **Sanitation** refers to the creation and maintenance of conditions that prevent food contamination or food-borne illness.
- **Contamination** refers to the presence, generally unintended, of harmful organisms or substances.

# Food Hazards:

- Most food-borne illness is the result of eating food that has been **contaminated**
- **contaminated** means it that the food contains **harmful substances** that were not present originally in the food

# Food Hazards:

Any substance that can cause illness or injury is called a hazard

There are three types of food hazards:

- Biological hazards
- Chemical hazards
- Physical hazards

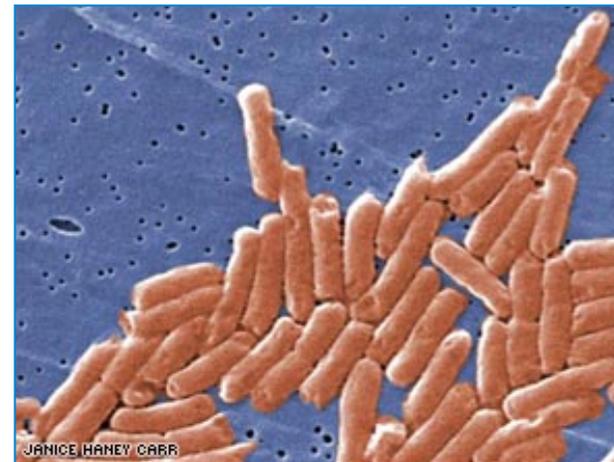
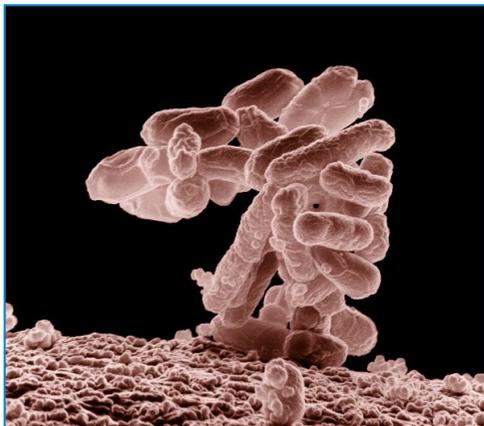
# Pathogens

- Microbiology is the study of tiny, usually single-celled, organisms that can only be seen under a microscope. The four types that can contaminate food are:
  - Bacteria
  - Viruses
  - Parasites
  - Fungi
- Most food-borne diseases are caused by bacteria, so that is what we will concentrate our attention on



# Direct Contamination:

- Several microorganisms, primarily **bacteria**, **parasites**, **viruses**, and **fungi** can cause biologically based food-borne illness.
- Bacteria are single-celled, are the leading cause of food-borne illness.
- Beneficial bacteria called putrefactive are not a concern.
- The dangerous ones are called pathogenic



# Types of Bacteria:

Bacteria are everywhere - in the ground, air, our food, on our skin, and inside our bodies.

- The classifications are:
  - 1. **Harmless bacteria**
    - Most bacteria fall into this category. They are neither helpful nor harmful to us.
  - 2. **Beneficial Bacteria**
    - These bacteria are helpful to us. They live inside us and help us digest food. In food production, bacteria make possible the manufacture of many foods, including cheese & yogurt



# Types of Bacteria

- 3. Undesirable bacteria
  - These are the bacteria that are responsible for **food spoilage**. They cause **souring**, **putrefying**, and **decomposition**.
  - They announce their presence by means of **sour odors**, **sticky** or **slimy surfaces**, and **discoloration** (the colour changes)
  - We are concerned with these bacteria for two reasons:
    - Food spoilage costs money.
    - Food spoilage is a sign of improper food handling and storage. This means the next kind of bacteria is probably present.

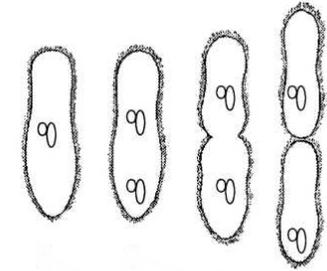
## 4. Disease-causing bacteria, or pathogens

- These are the bacteria that cause most food-borne illness, the bacteria we are most concerned with:
- **Pathogens** do not necessarily leave **detectable odors** or **tastes** in food. In other words, you can't tell (*don't know*) if food is contaminated by smelling, tasting, or looking at it
- The only way to protect food against pathogenic bacteria is to use **proper hygiene** and **sanitary food** handling and storage techniques.



Illustration: Don Smith

# Bacterial Growth:



- Bacteria grow by a process called binary fission. A single bacterium can grow to a million in less than 6 hours!
- Conditions for growth:
  - **Food**
    - Foods with sufficient amounts of **proteins** are best for bacterial growth.
    - These include **meats, poultry, fish, dairy products, and eggs**, as well as some grains and vegetables.
  - **Moisture**
    - Bacteria require water in order to absorb food
  - **Temperature**
    - Bacteria grow best at warm temperatures. Temperatures between 5°C and 57°C promote the growth of disease-causing bacteria. This is called the **FOOD DANGER ZONE**



# Bacterial Growth:

- **Acidity or alkalinity**

- In general, disease-producing bacteria like a neutral environment, neither too acidic nor too alkaline.

- **Oxygen**

- Some bacteria require oxygen to grow.

- **Time**

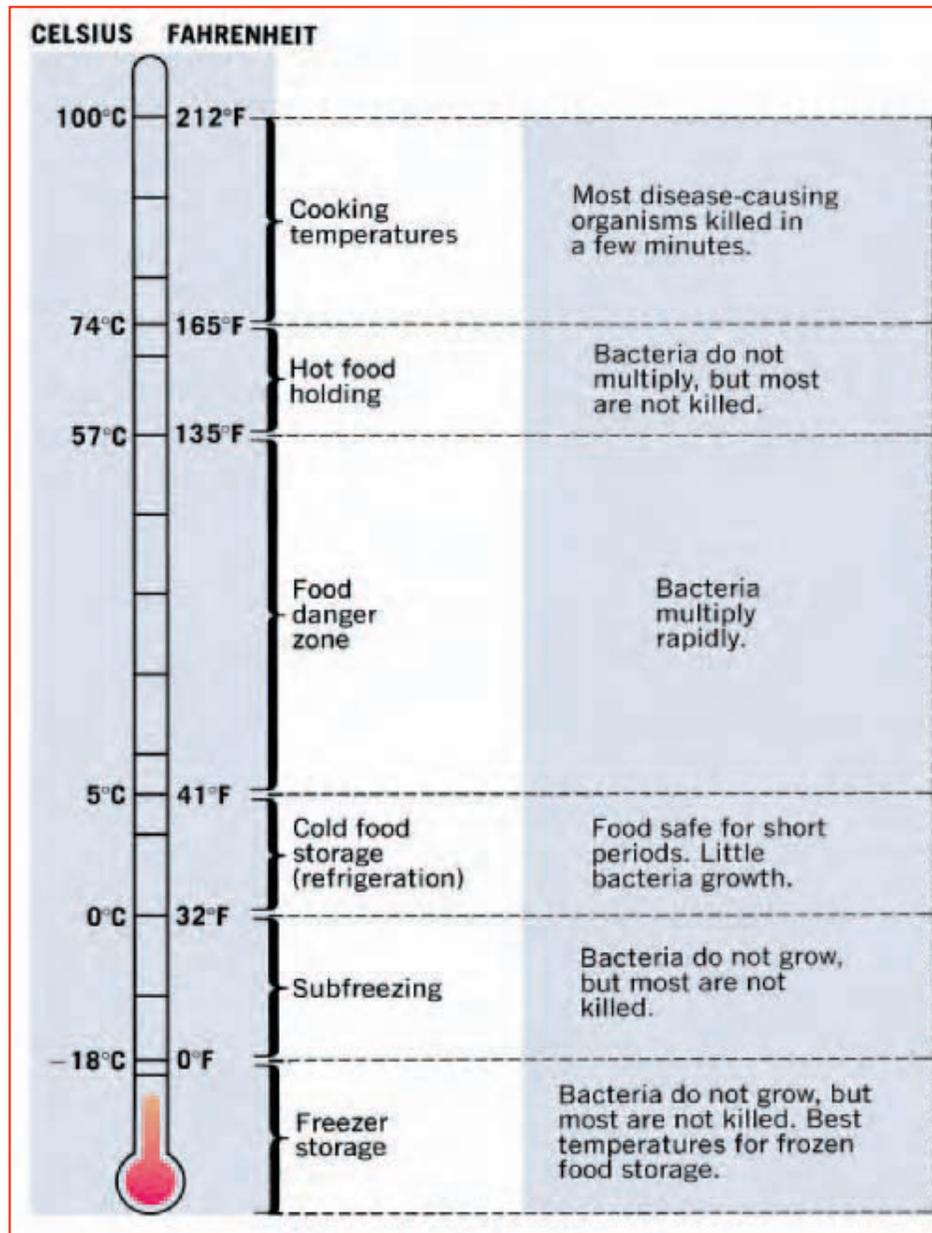
- When bacteria are introduced to a new environment, they need time to adjust to their surroundings before they start growing

# Potentially Hazardous Foods:

- **Two general categories:**
  - Food from animals or foods containing animal products
  - Any food derived from plants which has been cooked, partially-cooked, or heat-treated.
- **Three specific items:**
  - Raw seed sprouts
  - Sliced melons
  - Garlic and oil mixtures
- Foods that are **not** potentially hazardous include **dried** or **dehydrated** foods (such as the dried noodles meal)

# The Temperature Danger Zone:

- The danger zone is 5° C to 57° C. Bacteria grow rapidly if food (high protein) is held within these temperatures
- Simply keep hot food hot and cold food cold at all times
- Keep frozen foods frozen until use
- Thaw (melt... go from frozen to normal temperature) food properly



**Important temperatures in sanitation and food protection**

# Locomotion: How they move

- Bacteria can move from place to place in only one way: They must be carried. **They can't move on their own!**
- Foods can become contaminated by any of the following means:
  - Hands
  - Air
  - Coughs and sneezes
  - Water
  - Other foods
  - Insects
  - Equipment and utensils
  - Rats and mice



# Protection against Food borne illnesses:

- Because we know how and why bacteria grow, we should be able to keep them from growing.
- There are three basic principles of food protection against bacteria
- **1. Keep bacteria from spreading.**
  - *Don't let food touch anything that may contain disease-producing bacteria, and protect food from bacteria in the air.*
- **2. Stop bacteria from growing.**
- Take away the conditions that encourage bacteria to grow. In the kitchen, our best weapon is temperature. *The most effective way to prevent bacterial growth is to keep foods below 5°C or above 57°C.*
  - *These temperatures won't necessarily kill bacteria; they'll just slow down their growth*

### 3. Kill bacteria:

- Most disease-causing bacteria are **killed** if they are subjected to a **temperature of 77°C for 30 seconds** or **higher temperatures** for **shorter times**
- This enables us to **make food safe by cooking** and to sanitize dishes and equipment with heat
- The term **sanitize means to kill disease-causing bacteria.**
- Certain **chemicals** also kill bacteria. These may be used for sanitizing equipment. This means using **chemicals** to kill the bacteria

# Viruses and Parasites:

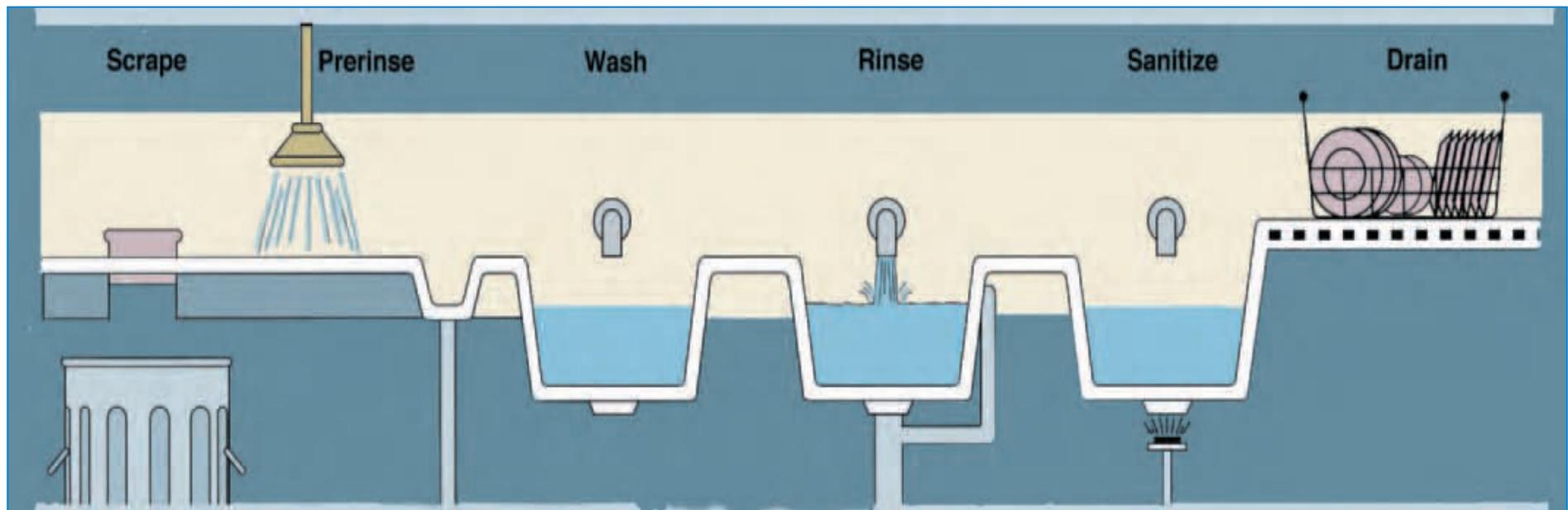
- **Viruses** are even smaller than bacteria;
  - viruses do not multiply in food like bacteria, food-borne viral diseases are usually caused by contamination from **people**, **food contact surfaces**, or, in the case of seafood, **contaminated water** (water that is contaminated)
- **Parasites** are organisms that can survive only by living on or inside another organism;
  - The organism a parasite lives in and takes nourishment from is called the *host*
  - They can usually be killed by proper cooking or by freezing.

# Allergens:

- An **allergen** is a substance that causes an allergic reaction.
- **Allergens** affect only some people, and these people are said to be *allergic to that specific substance*
- Allergic reactions to food may occur as soon as the food is eaten or, in some cases, merely touched, or they may not occur until hours after the food is eaten.
- Common symptoms of allergic reaction to foods include itching, rash or hives, shortness of breath, tightness in the throat, and swelling of the eyes and face.
- In severe cases, allergic reactions may lead to unconsciousness or death.
  
- Foods to which some people are allergic include:
- Biological allergens include **wheat products, soy products, peanuts** and other **nuts, eggs, milk** and **dairy products, fish, and shellfish**
- Nonbiological allergens include food additives such as **nitrites**, used in cured meats, and monosodium glutamate (**MSG**), often used in Asian foods.
  
- Because these products are common and are perfectly safe for most people, it is difficult to avoid serving them. Customers need to be told what that they are present in their food.

# CLEANING AND SANITIZING EQUIPMENT:

- *Cleaning means removing visible soil. Sanitizing means killing disease-causing bacteria.*
- *Two ways of killing bacteria are by heat and by chemicals.*



## **P**rocedure for Manual Dishwashing

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### 1. Scrape and rinse.

The purpose of this step is to keep the wash water cleaner longer.

### 2. Wash.

Use warm water at 110°F to 120°F (43°C to 49°C) and a good detergent. Scrub well with a brush to remove all traces of soil and grease.

### 3. Rinse.

Use clean, warm water to rinse off detergent. Change the water frequently, or use running water with an overflow, as in Figure 2.2.

### 4. Sanitize.

Place utensils in a rack and immerse in hot water at 171°F (77°C) for 30 seconds. (A gas or electric heating element is needed to hold water at this temperature.)

### 5. Drain and air dry.

Do not towel dry. This may recontaminate utensils. Do not touch food contact surfaces of sanitized dishes, glasses, and silverware.

## Food-borne illness group assignment:

- Get into a group of 4 or 5. Write your names on my piece of paper and I will give you a Bacterial disease, a virus or a parasite to present to the class. You can make a ppt. The ppt can be no longer than 5 minutes. Each member should present at least one slide
- I want to know:
  - What causes the disease and its characteristics
  - A picture of the disease (this may mean a close-up picture of the bacteria)
  - What is the source of the bacteria (a picture if possible)
  - What foods are usually involved (and a picture of them for the class to see)
  - How we can prevent the disease from happening
  - Give the class a demonstration of how a person would act with the disease!
- **Try to make it interesting so that we learn something from it. You will present it in the next class.**

# **HACCP: Hazard Analysis Critical Control Points**

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# The HACCP System:

- Hazard Analysis Critical Control Points
- Is proving to be an effective and efficient system for maintaining sanitary conditions in all types of food service operations
- This system is widely accepted in the food service industry

# The Steps of the HACCP System: (p33)

1. Assess hazards
2. Identify critical control points
3. Set up standards or limits for critical control points
4. Set up procedures for monitoring critical control points
5. Establish corrective actions
6. Set up a recordkeeping system
7. Verify that the system is working

# The Flow of Food:

1. Receiving raw ingredients
2. Storing raw ingredients
3. Preparing ingredients
4. Cooking
5. Holding and serving
6. Cooling and storing leftovers
7. Reheating, holding, and storing leftovers

# Prevention of food poisoning and food-borne diseases

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# PERSONAL HYGIENE:

- Most food-borne disease is caused by bacteria.
  - most food-borne disease is caused by bacteria spread by food workers (Chefs, Waiters etc.)
- Most food contamination occurs as a result of
- **Cross-contamination:**
  - Cross-contamination may be defined as the transferring of hazardous substances, mainly microorganisms, to a food from another food or another surface, such as equipment, worktables, or hands



- Areas most frequently missed during hand washing
- Less frequently missed
- Not missed

(Adapted from Taylor L (1978), An evaluation of hand washing techniques - I, Nursing Times, 12 January, pp 54-55)



## COLOUR CODED CUTTING BOARDS

*eliminate the risk of bacterial cross contamination during food preparation*



RED

**RAW MEAT**



BLUE

**RAW FISH**



YELLOW

**COOKED MEAT**



GREEN

**SALAD & FRUIT**



BROWN

**VEGETABLES**



WHITE

**BAKERY & DAIRY**



# Cross-contamination:

- Mixing contaminated **leftovers** with a **freshly cooked** batch of food
- Handling ready-to-eat foods with **unclean hands**.
  - Handling several types of foods without washing hands in between.
- Cutting raw chicken, then using the same cutting board, unsanitized, to cut vegetables
- Placing ready-to-eat foods on a lower refrigerator shelf and allowing juices from raw fish or meat to drip onto them from an upper shelf
- Wiping down work surfaces with a soiled cloth.

# Personal hygiene:

- For the food worker, the **first** step in preventing food-borne disease is good **personal hygiene**
- Even when we are healthy, **we have bacteria** all over our skin and in our nose and mouth
- Some of these bacteria, if given the chance to grow in food, will make people ill.

# Steps to good personal hygiene:

- Do not work with food if you have any communicable disease or infection (flu, cold, cough etc.)
- Bathe or shower daily.
- Wear clean uniforms and aprons.
- Keep hair neat and clean. Always wear a hat or hairnet.
- Wash hands and exposed parts of arms before work and as often as necessary during work, including:
  - After eating, drinking, or smoking.
  - After using the toilet.
  - After touching or handling anything that may be contaminated with bacteria.

## Steps to good personal hygiene:

- Cover coughs and sneezes, then wash hands.
- Keep your hands away from your face, eyes, hair, and arms.
- Keep fingernails clean and short. Do not wear nail polish.
- Do not smoke or chew gum
- Cover cuts or sores with clean bandages.
- Do not sit on worktables.
  
- Please take note of the above. It is important for our food production course.

# Correct food storage procedures and packaging

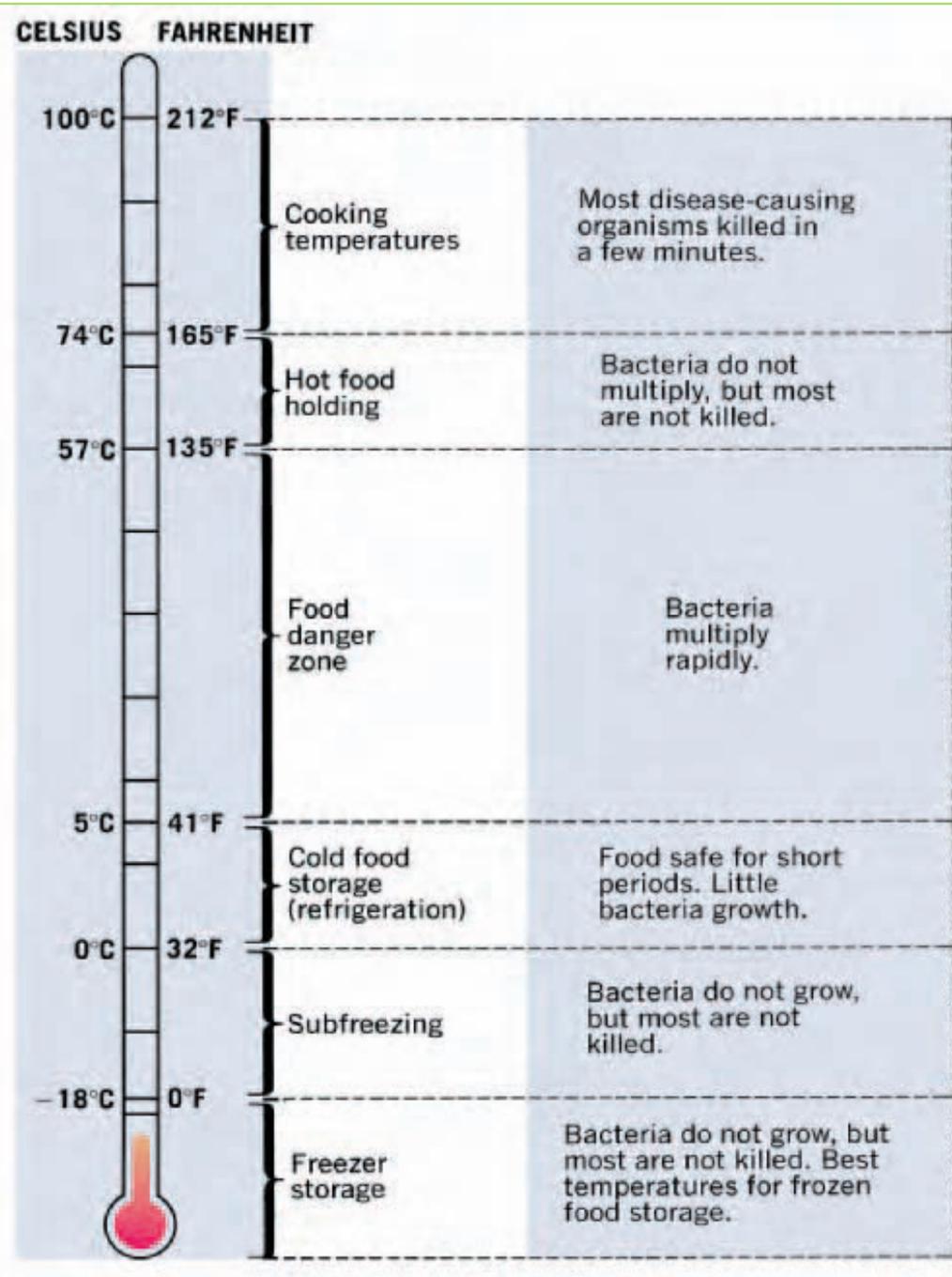
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# Correct food storage procedures:

- The following rules of safe food storage have two purposes:
  1. To prevent contamination of foods
  2. To prevent growth of bacteria that may already be in foods
- Temperature control is an important part of food storage. Perishable foods must be kept out of the Food Danger Zone **5°C to 57°C** — as much as possible, because these temperatures support bacterial growth.

# THE FOUR-HOUR RULE:

- Food is handled in many stages between the time it is received and the time it is finally served.
- This progression, called the flow of food
- During each stage, food might be allowed to remain in the **Food Danger Zone** for a time
  - To protect food and keep it safe, follow the **four-hour rule**:
  - **Do not let food remain in** the Food Danger Zone for a cumulative total of more than 4 hours between receiving and serving





← Refrigerator 2c-5c

Freezer -18c to -22c →



# **FREEZER STORAGE: $-18^{\circ}\text{C}$**

1. Keep frozen foods at  $-18^{\circ}\text{C}$  or lower.
2. Keep all frozen foods tightly wrapped or packaged to prevent freezer burn.
3. Label and date all items.
4. Thaw frozen foods properly. Do not thaw at room temperature, because the surface temperature will go above  $5^{\circ}\text{C}$  before the inside is thawed, resulting in bacterial growth.

## **These methods may be used:**

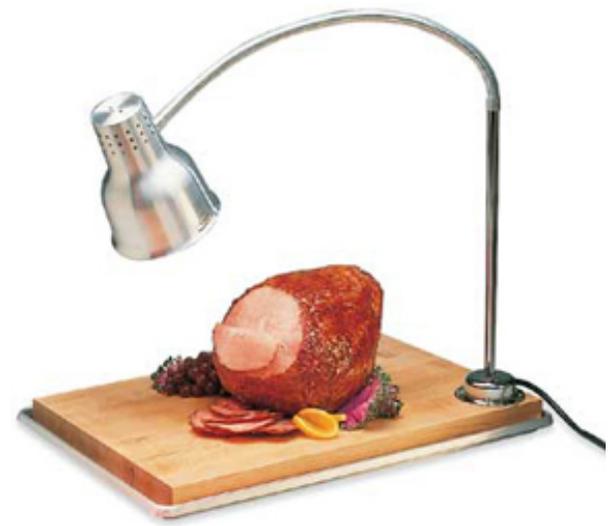
- In refrigerator
- Under cold running water
- In a microwave oven, if the item is to be cooked or served immediately

# REFRIGERATOR STORAGE: 2c-5c

- **1. Keep all perishable foods properly refrigerated.**
  - Food Danger Zone 5°C is only the upper limit for refrigerator storage.
  - Most foods keep even better at lower temperatures. The major exception is fresh fruits and vegetables, which are not considered potentially hazardous foods.
- **2. Do not crowd refrigerators. Leave space between items so cold air can circulate**
- **3. Keep refrigerator doors shut except when removing or putting in foods.**

# HOT FOOD HOLDING:

1. To keep foods hot for service, use steam tables or other equipment that will keep all parts of all foods above 57°C at all times.
2. Keep foods covered.
3. Bring foods to holding temperature as quickly as possible by using ovens, steamers, range-top pots and pans, or other cooking equipment.
  - Do not warm cold foods by placing them directly in the steam table. They will take too long to heat, and bacteria will have time to grow.
4. Do not let ready-to-eat foods come in contact with any contaminated surface.



## Table 2.4 Food Storage Temperatures

Raw vegetables and fruits (see note)	40°-45°F	4°-7°C
Eggs	38°-40°F	3°-4°C
Milk and cream	36°-40°F	2°-4°C
Poultry and meat	32°-36°F	0°-2°C
Fish and seafood	30°-34°F	-1°-1°C

# **Workplace habits that prevent injuries**

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# The kitchen as a safe place:

- Kitchen work is usually considered a relatively safe occupation
- Nevertheless, the kitchen has many hazards.
  - Minor injuries from **cuts** and **burns** are common, and more serious injuries are all too possible.
  - The quantity of hot equipment and powerful machinery, combined with the busy, sometimes frantic pace, make it important for everyone to work carefully and with constant attention to the rules of safety.

# Safety:

- The safe workplace is one that monitors:
  - Preventing cuts
  - Preventing burns
  - Preventing fires
  - Preventing injuries from machines and equipment
  - Preventing falls
  - Preventing strains and injuries from lifting

# THE SAFE WORKPLACE: (p35)

- Cuts – use sharp knife (not blunt) & cutting boards, concentrate on the task and DON'T leave the knives in the water when washing them
- Burns – handle hot items with care, be careful with steamers & ovens, wear long sleeves, use oven gloves, hot oil is dangerous
- Fires – know where the fire extinguisher is, don't leave food hot fat/oil unattended
- Injuries – make sure you know how to use equipment properly
- Falls – clean up liquid spills immediately, WALK don't run, Keep aisles and stairs clear and unobstructed

- Strains – pick items up properly. Bend knees

