Food and Drug Administration (FDA)

Factors that affect foodborne illness

6

Factors That Contribute to Foodborne Illness

Learning objectives

- What is the temperature danger zone, and how does it affect food safety?
- How can you prevent time and temperature abuse?
- How do you properly measure the temperature of foods?
- What are some good personal hygiene practices for food employees?
- What practices can be used to prevent cross contamination of foods?

Centers for Disease Control and Prevention (CDC)

The Centers for Disease Control and Prevention (CDC) reports the majority of foodborne illnesses are related to:

- Time and temperature abuse
- Contaminated equipment
- Poor personal hygiene practices
- Inadequate cooking of foods.
- Unapproved supplier

This presentation will discuss the first two and others will be discussed in following presentations.

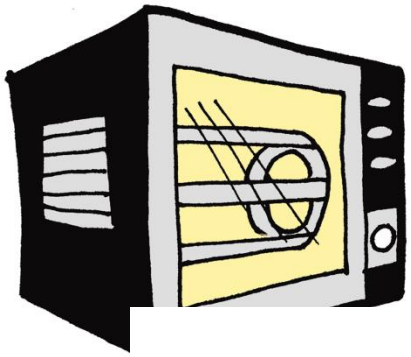
Prevention of Temperature Abuse

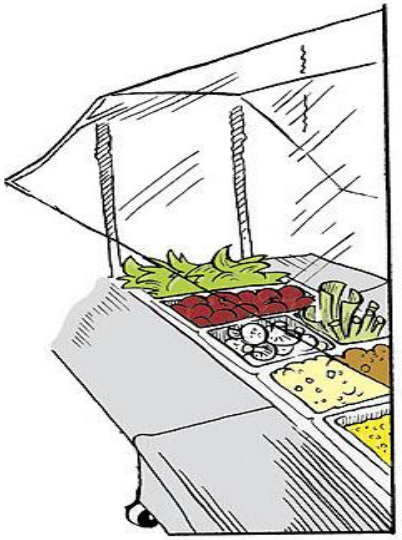
Time and Temperature Abuse

Rule of thumb:

- Keep hot food hot [(above 135°F (57°C)]
- Keep cold food cold [(below 41°F (5°C)]
- Or don't keep it at all.

Hot-holding





Cold-holding

Temperature Danger Zone: 41°F (5°C) to 135°F (57°C)

Keeping foods above 135°F (57°C) will

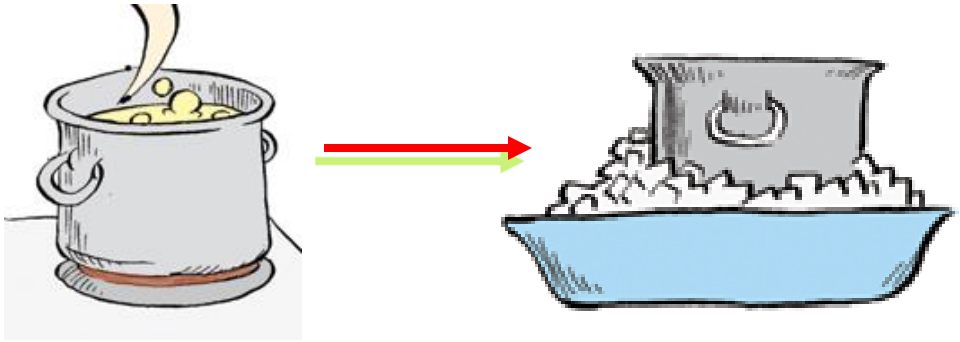
- Prevent growth of disease-causing microbes
- Destroy microbes.

Keeping foods below 41°F (5°C) will

- Prevent or slow the growth of microbes.

Temperature Danger Zone Awareness

Pass foods through the temperature danger zone quickly and as few times as possible!



Food Temperature-measuring Devices:
Dial Face, Metal Stem Thermometer

Dial face metal stem thermometer

Insert the probe of the dial face thermometer into the core of the food product until the dimple is inside.

Temperature-measuring Devices:
Digital Thermometer

Insert the probe of the digital thermometer at least 1 inch into the core of the food product.

Digital thermometer

Temperature-measuring Devices:

Thermocouple

Thermocouple

The thermocouple has a variety of interchangeable probes for a variety of uses.

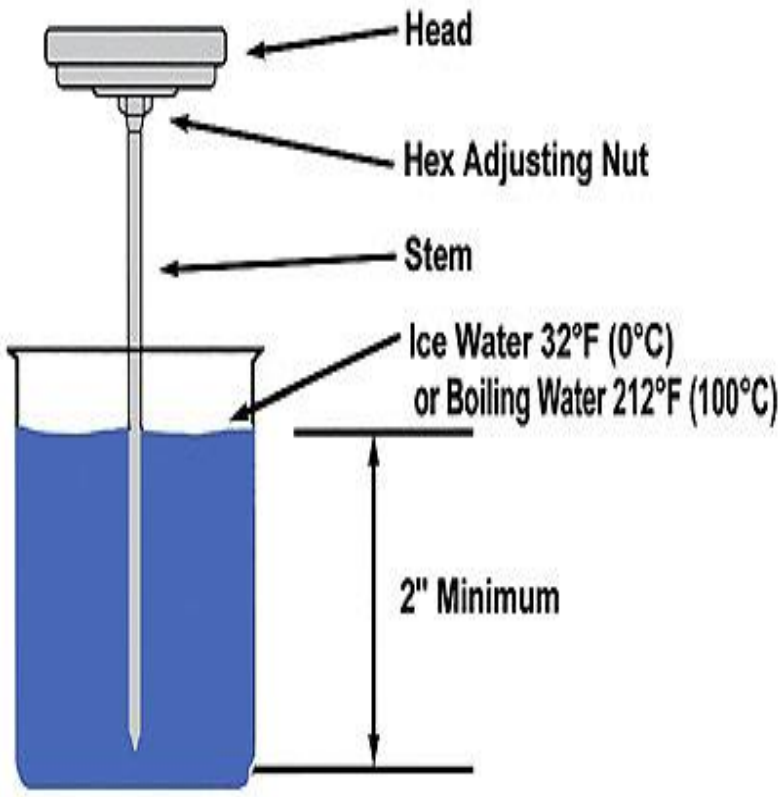
They need special calibration.

Thermocouples types

- Probes to use vary according to food

Fotos cortesía de Cooper-Atkins Corporation

Calibration of Temperature-measuring Devices

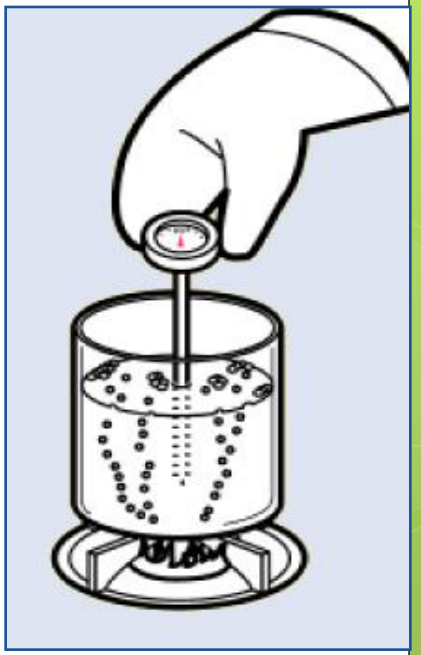


Calibrate dial face thermometers

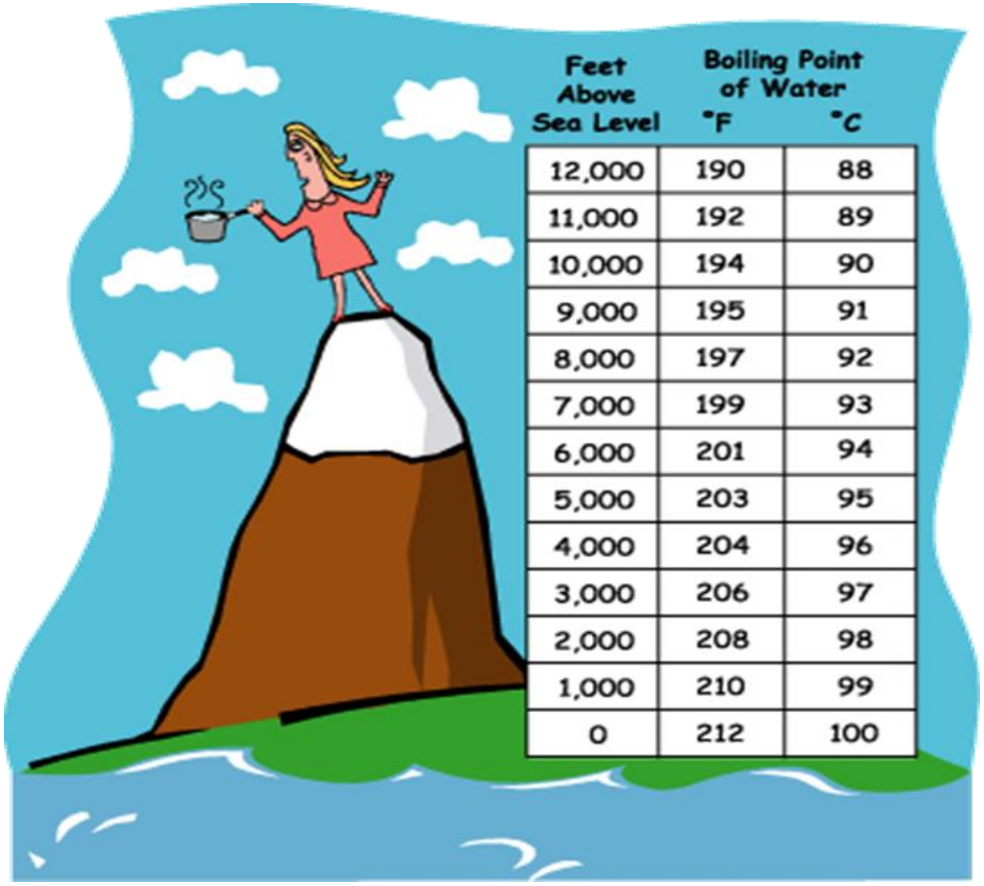
- Before first use
- On a regular basis
- If dropped
- If used in extreme temperatures
- When its accuracy is in question.

Thermometer calibration

- Boiling Point Method
  - Immerse the sensitive area of the thermometer probe in the boiling water.
  - Wait for 30 seconds.
  - Hold the calibration nut and turn indicator the thermometer until it indicates 212 ° F (100 ° C).
  - *Remember: Boiling point temperature of water changes with elevation.*



Boiling Point of water feet above sea level



Feet Above Sea Level	Boiling Point of Water °F	°C
12,000	190	88
11,000	192	89
10,000	194	90
9,000	195	91
8,000	197	92
7,000	199	93
6,000	201	94
5,000	203	95
4,000	204	96
3,000	206	97
2,000	208	98
1,000	210	99
0	212	100

Thermometer calibration

- Ice water method

Prepare a water slurry of cold water and ice

Immerse the thermometer until
the dimple is completely immerse
Wait until temperature settles

If it does not read 32F (0C) then move calibration nut, with the probe immerse in the ice water until it reaches and stays at 32F (0 C)

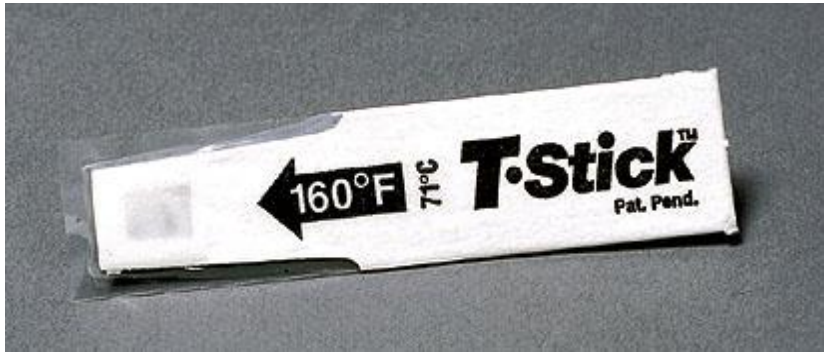
Temperature-measuring Devices: *Infrared*

Infrared

- The infrared thermometer does not measure the internal temperature of food products, only the surface temperature.
- Can not measure air of internal food temperature.
- Should be used close to the food or equipment.
- Remove any barrier between thermometer and surface. Do not take readings through metal or glass .

Temperature-measuring Devices:
Melt Devices

Color-changing melt devices are used to monitor product temperatures and sanitizing temperatures in warewashing machines.



Color-changing melt device

Monitoring Time and Temperature

Time-Temperature Indicators (TTI)

- Monitor both time and temperature
- Are attached to packages by the supplier
- A color change appears on the device when time-temperature abuse has occurred

Maximum Registering Tape

- Indicates the highest temperature reached during use
- Used where temperature readings cannot be continuously observed.

Temperature-measuring Devices:
Built-In and Maximum Registering

Maximum registering thermometers are used for measuring water temperatures for cleaning and sanitizing.

Built-in

Maximum registering

General Thermometer Guidelines

- Wash, rinse, sanitize, and air-dry thermometers before and after using them
- Calibrate them before each shift to ensure accuracy
- Make sure thermometers used to measure the temperature of food are accurate to +/- 2°F or +/- 1°C
- Only use glass thermometers if they are enclosed in a shatterproof casing

General Thermometer Guidelines

- When using thermometers: *continued*
- Insert the thermometer stem or probe into thickest part of the product
(usually the center)
- Take more than one reading in different spots
- Wait for the thermometer reading to steady before recording the temperature

Measuring Unpackaged Food Temperatures

Always wait until the temperature reading stabilizes.

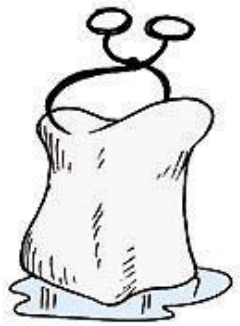
Measuring Packaged Food Temperatures

Ensure the probe of the thermometer is making good contact with the package(s).

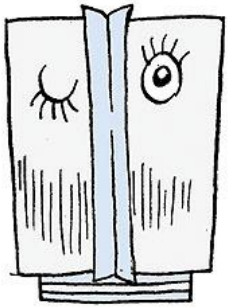
Preventing Temperature Abuse

Receiving

- Frozen foods
  - Shall be solidly frozen.

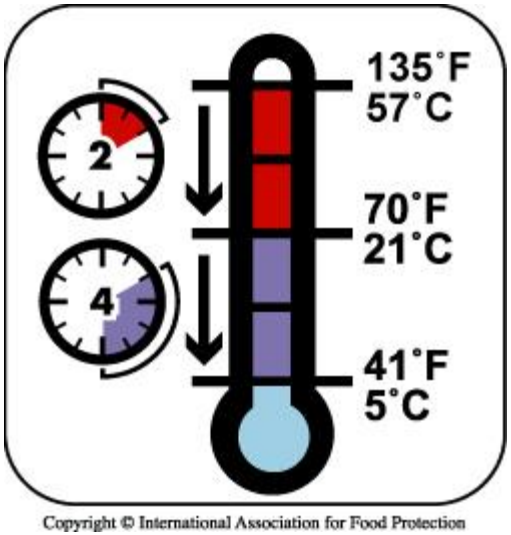


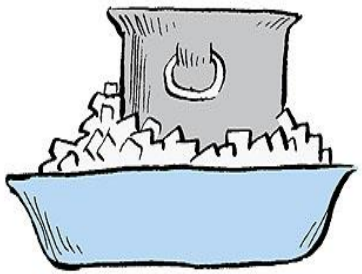
- Receive refrigerated foods
  - At or below **41°F (5°C).**



Preventing Temperature Abuse

Cooling

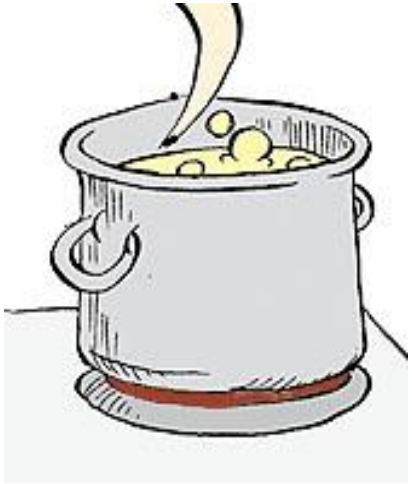




- ***FDA Food Code* states foods should be cooled:**
  - From 135°F (57°C) to 70°F (21°C) within two hours, **and**
  - From 135°F (57°C) to 41°F (5°C) or below within six hours.

Preventing Temperature Abuse

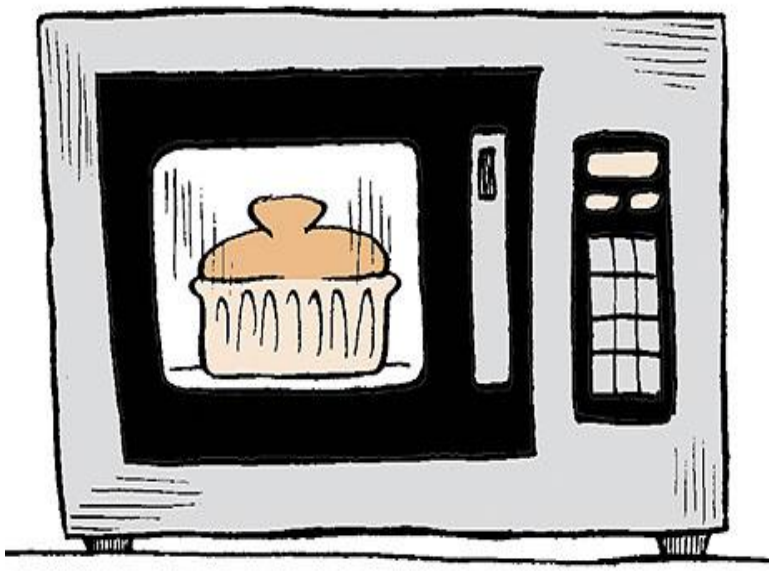
Cooking



- The range of safe cooking temperatures can vary from:
  - 145°F (63°C)

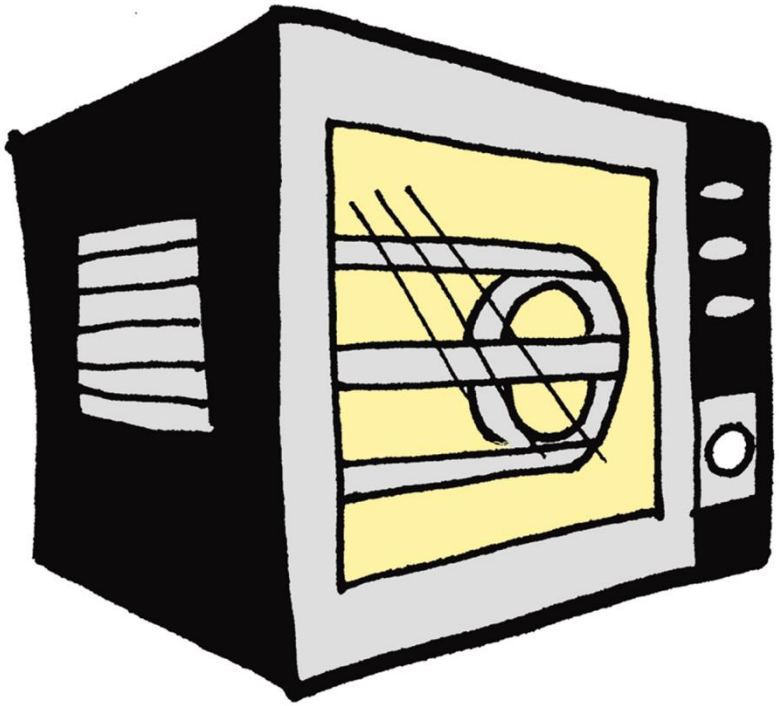
    To
  - 165°F (74°C)

Preventing Temperature Abuse
Reheating



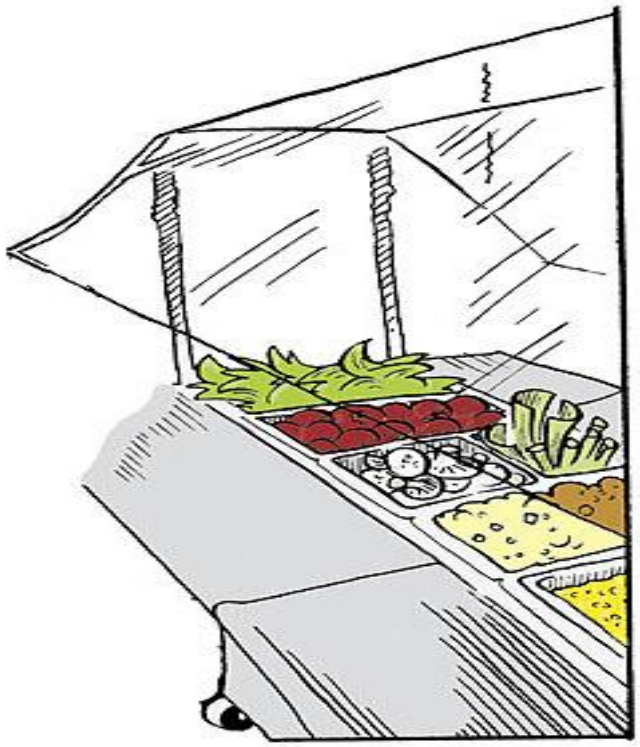
- **All reheated foods must be reheated to:**
  - 165°F (74°C) or above within two hours
  - 135°F (57°C) for ready-to-eat food that has been commercially processed and is in an intact package.

Preventing Temperature Abuse
Hot-holding



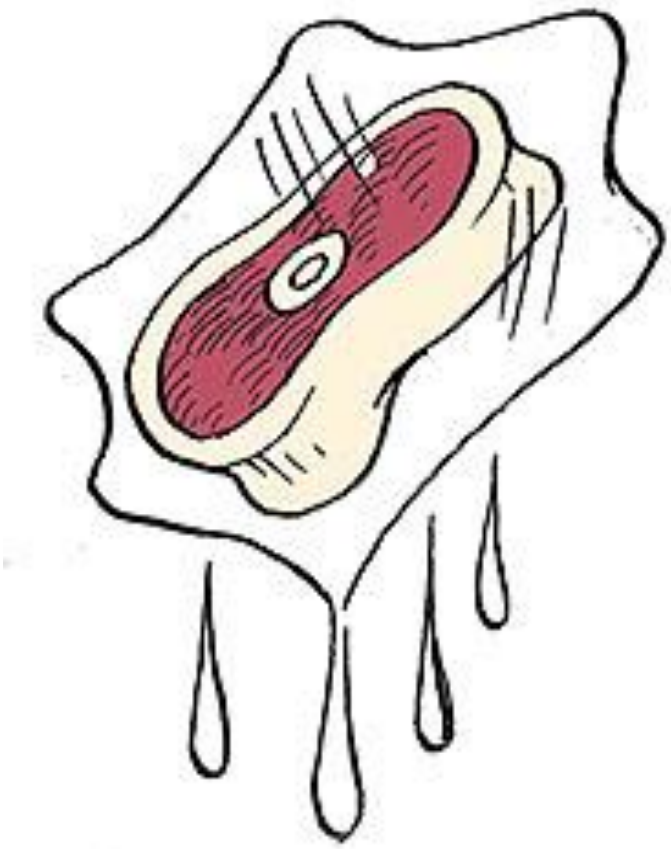
- Holding foods above 135°F (57°C) prevents the growth of harmful bacteria.

Preventing Temperature Abuse
Cold-holding



- Holding foods below 41°F (5°C) prevents or slows the growth of harmful microorganisms.

Preventing Temperature Abuse



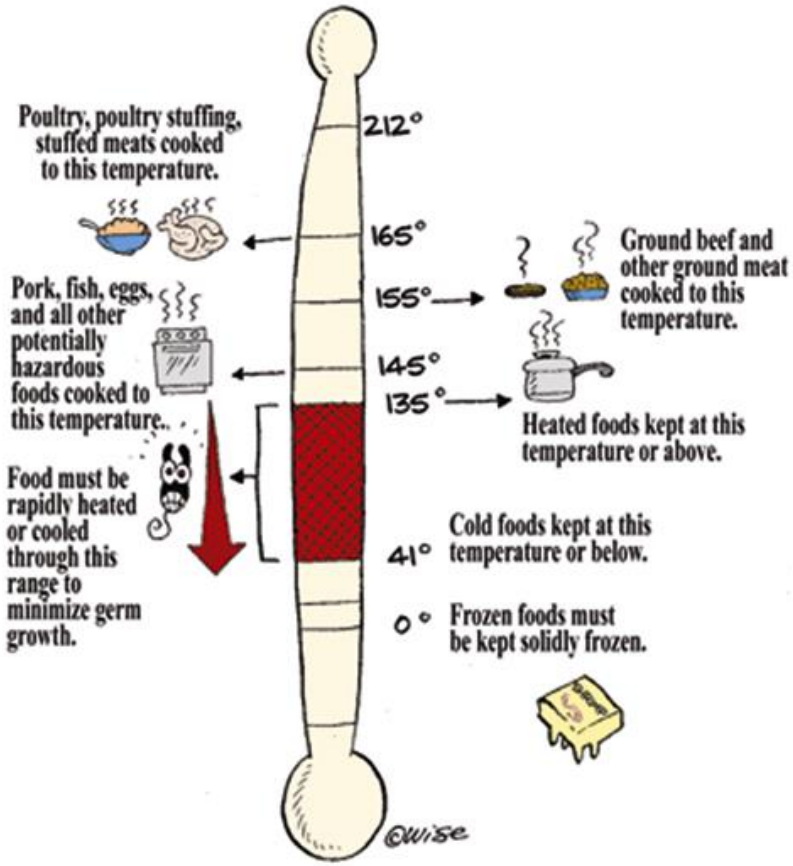
- **Preferred method for thawing is**:
  - In a refrigerator at 41°F (5°C) or below within 2-3 days.

Preventing Temperature Abuse
Food Preparation

During food preparation food can only be in the temperature danger zone for a maximum of four hours.

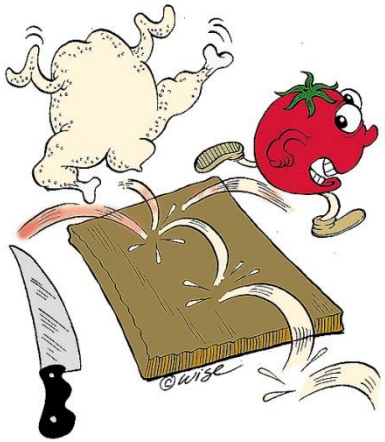
Keep it Hot, Keep it Cold, or Don't Keep It!!!

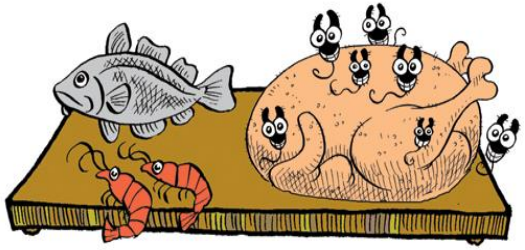
Ensure foods are cooked and held at the right temperatures!



Prevention of Cross Contamination

Cross Contamination





Germs can be transferred from one food to another by

- **Food employees**
- **Equipment**
- **Utensils**
- **Other foods.**

Avoiding Cross Contamination

To avoid cross contamination it is important to:

- Store cooked and ready-to-eat foods over raw foods
- Keep raw and ready-to-eat foods separate during storage
- Practice good personal hygiene
- Wash hands frequently
- Keep all food-contact surfaces clean and sanitary.

Avoiding Cross Contamination

Color-coded cutting boards and knives

Other preventive measures include:

- Use separate equipment for raw and ready-to-eat foods
- Use clean, sanitized equipment and utensils for food production.

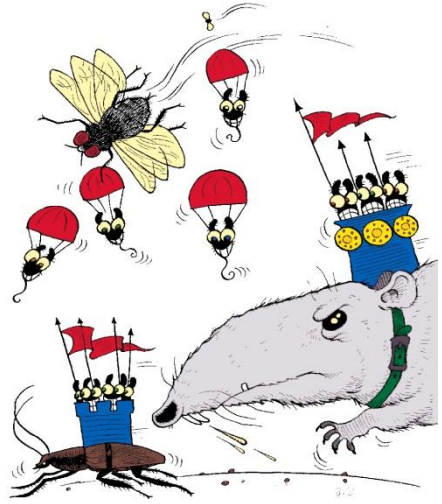
Avoiding Cross Contamination

Keep raw foods and ready-to-eat foods separate!

Other preventive measures include:

- Prepare ready-to-eat foods prior to raw foods
- Prepare raw and ready-to-eat foods in separate areas of the establishment.

Other Sources of Contamination



Contaminants can come from:

- Chemicals
- Utensils
- Food employees
- Rodents and pests.

Cleaning and Sanitizing

Cleaning is

- The removal of visible soil.

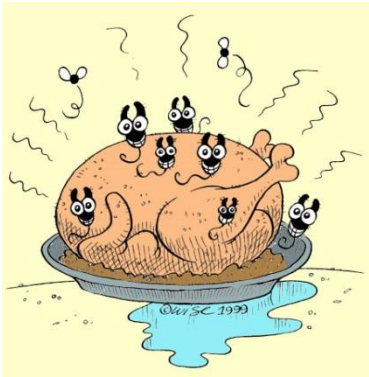
Sanitizing is

- Reducing the number of harmful microbes to a safe level.

Adequate cleaning and sanitizing is a way to control cross contact and cross contamination.

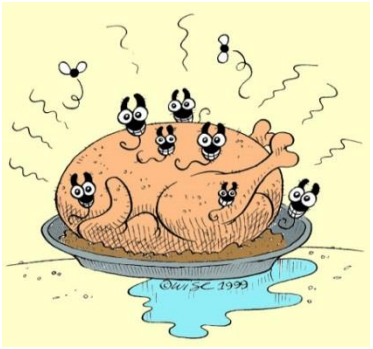
Concepts to Keep

- Common factors that lead to foodborne illness are:
  - Time and temperature abuse
  - Poor personal hygiene
  - Cross contamination.
- Keep food out of the temperature danger zone.
- Measure food temperatures often.



More Concepts to Keep

- When measuring food temperatures:
  - Use an approved measuring device
  - Calibrate the thermometer
  - Clean and sanitize the thermometer
  - Measure the core of the food.
- Practice good personal hygiene habits.
- Avoid cross contamination.



"MUST REMEMBER"

Importance of:

- Temperature-measuring devices.
- Calibrating thermometers.
- Accurate measuring of temperatures.
- Handwashing procedures.
- Proper disposable glove usage.
- Personal health and proper hygiene.
- How to prevent cross contamination.