

FOOD SAFETY MANUAL

BETHEL HEALTH DEPARTMENT
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Bacteria
and
Food Borne Illness

FACTORS CAUSING FOODBORNE ILLNESS

Improper Cooling Leaving cooked food at room temperature; storing foods in large pots and other containers in the refrigerator	63%
Lapse of a Day or More Between Preparing and Serving Coupled with improper cooling practices	29%
Improper hot-holding	27%
Infected Food Handlers Usually nasal carriers of staph aureus touching cooked foods	26%
Inadequate Heating of Previously Cooked Food	25%
Improper Cleaning of Kitchen Equipment Slicers, grinders, cutting boards, preparing knives, storage pots, etc.	9%

Food borne illness is caused by **bacteria and viruses**.

Bacteria can only be seen with a microscope. You cannot smell or taste bacteria.

Bacteria are everywhere - on our bodies, on food, in soil, in the air, on walls, on tables. Bacteria are carried from place to place by the activities of man and animals, by wind and by water.

Bacteria grow and reproduce. To do this, they need:

Food (Nutrients)

Water

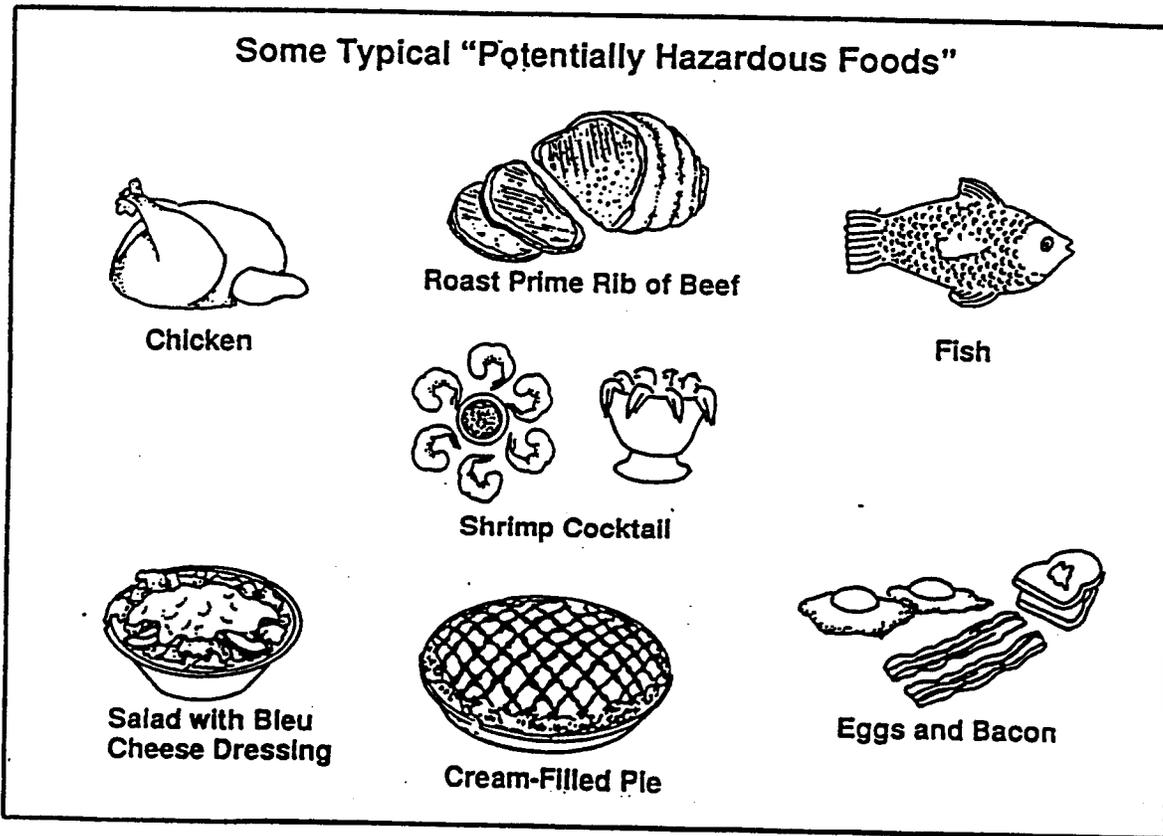
Time

Temperature

pH

Oxygen

Foods that provide the necessary nutrients and correct amount of water for bacteria to grow and multiply are called **Potentially Hazardous Foods**.

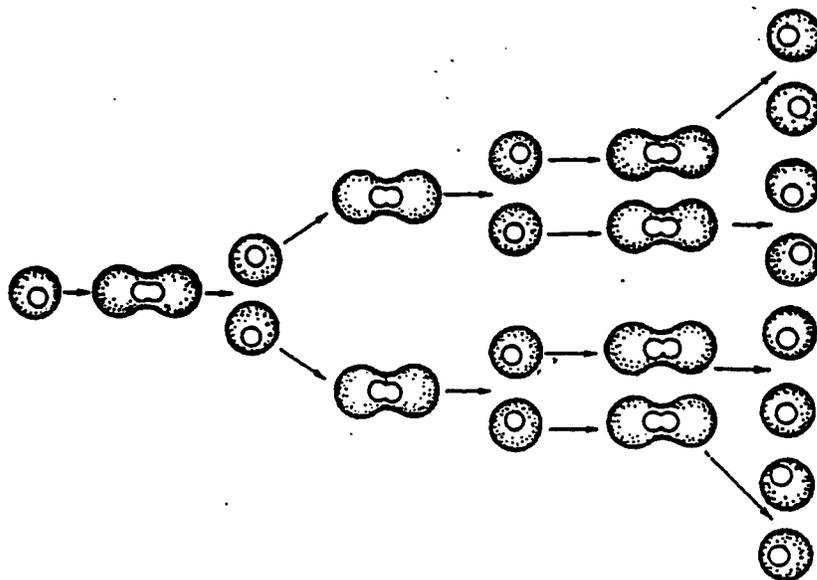


From: Foodservice Sanitation Manual - Premier Cruise Lines

Viruses require a living host to grow. They do not grow on food. Rather, food is used as a means of transportation to the disease victim - the person who eats the food.

Bacteria can multiply into a very large numbers in a short time by splitting in half.

The Reproduction of Bacteria by Simple Division



From: Foodservice Sanitation Manual - Premier Cruise Lines

Here is an example of how fast bacteria can grow on food:

At 1:00 PM food has 1000 bacteria on it. Favorable conditions exist for bacteria to grow. The bacteria can divide in half every twenty minutes. Five hours later, there are more than 32 million bacteria on the food.

<u>Time</u>		<u>Number of Bacteria</u>
1:00 p.m.	0	1000
	20 minutes	2000
	40 minutes	4000
2:00 p.m.	1 hour	8000
	1 hour 20 minutes	16,000
	1 hour 40 minutes	32,000
3:00 p.m.	2 hours	64,000
	2 hours 20 minutes	128,000
	2 hours 40 minutes	256,000
4:00 p.m.	3 hours	512,000
	3 hours 20 minutes	1,024,000
	3 hours 40 minutes	2,048,000
5:00 p.m.	4 hours	4,096,000
	4 hours 20 minutes	8,192,000
	4 hours 40 minutes	16,384,000
6:00 p.m.	5 hours	32,768,000

From: Foodservice Sanitation Manual - Premier Cruise Lines

BACTERIA MOST COMMONLY ASSOCIATED WITH FOOD PROTECTION

TYPE	SOURCES	FOOD INVOLVED	MODE OF ACTION	SYMPTOMS	REMARKS
Salmonella (Salmonellosis)	Poultry, hogs, animal by-products, infected humans, and soil.	Eggs, dry milk, dried yeast, coconut, smoked fish, chocolate, <u>poultry</u> , and <u>beef</u> .	Produces infection in man 6-48 hours after consumption. More likely to infect young and elderly	Nausea, headache, vomiting, diarrhea, abdominal cramps, <u>fever</u> , can cause death. Lasts several days or even weeks.	Organism killed by thorough cooking (145°F for 12 minutes.
Staphylococcus	Human mucous, pimples, boils, lesions, nasal discharge, and fecal material. 30 - 50% of healthy people carry it in their noses	Many types of hi-protein foods. Meats, pastries, dairy products, warmed-over foods. Foods high in salt or sugar. Foods with a lot of handling involved.	Produces toxin which is heat resistant. Toxin causes intoxication. Symptoms appear 1/2-8 hours (usually 2-4 hours) after consumption. Duration 1-3 days.	Salivation, headache, vomiting, diarrhea, abdominal cramps. Rarely results in death.	Organism destroyed by heat (140°F for 30 mins.). Toxin heat resistant. Takes appreciable number of organisms to produce toxin.
Clostridium Perfringens (Welchii) Type A	Feces of infected persons and animals, soil, dust, sewage, and flies.	Cooked meat and poultry at room temperature for several hrs. or cooled <u>slowly</u> . Gravy, stew, and meat pies	Symptoms appear 8-24 hrs. (average 12 hrs.). Both heat resistant and heat sensitive spores (some survive boiling for 1-5 hours).	Acute abdominal pain, gas, diarrhea, occasional dehydration, and prostration. Nausea, vomiting, fever, and chills are rare. Duration 1 day or less.	Thorough cooking will destroy vegetative cells but not heat-resistant spores. Chill foods rapidly in small quantities, reheat to 165°F. Grows best at 114°F.
Clostridium Botulinum (Botulism)	Soil, decayed vegetables, water.	Home processed low-acid foods, seafood, sausage, and meats.	Produces toxin which is heat sensitive. Symptoms appear usually 12-36 hours after consumption. (Can be 2 hours to 14 days)	Double vision, inability to swallow, speech difficulty, respiratory paralysis.	Most deadly form food poisoning known. Toxin destroyed by proper heating. Above 176°F for 15 min. (types A, B, & E). Growth inhibited by pH 4.5 or less

Time and Temperature

TEMPERATURE

Bacteria grow best at certain temperatures - between 45° F and 140° F. This temperature range is called the **Temperature Danger Zone**.

Cold temperatures (below 45° F) prevent bacteria from growing.

Hot temperatures (above 140° F) kill bacteria.

Here are some rules about temperature that you must follow:

- **Keep foods refrigerated**

Foods that you are not working on must be kept in the refrigerator. Foods that will not be served immediately must be refrigerated.

The temperature in the refrigerator should be 40° F or below.

- **Cook foods to proper temperatures**

Foods must be cooked to proper temperature to kill any bacteria that is on it. This is especially true for all meats and poultry, since most of it is contaminated with bacteria.

Proper cooking temperatures for meats are:

Beef	-	140° F
Pork	-	150° F
Poultry	-	165° F
Any leftover meats	-	165° F

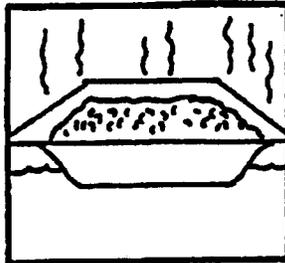
- **Keep foods Hot or Cold**

Potentially hazardous foods must be kept hot (140° F or above) or cold (45° F or below).

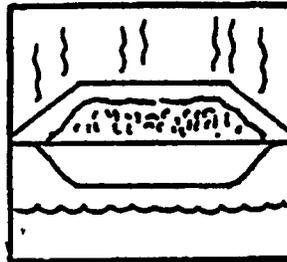
Use a steam table to keep foods hot. The food in the containers must be below the level of water in the steam table.

**Keep the Stainless Steel Container
Holding the Food Below the Level
of the Water in the Steam Table**

Like This



NOT Like This



From: Foodservice Sanitation Manual - Premier Cruise Lines

Use ice or a refrigerator to keep foods cold. Do not pile the food high in the container if you are using a baine marie or ice.

- **Reheat leftover foods rapidly, on the stove, to at least 165° F**
Leftover foods contain more bacteria than food that is served for the first time. For this reason, it is important to reheat to such a high temperature.

Do not reheat on the steam table or food warmer. These cannot reheat quickly enough. Use a stove or oven.

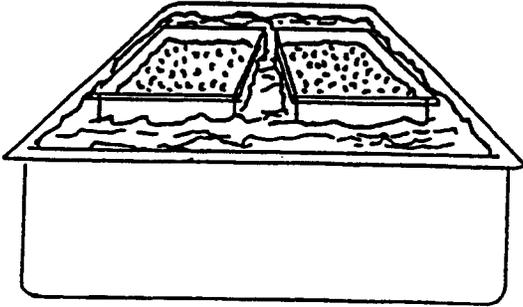
- **Do not thaw potentially hazardous foods at room temperature**
If you thaw at room temperature, the outside of the food will thaw and rise to dangerous temperatures before the center thaws.

Four Safe Ways to Thaw Food

- In the refrigerator
- Under cool, running water
- As part of the cooking process
- In the microwave

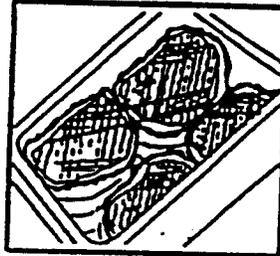
The safest way to cool large pieces of meat is to cut it into smaller pieces and place them in a shallow, loosely covered stainless steel containers. Place the containers in a large refrigerator or walk-in. There must be good air circulation around the containers. Do not crowd the containers together.

To Cool Gravy, Soups and Stews Rapidly, Divide Them into Smaller Portions and Place in an Ice Bath

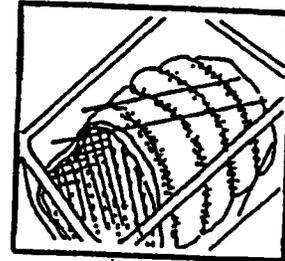


To Cool Large Pieces of Meat Rapidly, Cut Them into Smaller Pieces

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From: Foodservice Sanitation Manual - Premier Cruise Lines

Prepared foods such as potato salad and tuna salad should be made with ingredients that are already cold. Store them in covered, shallow stainless steel containers.

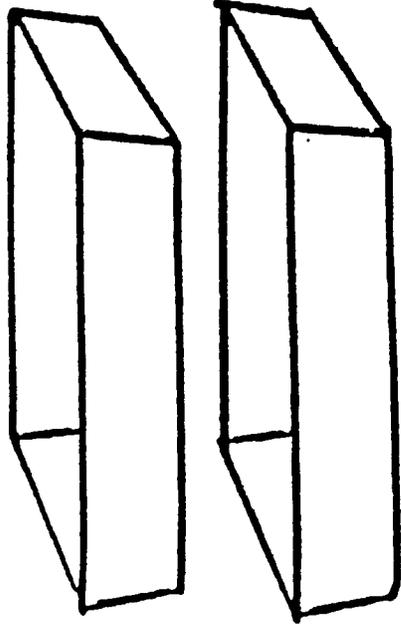
- **Do not leave foods unrefrigerated for long periods of time.** The longer food is at room temperature, the more time you give bacteria to grow and multiply.

Only work with the amount of food you can handle in a short time. Foods should not be out of the refrigerator for more than **thirty minutes**. Take out of the refrigerator only the amount of food you can prepare in thirty minutes. When you are finished, put the prepared food back in the refrigerator and take out more of the food you need to work on.

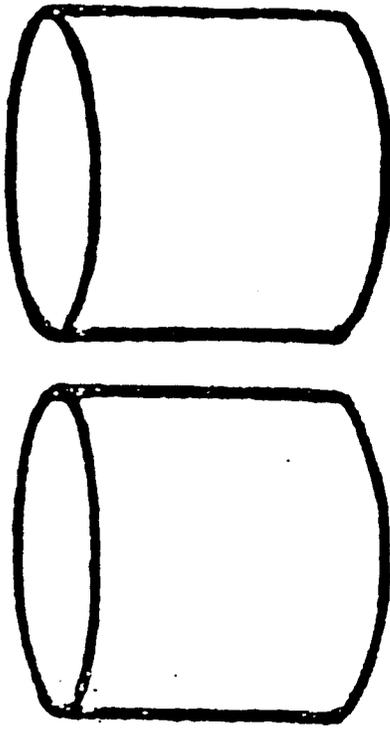
Therefore:

cool more quickly than

THESE

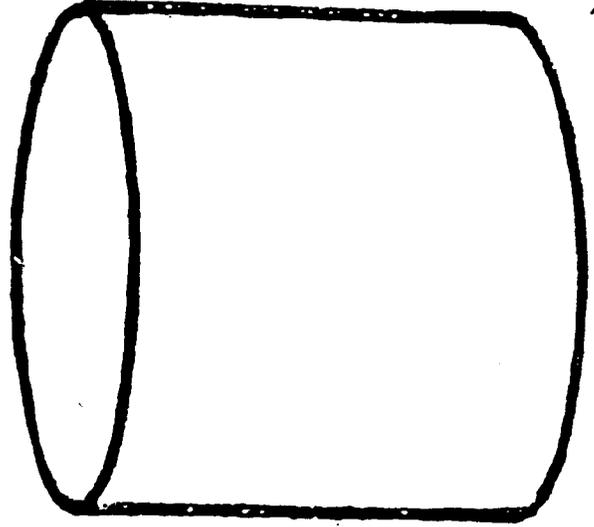


THESE



which cool faster than

THIS



Cooked potentially hazardous food shall be cooled:

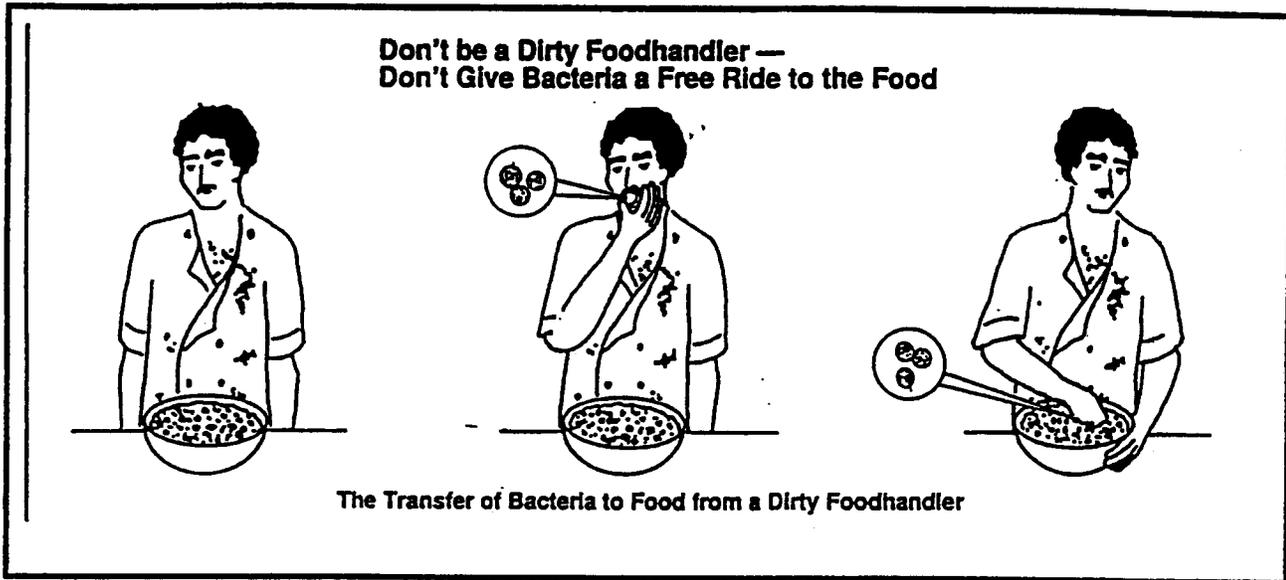
From 140°F to 70°F within 2 hours
From 70°F to 41°F within 4 hours

Potentially hazardous food shall be cooled to 5°C (41°F) or below within 4 hours if prepared from ingredients at ambient temperature such as reconstituted foods and canned tuna.

Personal Hygiene

The most common source of contamination to food is the person who prepares the food.

The human body is full of bacteria. People carry bacteria on their hands and faces, in their nose and mouth, in their intestines, and in infected cuts and sores.

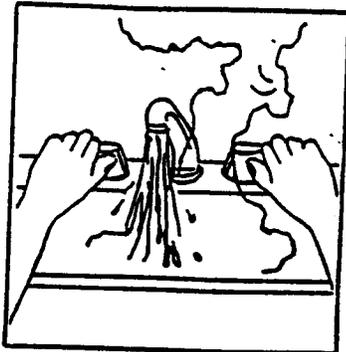


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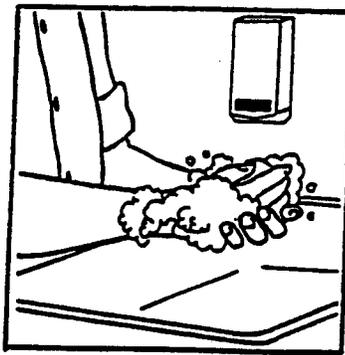
To prevent contamination of food, follow these simple rules:

- **Wash your hands often.**
Wash your hands after you do anything that may contaminate your hands. For example:
 - after using the toilet
 - before you start work and after a break
 - after handling raw meat or seafood
 - after smoking a cigarette
 - after coughing or sneezing
 - after handling dirty pots, pans, dishes or other utensils and equipment
 - after picking things up off the floor
 - after you handle anything that is dirty

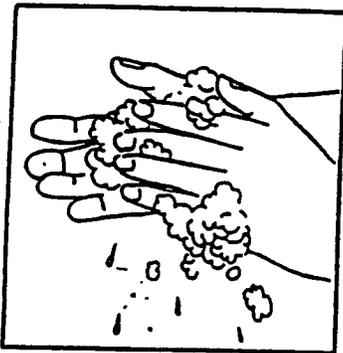
Proper Handwashing Technique



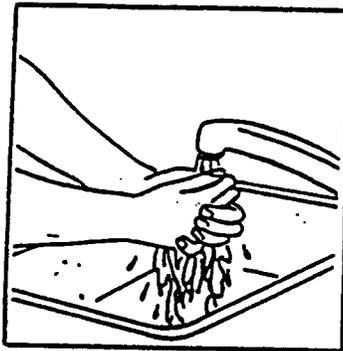
Turn on the Water. Make it Hot but Comfortable.



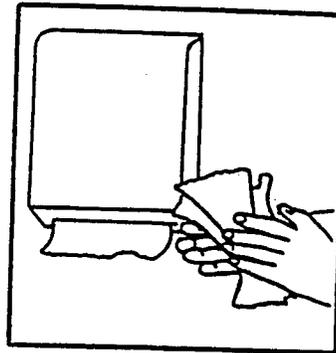
Take your Time. Also Wash Forearms.



Using Soap and Water, Scrub Hands Thoroughly.



Rinse your Hands. Remove All Traces of Soap.



Dry Hands with a Paper Towel.

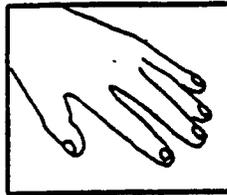
From: Foodservice Sanitation Manual - Premier Cruise Lines

- **If you have an open wound, sore, cut or burn on your hands, it must be covered with a bandage and you must wear plastic gloves to handle food.**
If it is infected, you cannot work. Wounds, cuts, sores and burns are full of bacteria, especially if they are infected. Signs of infection are redness, swelling and pus.
- **If you are sick with a sore throat, cold, cough or fever, stomach cramps, diarrhea, or nausea and vomiting, you MUST NOT work.** Illness is often caused by bacteria and viruses which can be carried into the food by the person who is handling the food.
- **Do not scratch your head, face or arms. Do not pick your nose or rub your eyes while working with food.**
If you do, wash your hands before you continue to work.

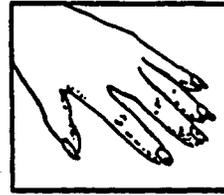
Keep your Fingernails Neat and Trim

- **Keep fingernails short and clean.**
Bacteria grows under your fingernails.

Like This



NOT Like This



- **Keep your body clean.**
Shower or bathe every day.

- **Wear clean uniforms**

From: Foodservice Sanitation Manual - Premier Cruise Lines

Dirty uniforms carry bacteria which can get into food.

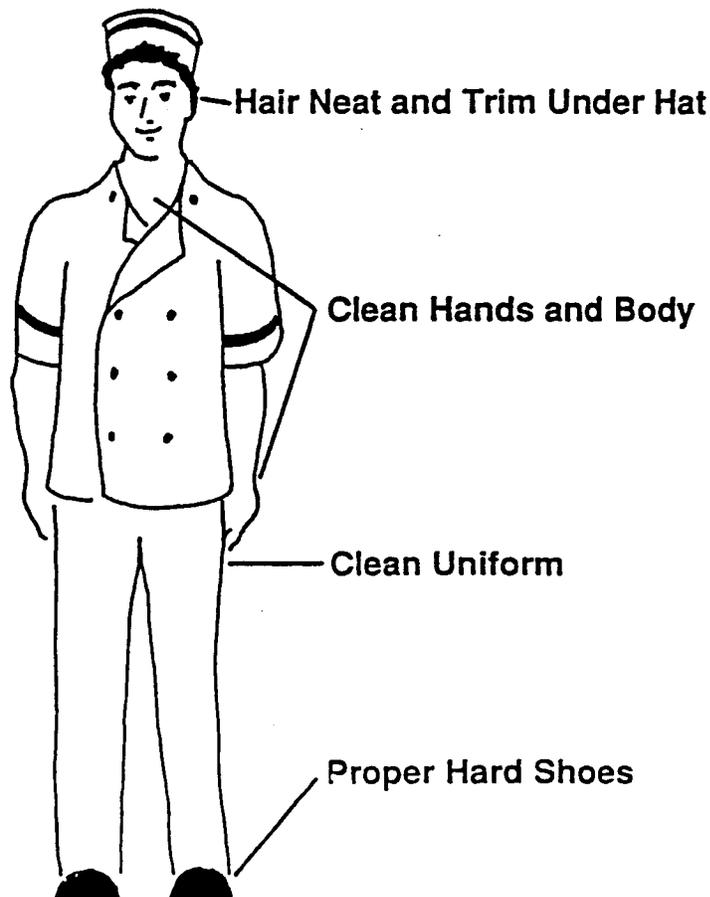
- **Keep your hair clean, trimmed and tied back.**

Keeping hair tied back will keep the hair from falling in the food and you won't have to keep touching it to keep it out of your face.

- **Do not eat, drink or smoke while working with food.**

These are actions that can put bacteria from your face and mouth onto your hands which are touching the food.

**Be a Clean and Healthy Foodhandler —
Follow The Rules of Good Personal Hygiene**



Cross Contamination

Cross contamination happens when bacteria is transferred from one food to another. by hands, utensils and equipmen, or other food.

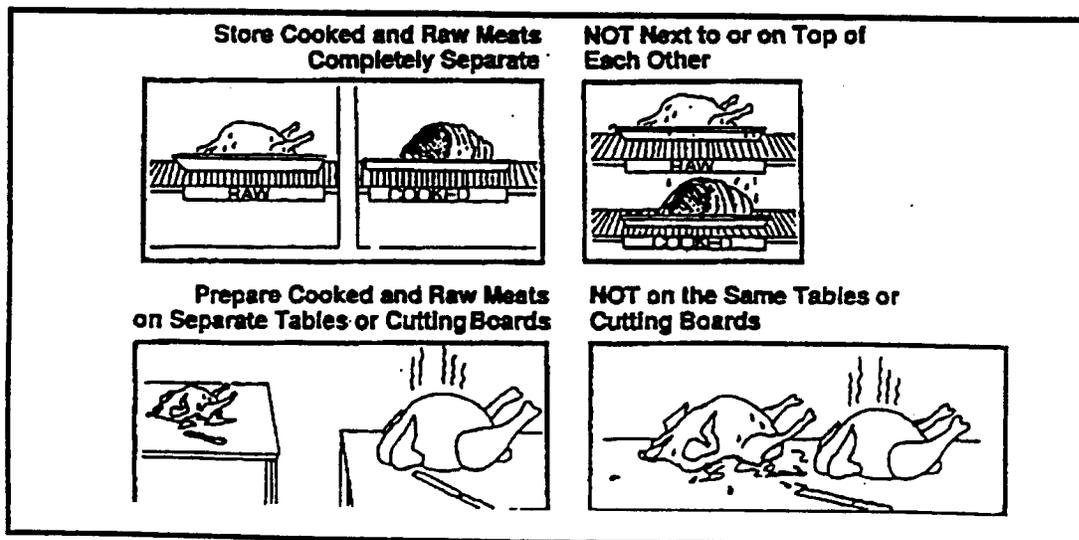
To prevent cross contamination, follow these simple rules:

- **Keep raw meats, poultry, fish and shellfish away from other foods in the refrigerator.**

Bacteria in the raw meat, poultry, fish or shellfish may drip on the foods underneath and contaminate them.

Store raw meats, poultry, fish and shellfish on the lowest shelf with no other foods underneath, or choose one section of a walk-in for these foods away from other foods.

- **Use separate cutting boards and knives for cutting raw meats, poultry, fish and shellfish and cooked foods, fruits or vegetables.** If this is not possible, be sure to carefully wash and sanitize the cutting board and knives in between cutting raw meats, poultry, fish and shellfish and cutting cooked foods, fruits or vegetables.
- **Wash hands after handling raw meats, poultry, fish and shellfish or afetr handling different typres of food.** This will prevent your hands from transmitting bacteria from one food to another.
- **Keep clean and dirty pots, equipment, dishes and utensils separate from each other.**



Sanitation

All **food contact surfaces** must be cleaned and sanitized after every use or interruption of use, or at regularly scheduled intervals if they are in constant use.

A **food contact surface** is any equipment or utensils that come into direct contact with food during storage, preparation, or service. Examples are: meat slicers, pots, cutting boards, dishes, knives, scoops, work tables, refrigerator shelves.

Cleaning

To remove particles, soil, grease and dirt from a surface using soap and water. Cleaning involves two steps: a **wash** step and a **rinse** step.

Sanitizing

To kill bacteria with either chlorine bleach or hot water. Sanitizing involves one step: a **sanitize** step.

- **To sanitize with bleach:**

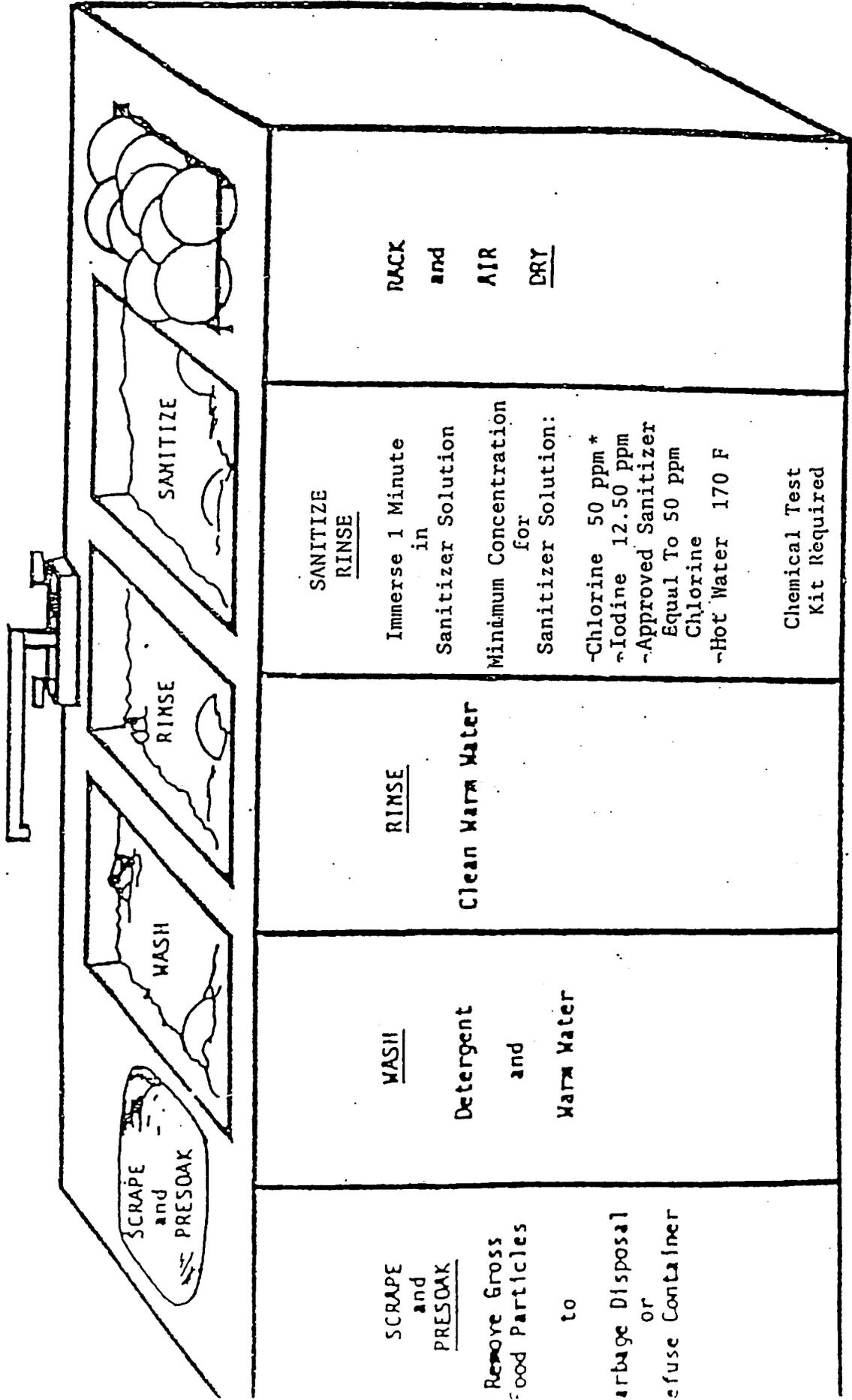
Use 1 tablespoon of bleach for every 2 gallons of water or 1 ounce of bleach for every 6 gallons of water. Soak the equipment or utensils for 1 minute. Let air dry.

If the equipment cannot be placed in the sink you must sanitize it in place. Double the strength of the sanitizing solution - use 2 tablespoons of bleach for every 2 gallons of water. Swab the equipment with a clean cloth soaked in the sanitizing solution. Let air dry.

- **To sanitize with hot water:**

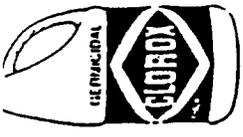
The hot water must be at least 170°F. A hot water booster will probably be required to get water that hot. Soak the equipment or utensils for at least 1 minute.

Manual Dishwashing Procedure



* One Ounce of a 5% Solution of Chlorine in Six (6) Gallons of Water = 100ppm Chlorine Solution

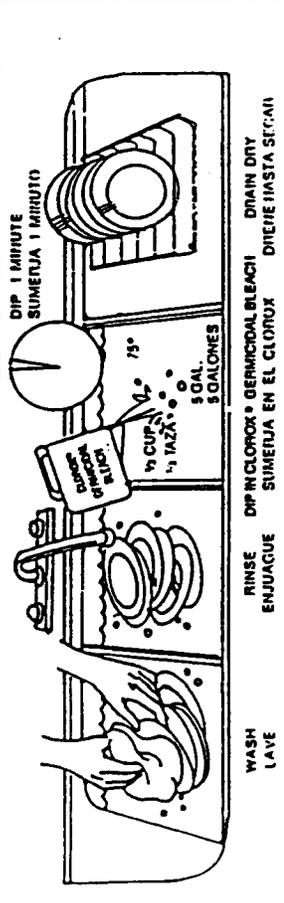
HOW TO SANITIZE AND DISINFECT WITH CLOROX® GERMICIDAL BLEACH



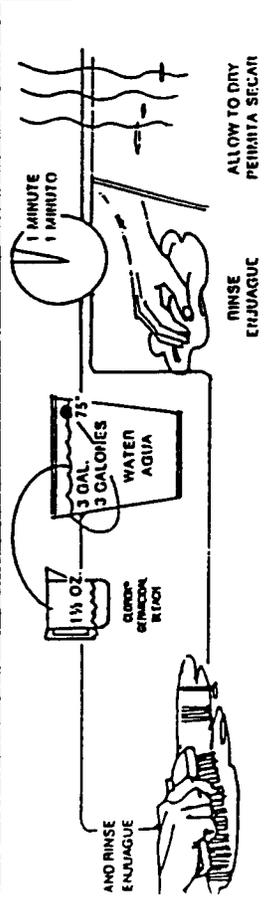
Clorox® Germicidal Bleach is an effective all-purpose sanitizer/disinfectant that kills bacteria that may cause food poisoning. Clorox® Germicidal Bleach is authorized for use under USDA meat, poultry, rabbit and egg products inspection.

To Sanitize

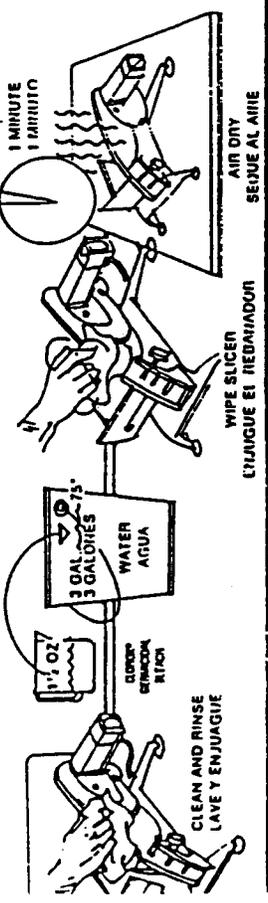
Pots & Pans • Glasses, Dishes, Utensils



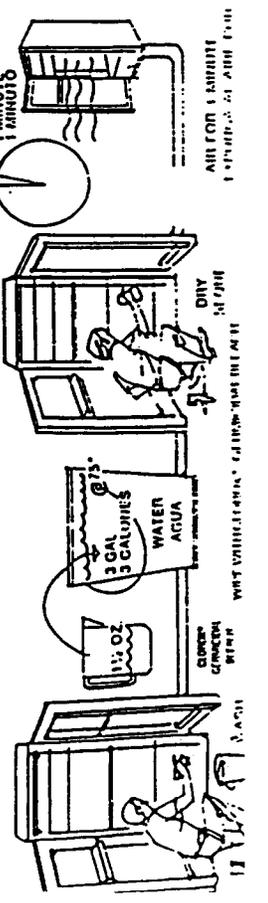
Food Contact Surfaces



Food Equipment



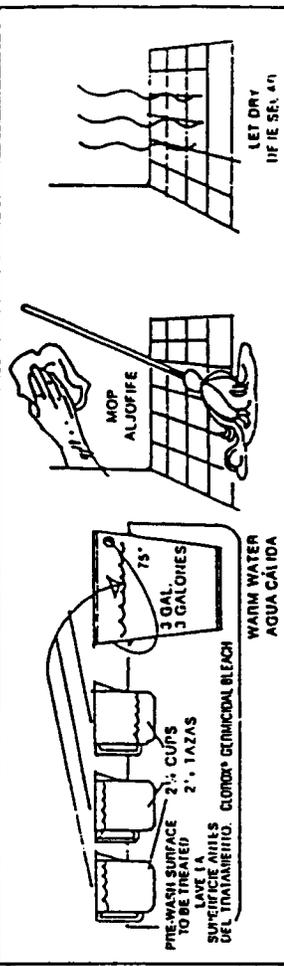
Refrigerators & Freezers



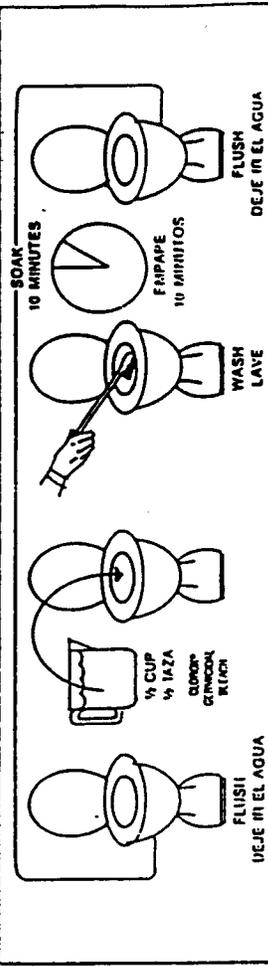
programs. One tablespoon of Clorox® Germicidal Bleach in a gallon of water is equivalent to 200 ppm available chlorine. One tablespoon of Clorox® Germicidal Bleach in a gallon of water meets U.S. Public Health Service recommended levels of hard surface sanitation.

To Disinfect

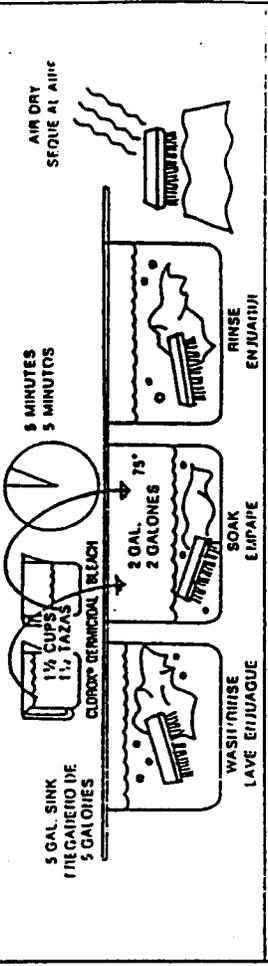
Floors & Walls



Toilets



Mops, Brushes, Rags



WARNING: Hazardous to humans and domestic animals. Causes substantial but temporary eye injury. Do not get in eyes or on clothing. Hazardous if swallowed. May irritate skin. Practical treatment in eye: remove contact lenses; rinse with plenty of water for at least 15 minutes. If swallowed: drink a glassful of water. Do not eat, call a physician. If contact with skin: immediately remove contaminated clothing and wash skin thoroughly with water. Physical and chemical hazards: Strong oxidizer. Flash point before and after use: Do not use or mix with other household chemicals, such as toilet bowl cleaners, rust removers, acid or ammonia containing products. To do so will release hazardous gases. Prohibited contact with metal may cause pitting or discoloration.

Advertencia: Peligro para los humanos y los animales domésticos. Causa lesiones serias pero temporales a los ojos. No permita que entre en los ojos o en la ropa. Es irritante a la piel. Tratamiento práctico al entrar en los ojos: quítete los lentes de contacto, enjuaga los ojos con abundante cantidad de agua. Si se ha ingerido, bebe un vaso lleno de agua. En contacto de la piel: quítate la ropa contaminada y lávate bien con agua y jabón. Evita el contacto con otros productos que liberen gases. No mezcles con otros productos químicos del hogar tales como productos para limpiar el baño, removierres de óxido o productos que contengan ácido. El contacto prohibido con metales puede causar corrosión o discoloración.

