

GLOSSARY OF TERMS

Aerobic - Requiring oxygen to live.

Anaerobic - Able to grow in the absence of oxygen.

Bacteria/Bacterium - Single-celled microorganisms, often with pathogenic properties.

Brining - A method of pickling foods by storing them in heavily salted water, which helps to control microorganism growth.

Canning - A method of preserving food by placing it in air-tight containers and destroying microorganisms by heat-processing.

Chilling - the lowering of the temperature of food to a range where bacterial growth is significantly slowed or stopped, usually at or below 40°F (4°C).

Cross-contamination - Contaminating one item with another as in transmitting bacteria from a piece of meat to other foods or cutting surfaces, such as with an unwashed knife.

Danger zone - The temperature range between 40°F (4°C) and 140°F (60°C) at which bacteria thrive and grow most quickly.

Drying - A method of preserving food by lowering the moisture content of foods to prevent the growth of microorganisms and slow down deterioration by enzymes.

FIFO - Stands for *First In, First Out*, a method of inventory rotation so that older items are used before newer or fresher ones.

Foodborne illness - An illness which is caused by eating food that has been contaminated with harmful microorganisms called pathogens.

Freeze drying - A method of food preservation in which food is first frozen and a vacuum is used to withdraw the moisture. Adding water back returns the food to its original state.

Freezing - A method of food preservation by rapidly lowering the food temperature to below 32°F (0°C) at a minimum and then storing at a temperature of 0°F (-18°C) for maximum quality retention.

Fungi - Microscopic life forms including yeast, mold, mildew and mushrooms.

Graded - A food which has been examined and rated for quality by any of a variety of factors including size, color or nutritional content.

Microorganisms - Microscopic life forms including bacteria, fungi, viruses and yeasts; may be characterized as beneficial, detrimental or neutral.

(over)

GLOSSARY OF TERMS - cont.

Parasite - A plant or animal which lives off another plant or animal, a host, while making no beneficial contribution to that host.

Pathogen - Any microorganism which can cause disease.

Perishable - A food which is likely to spoil quickly.

pH - The measure of the acidity (less than 7) or alkalinity (greater than 7) of a solution.

Pickling - A method of food preservation using vinegar or brine, or a combination of both. These solutions inhibit the growth of microorganisms.

Preservation - To maintain the quality of food for consumption at a later time; examples include canning, drying, freezing, pickling, smoking, and making preserves.

Regulate - To control, based on a given set of standards or laws.

Shelf-dating - An indication on fresh and processed foods of the shelf-life or how long it will retain its quality attributes.

Smoking - The use of smoke from a fire to produce a dry moderate controlled heat, to remove moisture from food, usually meat or fish.

Spoilage - The condition or process of deterioration or decomposition indicating a food is damaged, decayed or otherwise unfit for consumption.

U.S. Department of Agriculture (USDA) - A governmental agency charged with setting the standards for, and inspection of, meat and poultry, as well as selected commodity foods such as cereals, grains and fresh fruits and vegetables.

U.S. Department of Commerce (National Marine Fisheries Service) - A governmental agency charged with oversight of fresh fish and fish products.

U.S. Food and Drug Administration (FDA) - An agency of the U.S. government responsible for setting the standards for, and the inspection of, all foods except meats and poultry.

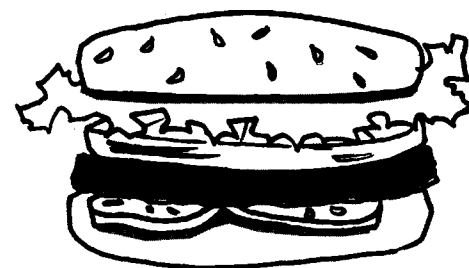
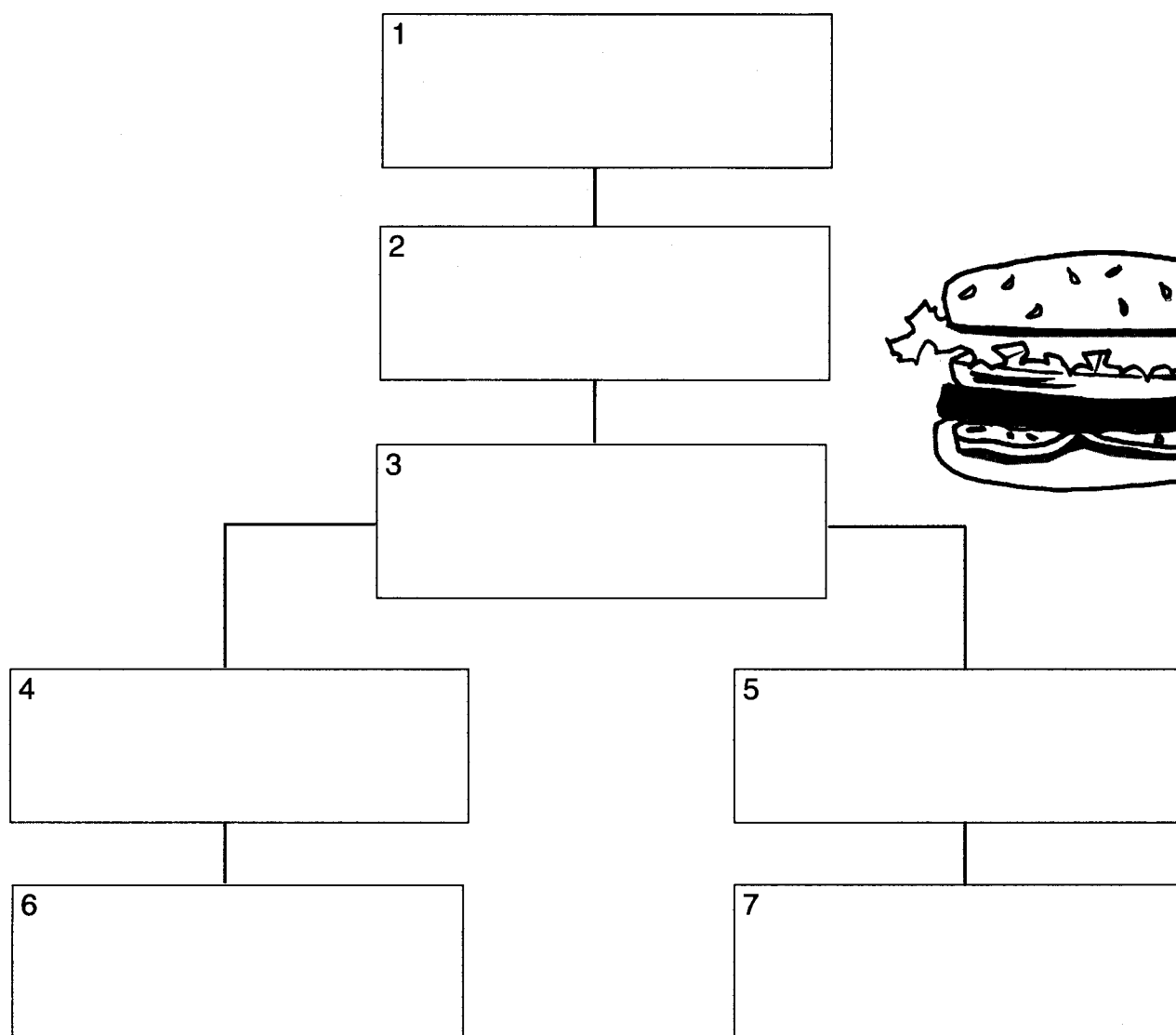
Virus - A life form smaller than a bacterium that can multiply in living cells and cause disease.

Wholesomeness - The overall healthful value of any given food or beverage.

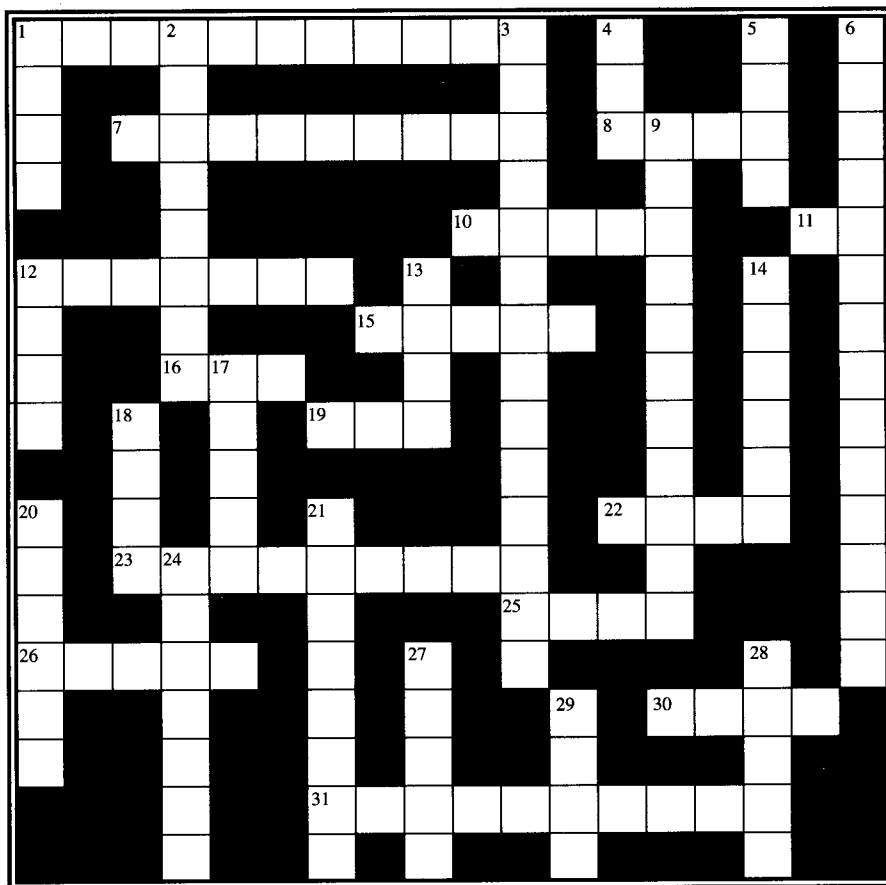
FROM THE SOURCE TO THE STORE/RESTAURANT

Complete the flow chart below to show each step of how a food, such as a hamburger or other meats, gets from its source to your plate. Think about all the people involved from the producers to transportation, to the inspectors, wholesalers and retailers. Develop the flow chart from the words below. Include a brief description in each box about what happens at each step.

Transport
Cold Storage Warehouse
Restaurants
Farm
Restaurant Cold Storage Warehouse
Retailers
Processing Plant



MICROORGANISMS AND YOU



CLUES ACROSS

1. _____ perfringens
7. able to live in the absence of oxygen
8. pH less than 7
10. poison
11. measure of acidity or alkalinity
12. good personal _____ is important for food handlers
15. a knife and cutting _____ are most often linked with cross-contamination
16. botulism is the only pathogen whose symptoms affect this organ
19. hamburger is a ground ____ meat
22. on food labels look for the expiration ____.
23. disease-causing microorganisms
25. opposite of less
26. _____ potentially hazardous foods below 40°F (4°C)
30. temperatures above 160°F (70°C) will ____ most microorganisms
31. bacteria commonly found in eggs, poultry, sauces and gravies; causes chills and fever

CLUES DOWN

1. ____ hot food quickly
2. reduces bacteria level on utensils & food preparation surfaces to prevent contamination
3. living things that cannot be seen by the naked eye; can be beneficial, detrimental or neutral
4. regulatory agency for all foods except meat and poultry
5. regulatory agency for meat and poultry sources
6. disease-causing bacteria found in the nose, mouth and throat
9. harmful bacteria will _____ food
12. some pathogens are _____-resistant
13. eaten by humans as a source of energy
14. beneficial microorganisms introduced into this food give it its unique flavor
17. microorganism used in baking bread
18. a cleaning substance, not necessarily a sanitizer
20. a common symptom of food poisoning
21. foodborne illness caused by anaerobic microorganisms that attack the central nervous system
24. requiring air or oxygen to live
27. (O157:H7) found in undercooked ground red meats
28. free of visible soil
29. 40°F - 140°F (4°C - 60°C) is the danger _____

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**INSTITUTE
OF FOOD
TECHNOLOGISTS**

PROPER HANDWASHING TECHNIQUE

The proper technique for washing hands takes just **20 seconds**. That's a small amount of time to ensure that you're not introducing germs into your food. To make sure your hands are clean, follow these six easy steps. Don't shortchange yourself when it comes to food safety. Learn the Handwashing Rap below, and repeat it to yourself every time you wash up before handling food.

- 1** Use water as warm as you can stand.
- 2** Lather well using soap (disinfectant soap is preferred when working with food).
- 3** Rub hands together, paying attention to areas between fingers and around nails (a brush should be used on nails).
- 4** Scrub all the way to the elbow for at least 20 seconds.
- 5** Rinse well under running water. Allow water to flow down to the fingertips.
- 6** Dry thoroughly with sanitary towel or single service (paper) towel. Be careful to not touch anything dirty (door knobs, etc.) before returning to the food.

Handwashing Rap

(emphasis on words in bold)

“You **gotta'** wash your **hands**, you **gotta'** wash em **right**,
 don't **give** in to **germs** with-**out** a **fight**.
 Use **water** that's **warm** and **lots** of soapy **bubbles**,
these are your **weapons** for preventing germ **troubles**.
 Don't **cut** your time **short**, your **fingers** - get **between**,
 it **takes** twenty **seconds** to **make** sure they're **clean**.
Gotta' wash...gotta' wash gotta' wash your **hands**,
gotta' wash...gotta' wash gotta' wash your **hands.**”

*From Youth Food Safety Curriculum
 University of Nebraska*

KNOW YOUR FOE



These pathogens are among the most common causes of foodborne illnesses. Take note of the typical foods that are likely to carry these pathogens. Follow the recommended prevention method. Whenever an incident of foodborne illness is suspected, seek medical advice right away.

DISEASE	ONSET (duration)	SYMPTOMS	TYPICAL FOODS	CONTAMINATION SOURCE	PREVENTION
<i>Salmonella</i>	5-72 hrs (usually 12-36 hours, 1-4 days)	diarrhea, abdominal pain, chills, fever	raw or undercooked eggs, raw milk, undercooked meat and poultry	infected food handler, animals, human feces	cook eggs, meat, and poultry thoroughly, pasteurize milk
<i>Staphylococcus aureus</i>	1-6 hrs (6-24 hrs)	nausea, vomiting, diarrhea, cramps	ham, meat, poultry products, cream-filled pastries, cheese, potato & meat salads	handlers with sore throats or infected cuts	thorough heating and rapid cooling of foods
<i>Escherichia coli</i> (<i>E. coli</i> 0157:H7 is of major concern)	12-72 hrs (depends on specific microorganism)	diarrhea, fever (severe bloody diarrhea with potential kidney problems for 0157:H7)	undercooked ground meats, unpasteurized milk, cheese	intestinal tract of animal	cook meats thoroughly, pasteurize milk
<i>Clostridium botulinum</i> (Botulism)	12-36 hrs (months)	fatigue, weakness, double vision, slurred speech, respiratory failure, sometimes death	<i>Types A&B:</i> vegetables, fruits, meat, fish and poultry products, condiments; <i>Type E:</i> fish & fish products	<i>Types A&B:</i> soil or dust <i>Type E:</i> water and sediments	thorough heating and rapid cooling of foods
<i>Clostridium perfringens</i>	8-22 hrs (12-24 hrs)	diarrhea, cramps, rarely nausea and vomiting	cooked meat and poultry	soil, raw foods	thorough heating and rapid cooling of foods

Source: Institute of Food Technologists, "Foodborne Illness: Role of Home Food Handling Practices," Table 1, excerpted from a reprint, published with permission from the American Council on Science and Health, Vol. 49 No. 4, April 1995.

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INTERVIEW CHECKLIST

Every good “reporter” prepares interview questions in advance. Here are some suggested questions to pose to your school cafeteria manager or local restaurant manager when he/she visits your classroom. What others can you think of? Write the questions in the space below or list them on a separate sheet. Record the guest’s answers and create a class newsletter based on the information you learn from your interview.

- 1** How far ahead do you place your food order?
- 2** What sources do you use to order food?
- 3** Is any of the food imported? Must imported foods meet the same standards as domestic foods, such as fresh produce, fresh or frozen seafood, canned foods?
- 4** Are “restaurant-grade” foods different from those for home use?
- 5** How often do you receive food deliveries? What foods are received fresh? frozen? canned? refrigerated?
- 6** What are the transportation requirements for each type of food — dairy, poultry, meat, produce, fresh, frozen, canned?
- 7** How do you insure that the food that is delivered is safe?
- 8** How do you determine shelf life of food you receive?
- 9** How often do you check your shelves for outdated food?
- 10** Can you explain the food handling processes and procedures that are regulated by government agencies?
- 11** What do government inspectors check for when they visit your kitchen?
- 12** What special training or instructions do employees receive regarding proper food handling procedures from the time food arrives at your store/cafeteria until it is served?

13

14

15



MICROORGANISMS WITH CULTURE

Yogurt Recipe

1 quart each of 1% milk, 2% milk, and skim milk
 3/4 cup yogurt starter*
 1 cup non-fat dry milk

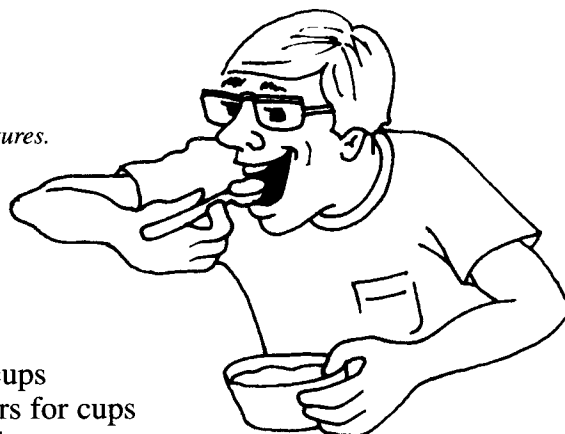
*Any plain yogurt in which the label indicates the presence of active yogurt cultures.

(Yogurt may be prepared with only one type of milk. If only one quart of milk is used, reduce yogurt starter to 1/4 cup and non-fat dry milk to 1/3 cup.)

Resources

yogurt recipe and ingredients
 double boiler
 spoons
 pH paper
 thermometer (°F or °C)
 methylene blue (optional)

stove
 custard or yogurt cups
 heat-resistant covers for cups
 oven or yogurt maker
 bowl of ice



Procedure

Day 1

- 1 Add 1/3 cup non-fat dry milk to each quart of milk and stir until well dissolved.
- 2 Heat milk in double-boiler to 185°F (85°C) for twenty minutes. (Use thermometer to check temperature.)
- 3 Cool immediately by placing double-boiler in a bowl of ice until milk reaches 110°F (43°C). Add 1/4 cup yogurt starter culture to each quart of milk.
- 4 Mix *gently* to minimize adding air.
- 5 Carefully fill yogurt or custard cups. Cover with yogurt cup caps or other heat-resistant cover.
- 6 Place in a 110°F (43°C) oven (or lowest oven setting) or a yogurt maker. Monitor the temperature of the yogurt mixture to maintain a temperature of 110°F (43°C) for 3-6 hours or until yogurt coagulates. (Times are provided as a general guideline for the yogurt-making process. What is important is the yogurt's consistency.) *Important: Avoid temperature variations greater than 3 degrees.*
- 7 Cool in refrigerator.

Day 2

- 1 Remove cooled yogurt from refrigerator.
- 2 Make observations and record data on the chart to the right. Determine if there are any differences among the yogurts made with the different bases (not applicable if only one type of base is used.)

Day 3 (Optional)

- 1 If a microscope is available, place a small portion of the yogurt culture on a slide and allow to dry.
- 2 Stain the dried culture with methylene blue for one minute. Gently rinse the film with water and allow to air dry.
- 3 Examine the slide at a magnification of 1000. Under the microscope you will observe two types of bacteria: 1) a chain of spherical cells (*Streptococcus thermophilus*), and 2) rod-shaped organisms (*Lactobacillus bulgaricus*).

Data Collection Chart (optional comparisons)

	Yogurt Base		
	1%	2%	Skim
pH			
Color			
Texture			
Taste			
Aftertaste			

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FOOD STORAGE FACTS AND SPOILAGE INDICATORS

Tips for Storage:

- "FIFO" - First in, first out: rotate stock.
- Read "pull" dates and "best if used by" dates.
- Store foods in an orderly manner, with like foods together.
- Properly stored foods stay fresher longer and maintain quality.
- Proper storage helps to preserve nutrients.
- Use thermometers to check storage temperatures.
- "When in doubt, throw it out."
- Pay special attention to foods that support bacteria growth (meat, fish, poultry and dairy foods).

DRY FOODS

Store in a cool area (55°-70°F/13°-21°C) and away from heat in a dry, dark, sanitary area. Opened foods and packages must be tightly sealed or placed in air-tight containers.

Baking power/soda	18 months	Peanut butter	2-3 months
Biscuit/pancake mixes	6 - 8 months	Opened	6 months
Cake mixes	one year	Unopened	6 months
Cocoa mixes	8 months	Salad/cooking oil	3 months
Extracts	12 months	Opened	6 months
Fruit (fresh/bananas)	up to 5 days	Unopened	8 months
Fruit (canned)	1 year	Solid shortening	1 year
Fruit (dried)	6 months	Spices/herbs	1 year
Gelatin	12-18 months	Whole spices	6 months
Grains & cereals	1 year	Dried & ground	2 years
Flour	1 year	Sugar	4 months
Pasta	1 year	Granulated	6 months
White rice	6 months	Confectioners/brown	up to 4 weeks
Brown rice	2-3 months	Tea bags	up to 4 weeks
Cereals	1 year	Vegetables (fresh)	up to 4 weeks
Honey/syrup	1 year	onions/potatoes	1 year
		Vegetables (canned)	1 year
		Vegetables (dried)	1 year
		beans, peas, lentils	1 year

Signs of Spoilage or Poor Quality in Grain and Dry Foods:

- weevils (small black bugs) infest flour and grain products
 - soggy and change in flavor
 - whole grain products may become rancid (refrigerate after opening)
- ## Signs of Spoilage in Canned Foods: (refrigerate canned goods after opening)
- bulging, leaking cans (check all dented cans for leaks and spoilage)
 - juices appear cloudy
 - strange smell or odor
 - food usually soft or mushy
 - spurting liquids when can is opened
 - juices or liquids bubble

REFRIGERATED FOODS

Storage temperature of 40°F (4°C) or below; not crowded, allow air to circulate between foods, clean; foods properly covered or wrapped, labeled and dated. Short term storage only.

Coffee	2 weeks
Dairy	5 days
Milk	1-2 weeks
Butter	3-5 days
Soft cheese	1 month
Hard cheese	1-2 weeks
Yogurt/sour cream	5 weeks
Eggs (raw)	1 week
Hard cooked	1-2 days
Fish (fresh)	3-4 days
Cooked	up to 1 week
Fruit	2-5 days
Citrus/melons	2-4 weeks
Berries, peaches, pears, etc.	2 weeks
Apples	3-4 days
Herbs (fresh)	1-2 days
Meats (fresh)	4-6 days
Ground	1 week
Luncheon	1 week
Bacon/hot dogs	2-3 days
Ham	1-2 days
Sausage	4-5 days
Poultry (pieces)	3 months
Whole chicken	1 day
Whole turkeys	1 day
Salad dressing	2-3 days
Bottled dressing	2-3 days
Shellfish	3 months
Vegetables (fresh)	1 day
Corn-on-the-cob	1 day
Asparagus	2-3 days
Leafy greens, peas, broccoli	2-3 days
Cabbage, cauliflower, celery, tomatoes, peppers, etc.	5 days
Root (carrots, turnip, beets, radishes)	7 days
	10-14 days

Signs of Spoilage or Poor Quality in Meat:

- off odors
 - slimy and slippery feel
 - red meat turns greyish brown
- ## Signs of Spoilage or Poor Quality in Fruits and Vegetables:
- wilted or limp
 - mold growth
 - soft mushy feel
 - off odors

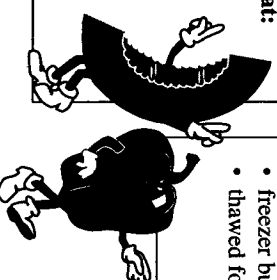
FROZEN FOODS

Storage temperature of 0°F (-18°C) or below; foods properly packaged to prevent freezer burn. Use air-tight wrapping, freezer foil or freezer plastic bags. Do not freeze cooked eggs, egg whites, mayonnaise, gelatin. Label with name, date and weight or count.

Baked goods	3 months
Dairy	2-3 months
Ice cream	1 month
Milk	6 months
Butter	1 year
Eggs yolks (raw)	3-6 months
Fish	8-12 months
Fruit	6 months
Meat (fresh)	2-3 months
Ground	not suggested
Luncheon	2-4 weeks
Bacon/hot dogs	2 months
Ham	4 months
Sausage	9 months - 1 year
Poultry (pieces)	1 year
Whole chicken	1 year
Whole turkeys	8 months - 1 year
Vegetables	

Signs of Spoilage or Poor Quality in Frozen Foods:

- unusual color or odor
- thawed food left at room temperature more than 2 hours
- thawed food refrigerated more than 2 days
- freezer burn, dried out areas, loss of juices
- thawed food should not be refrozen



PACKAGE DATES: WHAT THEY MEAN

DATING METHOD	DEFINITION	FOOD PRODUCTS	FRESHNESS INDICATORS
Pack Date	The day the food was cooked, processed and packaged.	Canned foods, some fresh produce.	No dents, nicks, or bulges; date product was packed.
Sell or Pull Date	The last day a food product is to be sold; allows for short storage time in consumer's refrigerator	Milk, ice cream, cold cuts, salad bar items, fresh prepared vegetables, frozen baked goods and vegetables, fresh packaged meats, cold cuts.	Package date; odor; no ice crystals on frozen products; no evidence of "melt down."
Expiration Date	The last day a food should be eaten or used.	Baby food, yeast, dairy products, eggs.	Package date; no bulges; no indicators of tampering.
Freshness Date	The date at which a food will have passed its quality peak.	Baked goods, such as rolls, cakes, pies, bread, etc.	Package or shelf date; softness of bread; no mold.

NOTE: Food processors sometimes package date their products with a code, usually a series of numbers or letters in a certain sequence. This code provides the food processor with quality control information, such as the batch number, as well as dating information. In addition, many food processing companies are willing to answer your questions, or even reimburse you the cost of the food if it is spoiled. If you suspect a food is bad, look at the package for both the date and for information on how to contact the company. Some companies provide a phone number, while others provide an address. Most will tell you to send the label, the code number if not on label and UPC symbol.

Consumers wishing to "decode" label information may call these companies toll-free:

- | | | | |
|---------------|----------------|---------|----------------|
| Dole | 1-800-232-8800 | Kraft | 1-800-847-1997 |
| Frito Lay | 1-800-352-4477 | Kellogg | 1-800-962-1413 |
| Betty Crocker | 1-800-328-6787 | Motts | 1-800-426-4891 |
| General Mills | 1-800-328-1144 | | |

Additional toll-free customer service numbers for other companies may be obtained by consulting a toll-free directory.

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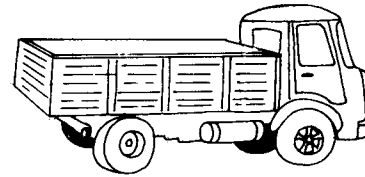


FOOD TRANSPORTERS

Specialized trucks transport foods under safe conditions and temperatures. Refrigerated stainless steel tank trucks transport unprocessed liquids such as milk, juice or syrup to processing plants. Refrigerated trucks that maintain a constant temperature transport fresh meats, eggs and seafood, as well as produce. Hoppers are tractor/trailer rigs with open tops and slatted or mesh sides. They often transport freshly picked produce on its way to be processed and packed in crates for shipping. Livestock is transported in large ventilated tractor/trailers specially designed to carry live animals.

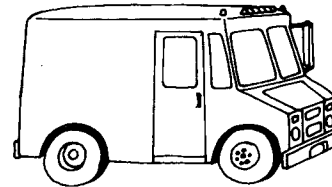
Draw a line between each food item and the type of truck used to transport it. You may use each truck more than once.

unprocessed milk



Hopper

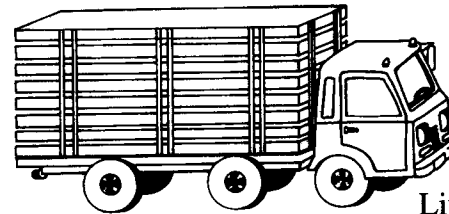
beef cattle



Refrigerated Truck

watermelons

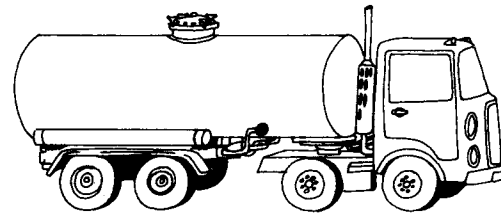
hogs



Livestock Rig

eggs

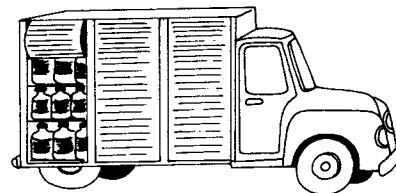
orange juice (bulk)



Tanker Truck

frozen poultry

apples

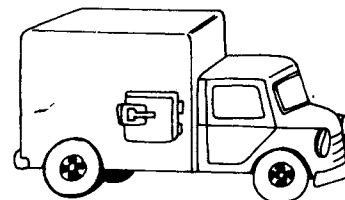


Beverage Truck

bottled water

fresh packaged poultry

ice cream



Freezer Truck

frozen fish