

Lesson 4: Food Safety

Introduction

As students become more independent, their responsibility for purchasing and preparing their own food also increases. Whether they choose prepared or pre-packaged food, cook food from scratch, or bring leftovers home from a restaurant meal, students need to know how to handle and store food properly to ensure the food they eat is safe.

Canada has one of the best and safest food supplies in the world. Food safety is multi-faceted, involving all stages of food handling, from production to distribution. The Canadian government has established an agency that enforces policies and standards, set by Health Canada, governing the safety and nutritional quality of all food sold. The Canadian Food Inspection Agency (CFIA) is authorized to direct industry to remove potentially harmful food products from shelves. The agency also educates the public about the safe storage, handling, and preparation of food.

Despite all the precautions taken to ensure safe food, “public health experts estimate that there are 11 to 13 million cases of food-borne illness in Canada every year,” costing over \$1 billion in health care costs, legal fees, and lost wages (CFIA). In most cases, the pathogenic organism is present because the food was not handled or stored properly. Most cases of food-borne illness can be prevented with safe food-handling practices. That is the focus in this lesson.

REFERENCE



For additional information, refer to the following website:

Canadian Food Inspection Agency (CFIA). “Causes of Food Borne Illness.” *Food*. 2 Aug. 2006. <www.inspection.gc.ca/english/fssa/concen/causee.shtm>.

For website updates, please visit Websites to Support the Grades 11 and 12 Curriculum at <www.edu.gov.mb.ca/k12/cur/physhlth/>.



Specific Learning Outcome

12.NU.8 Examine the causes and symptoms of food-borne illness (food poisoning) and demonstrate understanding of ways to minimize the risk of food poisoning.



Key Understandings

- There are many causes of food-borne illness.
 - Different foods have different levels of risk of contamination.
 - Proper food handling by consumers from the time of purchase to consumption reduces the risk of food-borne illness.
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Essential Questions

1. What are the causes of food-borne illness?
 2. What are the best ways to keep food safe?
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Background Information

As students become increasingly independent, it is essential that they have the proper skills to handle, prepare, and store food, and are aware of the potential for food contamination.

Causes of Food-Borne Illness

According to the Centers for Disease Control and Prevention, more than 250 known illnesses can be transmitted through food. Unknown or undiscovered agents cause a high percentage of all food-borne illnesses and related hospitalizations. Many people do not report their illness because they suffer mild symptoms and recover quickly.

Food usually becomes contaminated through improper consumer handling, preparation, or storage (e.g., individuals who do not wash their hands after using the washroom or have infections themselves often cause contamination). Given the right conditions, the harmful organisms can multiply to millions in a very short period of time.

Sickness caused by contaminated food is referred to as *food-borne illness* or *food poisoning*. The organisms that cause food-borne illness are too small to see, they don't smell, and they don't have a taste.

The symptoms of food poisoning range from mild stomach cramps to nausea, vomiting, diarrhea, and fever, which can be life-threatening to very young children, seniors, pregnant women, and people whose immune systems are already weakened. Some people may become ill after ingesting only a few harmful organisms, while others may remain symptom-free after ingesting thousands.

High-Risk Foods

All foods can cause food-borne illness, and contamination can occur in the production, processing, or packing of food. Foods that can easily support the growth of harmful organisms are known as *high-risk foods*.

Examples of high-risk foods are

- meat and poultry such as chicken and turkey (raw and cooked)
- fish and seafood
- eggs
- prepared salads such as coleslaw, pasta salads, and rice salads that contain mayonnaise
- dairy products
- cooked rice
- cooked pasta
- prepared fruit salads
- processed meats such as salami and ham

Low-Risk Foods

Low-risk foods do not require refrigeration until opened. These foods tend to be high in sugar, salt, or acid, and/or low in water content.

Examples of low-risk foods are

- bread and most baked goods
- jam and preserves
- syrups and vinegars
- hard cheese
- peanut butter
- nuts, seeds, and dried fruit
- fresh fruit and vegetables (they can become contaminated after cutting and should always be washed before eating)

REFERENCES



For additional information, refer to the following websites:

Australia. State of Victoria. "Food Safety." *Better Health Channel*.

<www.betterhealth.vic.gov.au/bhcv2/bhcarticles.nsf/pages/hl_foodsafety?OpenDocument>.

Centers for Disease Control and Prevention. "Frequently Asked Questions." *Foodborne Illness*. 10 Jan. 2005.

<www.cdc.gov/ncidod/dbmd/diseaseinfo/foodborneinfections_g.htm#consumersprotect>.

Health Canada. "Safe Food Handling." *Food and Nutrition*. <www.hc-sc.gc.ca/fn-an/securit/handi-manipul/index-eng.php>.

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Suggestion for Instruction / Assessment

What's Bugging You?

Working alone or in small groups, students research any **three** food-borne pathogens from the list provided. As a result of their research, students should be able to answer the following questions related to each selected pathogen:

1. What are the common food sources of the pathogen?
2. Describe the symptoms and/or effects related to the pathogen.
3. Outline the time it takes for the onset of symptoms and the duration of the illness caused by the pathogen.
4. Describe any preventive measures that can be taken to reduce and/or prevent illness from the pathogen.
5. Explain why people need to be concerned about the illness caused by the pathogen.

FOOD-BORNE PATHOGENS

- Bacillus cereus
- Campylobacter jejuni
- Clostridium botulinum
- Clostridium perfringens
- Cryptosporidium parvum
- Escherichia coli 0157:H7 (E. coli)
- Giardia lamblia
- Hepatitis A
- Listeria monocytogenes
- Norovirus or Norwalk virus
- Salmonella
- Shigella
- Staphylococcus aureus
- Toxoplasma gondii
- Vibrio
- Yersinia

REFERENCES



For additional information about food-borne pathogens, refer to the following websites:

Canadian Partnership for Consumer Food Safety Education. "Fact Sheets." *Food Safety Tips*. <www.canfightbac.org/cpcfse/en/safety/safety_factsheets/>.

U.S. Food and Drug Administration (FDA). Center for Food Safety and Applied Nutrition. *Bad Bug Book: Foodborne Pathogenic Microorganisms and Natural Toxins Handbook*. 28 Dec. 2007. Available online at <www.foodsafety.gov/~mow/intro.html>.

---. "Foodborne Illness: What Consumers Need to Know." *Food Safety Education*. Sept. 2001. <www.foodsafety.gov/~dms/fsefborn.html>.

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Background Information

Contamination Protection and Food Safety

Consumers can help protect themselves from food-borne illness by learning more about the growth and spread of organisms/micro-organisms and by practising effective preventive measures.

▪ **What do organisms/micro-organisms need in order to grow and multiply?**

Organisms/micro-organisms need the following conditions to multiply:

- **Food:** Food is a basic requirement for growth.
- **Moisture:** Many micro-organisms will not grow in dry food. High salt, acid (vinegar), or sugar content will inhibit growth in moist foods.
- **Temperature:** Optimal temperature for the growth of micro-organisms is between 4°C and 60°C. This temperature range is known as the *food danger zone*.
- **Air:** Most micro-organisms (but not all) require oxygen to grow. Botulism is one exception and thrives in anaerobic environments.
- **Time:** When the above conditions are ideal, micro-organisms can grow rapidly.

▪ **How are micro-organisms transferred/spread?**

Micro-organisms may be present naturally in foods or transferred on people's hands, through coughs, other foods, utensils, equipment, water, or pests.

▪ **How can the growth of micro-organisms be prevented?**

We can prevent food-borne illness by following these simple steps:

- Prevent micro-organisms from spreading by protecting food from contact with contaminated objects. This includes people, dirty equipment, utensils, and possibly other foods.
- Stop micro-organisms from growing by eliminating conditions that encourage growth. The most effective way to keep micro-organisms from multiplying is to keep food out of the danger zone. Keep cold foods below 4°C and hot foods above 60°C.
- Finally, destroy the micro-organisms. Most micro-organisms cannot survive temperatures above 75°C for 30 seconds. We can make food safe by cooking it. The temperature that makes and/or keeps food safe is also used to sanitize dishes and equipment. Certain chemicals (such as bleach) also kill micro-organisms. These sanitizing agents are the best means to clean countertops and large equipment.

Everyone has a responsibility to help keep food fresh and safe by following safety guidelines related to handling, preparing, cooking, serving, and storing food.



Refer to RM 10–NU: Safe Food Guidelines.

REFERENCE



For additional information about preventing food-borne illness and food safety, refer to the following website:

Manitoba Agriculture, Food and Rural Initiatives. "Handling Food at Home." *Consumer Food Safety*. Nov. 2005. <www.gov.mb.ca/agriculture/foodsafety/consumer/cfs01s04.html>.

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Suggestion for Instruction / Assessment

Food Safety Errors: Case Studies

Provide students with an opportunity to read the case studies of food safety errors presented in RM 11–NU. Students determine what the errors were and identify steps that could have been taken to keep food safe. They can use the safety information from RM 10–NU to assist them.



Refer to RM 10–NU: Safe Food Guidelines and RM 11–NU: Food Safety Errors: Case Studies.



Suggestion for Instruction / Assessment

Food Safety Game

Consider having students develop questions and answers for a food safety game. Sample questions and answers related to food safety are available online.

REFERENCE



For sample questions and answers related to food safety, refer to the following website:

Canadian Food Inspection Agency. "Food Safety Wheel Game: Questions and Answers."
Food: Consumer Centre. 3 May 2004.

<www.inspection.gc.ca/english/corpaffr/educ/gamejeu/safsale.shtml>.

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