

# Food Irradiation: What's the Scoop?

Would Canadians be safer from food-borne illnesses if all foods in Canada were irradiated before being sold to the public?



## overview

### LESSON CONTEXT

In the summer of 2008, luncheon meat contaminated with the bacteria *Listeria monocytogenes* caused the deaths of 22 people and the sickness of many others. As a result, a number of products were pulled from the market and the company lost millions of dollars as well as consumer confidence.

### LEARNING GOALS

- Understands some of the ways that environmental factors, such as bacterial food contamination, can affect human health.
- Understands the role that food irradiation can play in food safety.
- Evaluates evidence and considers alternative perspectives, ideas and explanations.

### LEARNING ACTIVITIES

In this lesson, students will explore, and think critically about, the issue of food safety and the role that radiation can have in keeping food safe to eat. Students will do a group research project and an individual editorial writing assignment.

### BIG IDEAS

Food irradiation is a technology that has the potential to improve human health through improved food safety.

## assessment & evaluation

### PRIOR KNOWLEDGE AND SKILLS

- Awareness of food-borne illnesses
- Familiarity with the listeriosis outbreak of 2008
- Experience locating legitimate information using internet sources
- Experience working in cooperative small groups

### SUCCESS CRITERIA

- Students participate in meaningful class discussions
- Student research demonstrates understanding of the science and issues involved in food irradiation

### ASSESSMENT STRATEGIES

- Review of student backgrounders
- Assessment of student op-eds using rubric



time

60-70

MINUTES PLUS TIME  
OUTSIDE OF CLASS



subjects














SCIENCE  
HUMAN HEALTH  
FOOD SAFETY  
PHYSICS



skills

CRITICAL THINKING  
COMMUNICATION  
COLLABORATION

## resources & materials required

-   **BLM – Food Irradiation Backgrounder Rubric** – one per student
-   **BLM – Food Irradiation Individual Writing Assignment** – one per student
-   **BLM – Backgrounder Assignment Topic 1: Economic Impact** – one per student in this group
-   **BLM – Backgrounder Assignment Topic 2: Technology and the Food Irradiation Process** – one per student in this group
-   **BLM – Backgrounder Assignment Topic 3: Public Health and Disease Prevention** – one per student in this group
-   **BLM – Backgrounder Assignment Topic 4: Public Safety and Regulations** – one per student in this group
-  Curriculum alignment
- Electronic device with internet access

## minds-on

 10 MINUTES

- With the whole class, introduce the concept of food irradiation by discussing the Listeria outbreak of 2008. Questions for discussion can include:
  - » *What is listeriosis?*  
Listeriosis is an infection causing fever, nausea, diarrhea, headaches, etc.
  - » *What causes it?*  
It is caused by the bacterium *Listeria monocytogenes*.
  - » *In the 2008 Listeria outbreak, what did the bacteria contaminate?*  
They contaminated food – in this case, luncheon meats.
  - » *Did anyone become ill or die during the 2008 outbreak?*  
As of the final update on April 17, 2009, there were 57 confirmed cases and 22 deaths where listeriosis was the underlying cause.
  - » *Why were people so concerned?*  
Many people ate products made by the company which produced the infected meat.
  - » *How do you think this could have been prevented?*
- Explain to students that one way to kill harmful bacteria on foods is through radiation. The students may have visceral reactions to this statement.
- Discuss with the students their thought on food irradiation. Questions for discussion can include:
  - » *Would you buy foods exposed to radiation?*
  - » *How would you feel about eating foods that had been irradiated?*
  - » *How confident would you be that food that had been irradiated was safe to eat?*
  - » *How important would it be for you to learn about food irradiation before eating food that had been irradiated?*
  - » *Who do you think should provide you with information about food irradiation?*
  - » *Do you think food irradiation is a good idea, a bad idea or you don't know enough about it decide?*
- Have students brainstorm a list of energy sources used to generate electricity in Canada. Students should record these energy sources in their science notebooks. This list should include renewable (hydro, wind) and non-renewable (nuclear, natural gas, coal) energy sources. Discuss where they have seen examples of each in their province.



### MISCONCEPTION ALERT

Students may initially believe that irradiation is the same as contamination. When x-rays, gamma rays or electron beams have irradiated something, the irradiation stops as soon as the source of ionizing radiation has been removed or terminated. When radioactive contamination occurs, the source of the ionizing radiation itself is transferred to the substance.

## action

 20 MINUTES PLUS TIME OUTSIDE CLASS

- Organize students into groups of three or four. You may want to determine ahead of time which students will be in each group.
- Each of the small groups will research food irradiation, food safety, and food-borne illnesses using the websites listed with each of the assigned perspectives (see topics below).
- Assign each group to one of the four topics.
  - » Topic 1: Economic Impact
  - » Topic 2: Technology and the Food Irradiation Process
  - » Topic 3: Public Health and Disease Prevention
  - » Topic 4: Public Safety and Regulations
- Have students find their group members.
- Hand out the **Backgrounder Assignment BLMs** to the groups and have the students read over the questions for their topic that will help guide their research.
- Each group will produce a one-page backgrounder of their research. This backgrounder will later be shared with students in the other groups so that they can use them to complete the **Food Irradiation Individual Writing Assignment BLM**.
- Once each group has handed in their one-page backgrounder, photocopy a class set that includes all four topics. Give the copies to the students, or post on a student portal for the class.

### IMPLEMENTATION OPTIONS

- Students could choose the topic that they are most interested in. However, if this occurs, ensure that each topic is chosen by at least one group. If you have a large class, multiple groups could choose the same topic.
- You may choose to only use one, two or three of the topics instead of all four. What you choose may also depend on your curriculum requirements.
- Omit the whole class sharing and require students to read all of the backgrounders online before handing out the individual assignment.

## consolidation

 30 MINUTES

- Provide each group with two minutes to report what they learned about their topic. If there are multiple groups per topic, have subsequent groups only add new information.
- Students will participate in an individual writing assignment. The purpose of the assignment is to help answer the key question – see the **Food Irradiation Individual Writing Assignment BLM**. Based on the background research from all of the groups' backgrounders, as well as their own critical thinking and decision-making skills, students will each communicate their recommended alternative and course of action with regard to the irradiation of food in the form of an op-ed piece (see the **Food Irradiation Individual Writing Assignment BLM** for a description of an op-ed piece).
- Each student will be required to construct arguments and defend his/her position on the issue of food irradiation using examples and evidence and recognizing the various perspectives discussed in class. Each student will also be required to propose a course of action on this issue taking into account human needs.

### IMPLEMENTATION OPTION

- Instead of writing an op-ed piece, the students could present their findings in an oral presentation or they could debate the key question.

## extensions

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- Complete a class survey in order to find out which students were for food irradiation and which students were against it.
- Students may wish to submit their op-ed pieces to their school newspaper or post on their class portal.

## additional resources

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### CANADIAN NUCLEAR ASSOCIATION WEB PAGES

- [Food irradiation](#)

### RELATED TEACHNUCLEAR LESSON PLANS

- [Attack of the 50 Foot Mutant: Radiation in Popular Culture](#)
- [From the Outside In: Biological Effects of Radiation](#)
- [Flying the Radioactive Skies](#)

## background information

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[Retrieved August 2019]

- [Causes of Food Poisoning – Canadian Food Inspection Agency, Government of Canada](#)  
Links to information about common causes of food poisoning, including listeria.
- [Food Irradiation – Canadian Food Inspection Agency, Government of Canada](#)  
Facts about food irradiation, labelling, types of foods irradiated in Canada, and food safety.
- [Irradiated foods – Canadian Food Inspection Agency, Government of Canada](#)  
Requirements and controls for handling and labelling irradiated foods in Canada.
- [Food Irradiation – Health Canada, Government of Canada](#)  
Information on foods that are currently irradiated in Canada and answers to frequently asked questions.
- [Food-Related Illnesses – Health Canada, Government of Canada](#)  
A look at common causes of food-related illnesses including infant botulism, listeriosis, and salmonellosis.
- [Policy on Listeria monocytogenes in Ready-to-Eat Foods – Health Canada, Government of Canada](#)  
This policy outlines the roles and responsibilities of government, industry, and consumers in regard to listeria and food safety.
- [Listeriosis \(Listeria\) – Health Canada, Government of Canada](#)  
Causes, symptoms, risks, treatment, prevention, surveillance information and guidance for health professionals.
- [Lessons Learned: Public Health Agency of Canada's Response to the 2008 Listeriosis Outbreak – Public Health Agency of Canada, Government of Canada](#)  
Release of the Lessons Learned Report in the 2008 listeriosis outbreak (archived).