

“Chilling Out” – Lesson Plan 3

Title: Life Systems – Interactions Within Ecosystems - Bacteria

Recommended Time Requirement: 4 class periods

- 50 minutes to explore how the home refrigerator has changed our lives using the “Chilling Out” virtual exhibit and other resources
- 50 minutes to examine how refrigeration stops the spread of bacteria
- 50 minutes to research and plan a public service announcement on refrigeration or radio
- 50 minutes to present radio announcements

Student Task

You will be writing and presenting a public service announcement for your local radio station in 1930 telling citizens in your community why food should be refrigerated.

Intended Grade Level / Subject Matter Areas:

Science – Grade 7 Life Systems – Interactions Within Ecosystems; Language Grade 7 – Oral and Visual Communication

Concepts

Interactions of plants, animals, fungi, and micro- organisms in an ecosystem; factors that affect the balance among the components of an ecosystem (e.g. cooling)

Instructional Outcomes

Students will be able to:

- formulate questions about and identify the needs of various living things in an ecosystem, and explore possible answers to these questions and ways of meeting these needs
- plan investigations for some of these answers and solutions, identifying variables that need to be held constant to ensure a fair test and identifying criteria for assessing solutions;
- investigate the impact of the use of technology on the environment
- describe the conditions in an ecosystem that are essential to the growth and reproduction of plants and micro-organisms, and show the connection between these conditions and various aspects of the food supply for humans;
- compile qualitative and quantitative data gathered through investigation in order to record and present results
- communicate the procedures and results of investigations for specific purposes and to specific audiences, using oral presentations, written notes and descriptions.

TEACHER INSTRUCTIONS

Prior knowledge and skills required

To complete this task, students should have some knowledge or skills related to the following:

- the following terms: *refrigerator, micro-organism, bacteria*
- the safe and appropriate use of equipment

- using research materials to create point-form notes
- working with primary and secondary sources
- developing and creating a supported opinion piece (editorial)

Materials and resources required

- copy of Student Worksheet
- 2 balloons
- 3 500 ml beakers
- 2 250 ml flasks or small clear glass or plastic bottles with small openings
- Food thermometer to measure the temperature of the water
- Room-temperature water (about 70 °F/21 °C)
- 1/4 cup of sugar
- 1 package of dry yeast
- Warm water (about 110 °F/43 °C to 120 °F/49 °C)
- Ice water (below 40 °F/4 °C)

Task instructions

Introductory activities:

Pre-task 1: Changing Lives Through Chilling (50 minutes)

1. Link to the HVACR Heritage Centre of Canada “Chilling Out” exhibit at <http://pilot.hhc-canada.net/>. With the class, read the section on “Changing Lives” and clarify and language or concepts through discussion.
2. Working in pairs or small groups, depending on computer/internet capabilities, have students read **Four Steps** from the Fight BAC! Website. Students should click on the four sections of the Fight BAC! Diagram (clean, separate, chill, and cook) Canadian Partnership for Consumer Food Safety Education http://www.canfightbac.org/english/fight_bac/stepse.shtml
3. Discuss the issues surrounding the technology of the refrigerator. You might like to use the following question to get started:
 - What are the things we take for granted that help protect us from bacteria?
 - How “simple” would these four steps be without things like clean running water, modern stoves, ovens, food inspected by the government, and refrigerators?

Pre-task 2: Conducting the research: Can refrigeration help stop the growth of bacteria?

1. Working in pairs or small groups, have students conduct the experiment as outlined on the Student Worksheet, “Yeast Balloon Blow-up.”
2. Each student should first develop a hypothesis. Have students observe and record on their worksheet what happens after 5 minutes. After 30 minutes. After 1 hour.
3. Tell students to write up their conclusions.
4. Discuss the outcomes of their experiments. You might like to use the following questions from their worksheet to get started:
 - If the yeast in the warm water bath were dangerous bacteria instead of a harmless yeast microorganism, what could you say the warm environment does?

- If the yeast in the ice water bath were dangerous bacteria instead of good yeast, what could you say the cold environment does?
- What would happen if you put a sample of the yeast/sugar solution in the refrigerator?
- How do yeast and bacteria act the same?
- What effect did the cold temperature of the ice water have on the yeast?

Pre-task 3: Plan and write a public service announcement for radio audiences of 1930

1. Working in small groups, students should plan and write a brief radio public service announcement using the format for the development of a supported opinion piece.
2. You might suggest they review online examples of radio commercials from the period for inspiration (listed under Resources below)

Task

Present a public service announcement for your local radio station in 1930 telling citizens in your community why food should be refrigerated.

1. Small groups present their radio public service announcements.
2. Ask remaining class members to respond as members of the listening public.
 “Would this public service announcement encourage you to buy a refrigerator? Why or why not? What changes might this purchase make in your style of life?”

RESOURCES

- Canadian history text books
- Links
 “Changing Lives” section of “Chilling Out: Origins of Home Refrigeration”
<http://pilot.hhc-canada.net/>

Canadian Partnership for Consumer Food Safety Education
http://www.canfightbac.org/english/fight_bac/stepse.shtml

Old Time Radio – Commercials
<http://www.old-time.com/commercials/>
 “Not-so-famous products were radio sponsors” [see section on Ice]
http://www.old-time.com/commercials/notsofamous_i.html