Grade 7 Science

Grade 7

Cluster 1: Interactions within Ecosystems

Overview

In this cluster, students investigate the complex interactions between organisms and their environment. Students identify biotic and abiotic components of ecosystems, and analyze the cycling of matter that takes place within them. This includes an investigation of the transfer of energy that occurs at various consumer levels, the implications of the loss of producers and consumers to the transfer of energy, and the potential for bio-accumulation within an ecosystem. Students explore ecological succession and assess the positive and negative impacts of human interventions on this natural process. Students discuss environmental, social, and economic factors that should be considered in the management and preservation of ecosystems. They propose a course of action that would help protect the habitat of a particular organism. Students observe micro-organisms with microscopes and discuss their beneficial and harmful roles. Students consider how knowledge of micro-organisms has improved food production and preservation techniques.

PRESCRIBED LEARNING OUTCOMES	SUGGESTIONS FOR INSTRUCTION
Students will...	
7-1-01 Use appropriate vocabulary related to their investigations of interactions within ecosystems. Include: ecosystem, biosphere, abiotic, biotic, organisms, ecological succession, photosynthesis, cellular respiration, ecological pyramid, bioaccumulation, scavengers, decomposers, micro-organisms. GLO: C6, D2	

Teacher Notes

Prior Knowledge

Students have had previous experiences related to this cluster in Grade 4, Cluster 1: Habitats and Communities; in Grade 4, Cluster 4: Rocks, Minerals, and Erosion; and in Grade 3, Cluster 1: Growth and Changes in Plants.

➢ Introduce, explain, use, and reinforce vocabulary throughout this cluster.

➢ **Word Cycle**

Have students use the Word Cycle (Szabos, 1984) strategy to develop an understanding of a term by seeing how it is related to other terms. Students select one term from a list provided and place it on the word cycle. They then select a second term to place in an adjacent spot, indicating the relationship between the terms on a connecting band. This process continues until all spots have been filled. Students can then pair up to discuss their cycles and defend the choices they made.

(For a BLM of a Word Cycle, see *SYSTH*, Attachment 10.1, or *Success*, p. 6.99.)

SUGGESTIONS FOR ASSESSMENT

SUGGESTED LEARNING RESOURCES

PRESCRIBED LEARNING OUTCOMES

Students will...

7-1-02 Define ecosystem, and describe various examples that range from the microscopic to the entire biosphere.

Include: a place on Earth where living things interact with other living things as well as non-living things.

GLO: D2, E2

7-0-2a ↻ Access information using a variety of sources. *Examples: libraries, magazines, community resource people, outdoor experiences, videos, CD-ROMs, Internet…*
GLO: C6 (ELA Grade 7, 3.2.2; TFS 2.2.1)

7-0-7f ↻ Reflect on prior knowledge and experiences to construct new understanding and apply this new knowledge in other contexts.
GLO: A2, C4 (ELA Grade 7, 1.2.1)

SUGGESTIONS FOR INSTRUCTION

➢ Defining an Ecosystem

Provide small groups of students with pictures of various ecosystems (e.g., a forest, a pond, a prairie). Have students use a Concept Frame (Matchullis and Mueller, 1994) to

- list the characteristics common to all the pictures (e.g., they all contain living and non-living components)
- name the ecosystem each picture represents (students may need to use references) and list them in the "examples" portion of the frame
- write their own definition of an ecosystem
- describe what ecosystems are like and unlike

Have students share their results with the class. Discuss and revise these results with students as necessary to create a class definition that contains essential elements from the "include" portion of learning outcome 7-1-02.

(For a BLM of a Concept Frame, see *SYSTH*, Attachment 11.2, or *Success*, p. 6.111.)

➢ Ecosystem Awareness

Have students work in small groups to determine which of the following are examples of ecosystems:

- puddle
- rain barrel of water
- vacant lot
- Spirit Sands (Carberry Desert)
- field of wheat
- Canadian Shield
- North America
- Earth

Have two groups come together to discuss their conclusions and then work to reach consensus on the list. Students should continue this process until they reach a class consensus.

(Students should find that all items on the list meet the definition of an ecosystem. Not all the examples listed are stable or long-term, but they all include an interaction of living and non-living components.)

Suggestions for Assessment

Journal Reflection

Have students reflect on their experiences related to ecosystems using the following sentence stems:

1. I was surprised to learn . . .
2. I found it interesting that . . .
3. I wonder . . .

Suggested Learning Resources

Nelson Science & Technology 7 (Section 5.2)

Sciencepower 7 (Section 1.2)

Addison Wesley Science & Technology 7 (Chapter 1, Section 1.3)

PRESCRIBED LEARNING OUTCOMES
Students will...
7-1-03 Identify abiotic and biotic components of ecosystems that allow particular organisms to survive. GLO: D1, D2, E2
7-0-2a ⊂ Access information using a variety of sources. *Examples: libraries, magazines, community resource people, outdoor experiences, videos, CD-ROMs, Internet…* GLO: C6 (ELA Grade 7, 3.2.2; TFS 2.2.1) **7-0-4e** Demonstrate work habits that ensure personal safety, the safety of others, and consideration for the environment. Include: keeping an uncluttered workspace; putting equipment away after use; handling glassware with care; wearing goggles when required; disposing of materials safely and responsibly. GLO: C1 **7-0-5a** ⊂ Make observations that are relevant to a specific question. GLO: A1, A2, C2 **7-0-5f** Record, compile, and display observations and data, using an appropriate format. GLO: C2, C6 (ELA Grade 7, 3.3.1; Math: SP-III.2.7)

SUGGESTIONS FOR INSTRUCTION

➢ Biotic or Abiotic

Use explicit instruction to introduce the terms *biotic* and *abiotic* as the scientific way of referring to living and non-living components of an ecosystem. Have students brainstorm the needs of living things (addressed extensively from Grades 1-6) and categorize them according to whether they are obtained from biotic or abiotic components of the ecosystem.

Example:

A human needs

- air/oxygen (abiotic)
- water (abiotic)
- food (biotic—from plants and animals)
- shelter (abiotic)

➢ Observing Ecosystems

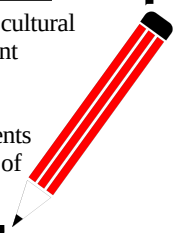
Have students observe an ecosystem (e.g., aquarium, schoolyard, forest, pond) and identify its biotic and abiotic components. If viewing an actual ecosystem is not possible, students can use the pictures of ecosystems from the Defining Ecosystems learning activity (see learning outcome 7-1-02). Ask students to draw a diagram of the ecosystem being studied, label its biotic and abiotic components, and write a brief paragraph describing how the components interact.

Note: The Ducks Unlimited Canada website <http://www.ducks.ca> has an online teacher resource containing student learning activities and support materials on the topic of wetland ecosystems.

Teacher Notes

In conjunction with this cluster, initiate an outdoor learning experience or field trip that allows students to collect a wide range of information on one or several ecosystems for use throughout the study of this cluster. Refer to *Science Safety: A Kindergarten to Senior 4 Resource Manual for Teachers, Schools, and School Divisions* (1997) for guidelines and sample forms related to field trips. This document was distributed to all Manitoba schools. Additional copies can be obtained from the Manitoba Text Book Bureau at <http://www.edu.gov.mb.ca/metks4/curricul/learnres/mtbb/index.html>.

Note: The terms *living* and *non-living* are problematic for some cultural groups, particularly Aboriginal groups. These groups use different criteria than Western scientists to determine whether an object is animate. Teachers should be sensitive to the potential conflict between Western science and other views and indicate that students can hold multiple views at the same time, recognizing the value of each.



Suggestions for Assessment

Extended Response

Provide students with the following:

Components of an Ecosystem

List and label the abiotic and biotic components in the ecosystem pictured below. Include things that are obvious to the unaided eye as well as those things you can't see but feel certain are present.

Look for:

- trees—biotic
- grass/plants—biotic
- rocks—abiotic
- squirrel/bird—biotic
- soil—abiotic
- etc.

Suggested Learning Resources

Nelson Science & Technology 7 (Section 5.2)

Sciencepower 7 (Section 1.2)

Addison Wesley Science & Technology 7 (Chapter 1, Sections 2.0-2.1)

Science Safety: A Kindergarten to Senior 4 Resource Manual for Teachers, Schools, and School Divisions (Teacher Reference)

PRESCRIBED LEARNING OUTCOMES
Students will...
7-1-04 Describe ecological succession and identify signs of succession in a variety of ecosystems. Include: the natural process whereby some species are replaced by other species in a predictable pattern. GLO: D2, E2, E3
7-0-5a ⊂ Make observations that are relevant to a specific question. GLO: A1, A2, C2 **7-0-5f** Record, compile, and display observations and data, using an appropriate format. GLO: C2, C6 (ELA Grade 7, 3.3.1; Math: SP-III.2.7) **7-0-7a** Draw a conclusion that explains investigation results. Include: explaining the cause and effect relationship between the dependent and independent variables; identifying alternative explanations for observations; supporting or rejecting a prediction/hypothesis. GLO: A1, A2, C2 (ELA Grade 7, 3.3.4)

(continued)

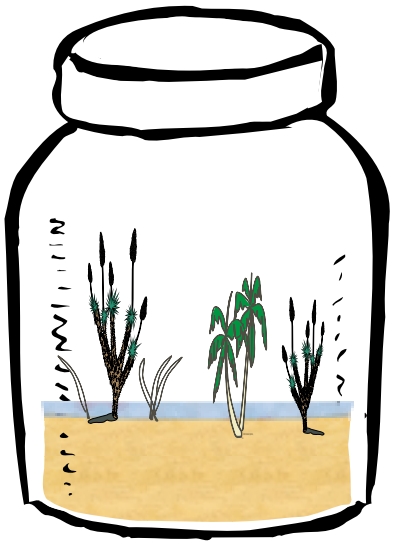
SUGGESTIONS FOR INSTRUCTION

➢ Changes within an Ecosystem

Have students create a small pond ecosystem, following these steps:

- Place 5 cm of soil and 7.5 cm of water in a large jar.
- Place the jar near a window or grow light and let the water settle overnight.
- The following day, place an aquatic plant in the water. Draw an illustration of the ecosystem and label its biotic and abiotic components.
- Add three or four birdseeds to the jar every couple of days for a week (initially they will germinate and rot).
- Continue to add birdseeds when the water has evaporated (the seeds will begin to grow and the aquatic plant will die).
- Draw an illustration of the ecosystem and label its biotic and abiotic components.

Example:



Have students answer the following questions in their science notebooks:

1. What type of ecosystem does your first illustration represent? (pond) What other types of biotic and abiotic components would you find in the real ecosystem? (fish, insects, rocks)
2. What type of ecosystem does your second illustration represent? (wetland) What other types of biotic and abiotic components would you find in the real ecosystem? (birds, moose, rocks, cattails, reedy grasses)

(continued)

SUGGESTIONS FOR ASSESSMENT	SUGGESTED LEARNING RESOURCES
Refer to the assessment strategy suggested for learning outcome 7-1-05.	*Nelson Science & Technology 7* (Section 5.20) *Sciencepower 7* (Section 2.4) *Addison Wesley Science & Technology 7* (Chapter 1, Sections 5.0, 5.3-5.5)

PRESCRIBED LEARNING OUTCOMES	SUGGESTIONS FOR INSTRUCTION
Students will...	
7-1-04 *(continued)*	*(continued)*

3. What type of ecosystem would be present after the model had thoroughly dried out? (grassland)
4. Do the changes that took place in this model ecosystem mirror what happens in a real ecosystem? Why or why not? (Ecosystems are constantly changing, with biotic and abiotic components being added or replaced.)
5. What are some examples of changing ecosystems that you have observed? (trees starting to grow along the edges of grassy fields, grasses starting to fill in a pond)

Have students share their answers with the class.

➢ **Ecological Succession**

In a class discussion, introduce *succession* as the term used to describe the natural process whereby some species are replaced by other species in a predictable pattern.

Have students view information from print or multimedia sources to observe examples of succession in a variety of ecosystems, and select one to represent with a series of illustrations showing the major changes.

Have students answer the following questions in their science notebooks:

1. What are some ways in which new plants move to an area? (Seeds are carried by wind, birds, and/or animals.)
2. What are some reasons animals move to a new area? (Animals may move to a new area to find food, mates, and/or shelter.)
3. What naturally occurring event can start the process of succession all over again? (Natural fires burn off some of the accumulated debris on the forest floor and allow some plants/trees to re-establish themselves.) What happens if this event is prevented from taking place? (There is a build-up of debris on the forest floor. When a fire starts it burns very hot and causes major damage.)
4. What are some ways in which humans prevent or accelerate the process of succession? **Note:** This question will also be addressed in conjunction with learning outcome 7-1-05.

SUGGESTIONS FOR ASSESSMENT

SUGGESTED LEARNING RESOURCES

PRESCRIBED LEARNING OUTCOMES

Students will...

7-1-05 Identify and describe positive and negative examples of human interventions that have an impact on ecological succession or the makeup of ecosystems.

Examples: positive—protecting habitats, reintroducing species; negative—preventing natural fires, introducing non-indigenous species, draining wetlands for agriculture or housing...

GLO: B5, D2, E2, E3

7-0-8g Discuss societal, environmental, and economic impacts of scientific and technological endeavours. Include: local and global impacts. GLO: A1, B1, B3, B5

7-0-9e Be sensitive and responsible in maintaining a balance between the needs of humans and a sustainable environment. GLO: B5

7-0-9f Consider both immediate and long-term effects of their actions. GLO: B5, C4, E3

SUGGESTIONS FOR INSTRUCTION

➢ **Word Splash**

Have students use a Word Splash (Sophier and Haley, 1993) to obtain information about the effects that humans can have on natural succession. To develop a Word Splash, collect newspaper or magazine articles that feature either a positive or a negative example of human intervention on an ecosystem.

(The Manitoba Clean Water Guide, produced by Manitoba Environment, includes a section entitled "Invasion of Exotic Species" which would be useful for a Word Splash. The guide can be obtained from: <http://www.gov.mb.ca/environ/pages/publs97/cwgtext/cover.html>.)

Identify 10 to 15 key words from an article and place them on a sheet. Ask students to make thought/concept connections between the words, and then read the article and discuss the similarities and differences between their connections and the connections made in the article.

Have students summarize the information they gathered from the article using the following format:

Word Splash Summary

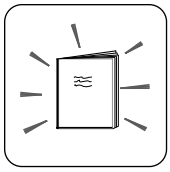
Title of article:

Type of ecosystem being affected:

Causes of change within the ecosystem:

Does the change to the ecosystem have a positive or negative impact? Support your answer with points from the article.

SUGGESTIONS FOR ASSESSMENT



Word Splash

Look for indications of the following in student work:

Checklist			
Criteria	**Yes**	**No**	**Needs Improvement**
• the ecosystem is identified			
• the causes of change are identified			
• the effects of change are identified			
• the conclusion states whether the change had a positive or negative impact on the ecosystem and is supported by points from the article			

SUGGESTED LEARNING RESOURCES

Nelson Science & Technology 7 (Section 5.21)

Sciencepower 7 (Section 3.2)

Addison Wesley Science & Technology 7 (Chapter 1, Section 6.0)

PRESCRIBED LEARNING OUTCOMES
Students will...
7-1-06 Identify environmental, social, and economic factors that should be considered in the management and preservation of ecosystems. *Examples: habitat preservation, recreation, employment, industrial growth, resource development...* GLO: B1, B5, D2, E2
7-0-8g Discuss societal, environmental, and economic impacts of scientific and technological endeavours. Include: local and global impacts. GLO: A1, B1, B3, B5 **7-0-9a** Appreciate and respect that science has evolved from different views held by women and men from a variety of societies and cultural backgrounds. GLO: A4 **7-0-9e** Be sensitive and responsible in maintaining a balance between the needs of humans and a sustainable environment. GLO: B5 **7-0-9f** Consider both immediate and long-term effects of their actions. GLO: B5, C4, E3

SUGGESTIONS FOR INSTRUCTION

➢ Sustainable Development

Use explicit instruction to introduce the concept of *sustainable development. Education for a Sustainable Future: A Resource for Curriculum Developers, Teachers, and Administrators* is a useful resource available on the Manitoba Education and Training website at: <http://www.edu.gov.mb.ca/metks4>. Have students discuss examples of situations where different perspectives and priorities must be balanced in the decision-making process (e.g., environmental, economic, and social factors).

Teacher Notes

Background Information

Sustainable development is an approach to daily decisions that integrates probable consequences to the environment, the economy, and human health and well-being. It is a way of making decisions that balances the needs of today without sacrificing the ability of future generations to meet their own needs.

Manitoba Conservation, 1999

➢ Aboriginal Perspectives

Have students read "Aboriginal Perspectives" (BLM 7-A) and discuss the following questions:

1. What can Aboriginal perspectives contribute to society's goal of sustainability?
2. How can environmental knowledge from Aboriginal people be accessed and included in a decision-making process?

Suggestions for Assessment

Journal Reflection

Have students reflect on the following question in their science journals:

The Role of Science

What contribution can science make to the overall goal of a sustainable society that balances the needs of society, the environment, and the economy? Explain your thinking.

Suggested Learning Resources

Nelson Science & Technology 7 (Sections 5.13-5.17)

Sciencepower 7 (Section 3.5)

Addison Wesley Science & Technology 7 (Chapter 1, Section 6.0)

Education for a Sustainable Future: A Resource for Curriculum Developers, Teachers, and Administrators (Teacher Reference)

Native Science: Natural Laws of Interdependence (Teacher Reference)

A People's Ecology: Explorations in Sustainable Living: Health, Environment, Agriculture, Native Traditions (Teacher Reference)

Look to the Mountain: *An Ecology of Indigenous Education* (Teacher Reference)

Native Studies: Middle Years (Grades 5 to 8) (Teacher Reference)

PRESCRIBED LEARNING OUTCOMES

Students will...

7-1-07 Propose a course of action to protect the habitat of a particular organism within an ecosystem.

Examples: protect the nesting habitat of a given bird in a local wetland...

GLO: B5, C3, D2, E2

7-0-8g Discuss societal, environmental, and economic impacts of scientific and technological endeavours. Include: local and global impacts. GLO: A1, B1, B3, B5

7-0-9b Express interest in a broad scope of science and technology related fields and issues. GLO: B4

7-0-9c ➲ Demonstrate confidence in their ability to carry out investigations. GLO: C5

7-0-9e Be sensitive and responsible in maintaining a balance between the needs of humans and a sustainable environment. GLO: B5

7-0-9f Consider both immediate and long-term effects of their actions. GLO: B5, C4, E3

SUGGESTIONS FOR INSTRUCTION

➢ What Is Your Opinion?

Locate articles or videos that discuss a current environmental issue. Place statements about the issue on an Anticipation Guide (Readence, Bean, and Baldwin, 1981) and have students list their opinions about the issue before they view the videos or read the articles provided. Ask students to complete the last portion of the Anticipation Guide after they have viewed the videos or read the articles.

(For a BLM of an Anticipation Guide, see *SYSTH*, Attachment 9.3, or *Success*, p. 6.98.)

➢ Habitat Protection

As a class, or in groups, identify an issue related to an endangered organism and/or habitat (e.g., preserving wetlands, creating prairie tall-grass sites) for class exploration. Design a course of action to become involved in the issue, while recognizing that the principles of sustainable development need to come into play (refer to learning outcome 7-1-07). Some possible activities:

- Identify existing groups that work toward protecting habitats (Living Prairie Museum, Fort Whyte Centre, Ducks Unlimited, and Oak Hammock Marsh). Find information about the groups and then choose one group to support (e.g., assist with the general clean-up of litter, or the set-up of educational materials or tours).
- Create pamphlets to inform the public of the threats to a habitat and the ways in which the public can ensure its well-being.
- Create a video that describes the plight of a habitat and the organisms that depend on it. Suggest ways to ensure the well-being of the habitat.
- Write a letter to Members of Parliament, Members of the Legislature, and/or local government officials citing concerns about an endangered organism or habitat and possible ways to alleviate the problems.

SUGGESTIONS FOR ASSESSMENT

SUGGESTED LEARNING RESOURCES

Nelson Science & Technology 7 (Section 5.20)

Sciencepower 7 (Section 1.5)

Addison Wesley Science & Technology 7 (Chapter 1, Section 6.2)

PRESCRIBED LEARNING OUTCOMES

Students will...

7-1-08 Compare photosynthesis to cellular respiration, and explain how both are part of the cycling of matter and the transfer of energy in ecosystems.

Include: photosynthesis: water + carbon dioxide + light energy = sugar + oxygen in the presence of chlorophyll; cellular respiration: sugar + oxygen = water + carbon dioxide + energy.

GLO: A2, C6, D2, E4

7-0-1a ↻ Formulate specific questions that lead to investigations. Include: rephrase questions to a testable form; focus research questions. GLO: A1, C2 (ELA Grade 7, 3.1.2; Math: SP-I.1.7)

7-0-1b Select and justify a method to be used in finding the answer to a specific question. GLO: C2 (ELA Grade 7, 3.2.3; Math: SP-II.1.7)

7-0-3a Formulate a prediction/hypothesis that identifies a cause and effect relationship between the dependent and independent variables. GLO: A2, C2 (Math: SP-I.1.7)

7-0-3b Identify with guidance the independent and dependent variables in an experiment. GLO: A2, C2

7-0-3c Create a written plan to answer a specific question. Include: apparatus, materials, safety considerations, steps to follow, and variables to control. GLO: C2 (ELA Grade 7, 3.1.4)

7-0-4a Carry out procedures that comprise a fair test. Include: controlling variables, repeating experiments to increase accuracy and reliability. GLO: C2

7-0-4c ↻ Work cooperatively with team members to carry out a plan, and troubleshoot problems as they arise. GLO: C7 (ELA Grade 7, 5.2.1)

7-0-4e Demonstrate work habits that ensure personal safety, the safety of others, and consideration for the environment. Include: keeping an uncluttered workspace; putting equipment away after use; handling glassware with care; wearing goggles when required; disposing of materials safely and responsibly. GLO: C1

7-0-4f Identify WHMIS hazard symbols that provide information on the safety of substances. GLO: C1

7-0-5a ↻ Make observations that are relevant to a specific question. GLO: A1, A2, C2

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SUGGESTIONS FOR INSTRUCTION

➢ Activating Prior Knowledge

To activate students' prior knowledge of plants, have them fill out a Knowledge Chart (Matchullis and Mueller, 1994) on the topic.

(Plant parts, functions, and needs were studied in Grade 3, Cluster 1: Growth and Changes in Plants. For a BLM of a Knowledge Chart, see *SYSTH*, Attachment 9.2, or *Success*, p. 6.95.)

➢ Photosynthesis

In the following learning experiences students investigate the products that plants produce and recognize how these products are part of the process called *photosynthesis*.

As a class, review work habits to ensure personal safety, the safety of others, and consideration for the environment prior to carrying out the following learning experiences. Students should also be made familiar with the Workplace Hazardous Materials Information System (WHMIS) safety symbols. *Science Safety: A Kindergarten to Senior 4 Resource Manual for Teachers, Schools, and School Divisions* (available online at <http://www2.edu.gov.mb.ca/metks4/curricul/k-s4curr/science> or for purchase from the Manitoba Text Book Bureau) contains important information on safety practices, equipment, and WHMIS safety symbols, and provides student lessons in these areas.

Part A: Plants Provide Oxygen

Read the following to students.

Joseph Priestly was an English clergyman and scientist. He noticed that if he put a burning candle in a jar, the candle went out after a few minutes and when he put a mouse in the jar, the mouse died. When Priestly added a green plant to the jar the candle did not go out as quickly and the mouse survived.

Ask students: What substance was given off by the plant? (Plants provide oxygen, a substance that is essential for the survival of animals and necessary for a fire to burn.)

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SUGGESTIONS FOR ASSESSMENT

SUGGESTED LEARNING RESOURCES

Teacher Notes

Background Information

All living things require food, which provides the energy and matter for all life processes.

- Green plants make their own food through *photosynthesis*, the process by which water, carbon dioxide, and light energy are transformed into sugar (stored energy) and oxygen (a by-product). For this process to take place, chlorophyll must be present (found in green plants). Almost all other forms of life depend on green plants for their own food needs. Plants also resupply the environment with oxygen which is important for living things.
- Living things release the energy that is stored in their food (in the form of sugars) through a process called *cellular respiration.* The sugars (stored energy) are combined with oxygen to release the energy and give off carbon dioxide as a by-product. Photosynthesis and cellular respiration are part of the cycling of matter and the transfer of energy in ecosystems.

Nelson Science & Technology 7 (Section 5.18)

Sciencepower 7 (Section 3.1)

Addison Wesley Science & Technology 7 (Chapter 1, Sections 3.2, 4.2)

Science Safety: A Kindergarten to Senior 4 Resource Manual for Teachers, Schools, and School Divisions (Teacher Reference)

Be Safe! Canadian Edition: A Health and Safety Reference for Science and Technology Curriculum: K-9 (Teacher Reference)

PRESCRIBED LEARNING OUTCOMES

Students will...

7-1-08 *(continued)*

7-0-5c Select and use tools to observe, measure, and construct. Include: microscopes, a variety of thermometers, graduated cylinders, glassware, balance. GLO: C2, C3, C5

7-0-5f Record, compile, and display observations and data, using an appropriate format. GLO: C2, C6 (ELA Grade 7, 3.3.1; Math: SP-III.2.7)

7-0-6b Interpret patterns and trends in data, and infer and explain relationships. GLO: A1, A2, C2, C5

7-0-6c Identify strengths and weaknesses of different methods of collecting and displaying data, and potential sources of error. GLO: A1, A2, C2, C5 (ELA Grade 7, 3.3.3)

7-0-6f Identify how the original plan evolved and justify the changes. GLO: C2, C3 (ELA Grade 7, 3.3.4)

7-0-7b Critically evaluate conclusions, basing arguments on fact rather than opinion. GLO: C2, C4

7-0-7c ➲ Identify a new prediction/hypothesis based on investigation results. GLO: A1, C2 (ELA Grade 7, 3.3.4)

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SUGGESTIONS FOR INSTRUCTION

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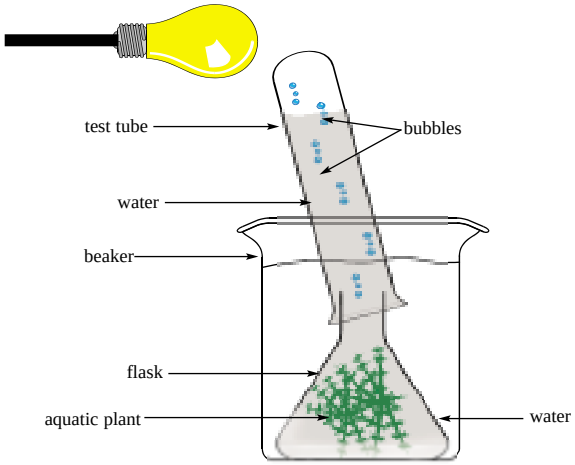
Part B: Effect of Light on Oxygen Production

Have students plan and conduct an experiment to determine whether light affects the production of oxygen in a green plant. Prior to the experiment, discuss with students the importance of fair testing and the need for several trials to take place. Students may need to be introduced to the use of a glowing splint to test for the presence of oxygen. (It will burst into flame in the presence of oxygen.) As an alternative to individual student experiments, have students plan an experiment and then select one (or more) as a class to be conducted as a teacher demonstration.

Possible setup:



Part C: Sugar Production

Provide students with the following information about chemical indicators:

Indicators are chemicals that change appearance in the presence of specific substances.

- Benedict's solution is an indicator of the presence of sugar and undergoes a series of colour changes when heated in the presence of sugar (ending up as a reddish-orange).
- Glucose indicator strips go through colour changes in the presence of sugar.
- Starch turns blue/black when it comes in contact with iodine.
- Brown wrapping paper becomes translucent when it comes in contact with oil or fat.

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SUGGESTIONS FOR ASSESSMENT

SUGGESTED LEARNING RESOURCES

Nelson Science & Technology 7 (Section 5.18)

Sciencepower 7 (Section 3.1)

Addison Wesley Science & Technology 7 (Chapter 1, Sections 3.2, 4.2)

Science Safety: A Kindergarten to Senior 4 Resource Manual for Teachers, Schools, and School Divisions (Teacher Reference)

Be Safe! Canadian Edition: A Health and Safety Reference for Science and Technology Curriculum: K-9 (Teacher Reference)

PRESCRIBED LEARNING OUTCOMES	SUGGESTIONS FOR INSTRUCTION
Students will...	
7-1-08 *(continued)*	*(continued)*

Have students test different parts of plants to determine where sugars, starches, and oils are stored. Recommended plants include potatoes (when testing for starch), apples/bean seeds (when testing for sugar); peanuts (when testing for oils). Crush seeds with a mortar and pestle and add water to use a glucose test strip, and crush peanuts before applying the brown paper. The Benedict's test may be conducted as a teacher demonstration.

Safety Precaution:
Remind students to wear goggles when heating solutions and to point test tubes away from people. Iodine is a corrosive substance when used in higher concentrations.

Check for allergies before bringing peanuts into the school.

Part D: Word Equations

Use explicit instruction to summarize what students have learned in investigations regarding what plants need to survive and what products they produce. Use the term *photosynthesis* to describe the overall input and output processes and to develop the following word equation:

$$\text{Water + carbon dioxide +light energy} \xrightarrow{\text{Chlorophyll}} \text{sugar + oxygen}$$

Ask students to answer the following questions about photosynthesis:

1. What are the inputs? (water, carbon dioxide, light energy)
2. What are the outputs? (sugar, oxygen)
3. Where does the water and carbon dioxide come from? (the environment)
4. What happens to the sugar and oxygen? (The oxygen is given off as a by-product and the sugar is stored in the plant and used as energy for life processes.)
5. What is important about chlorophyll? (Chlorophyll must be present for photosynthesis to take place. Photosynthesis takes place only in plants that contain chlorophyll, i.e., green plants.)

(continued)

SUGGESTIONS FOR ASSESSMENT	SUGGESTED LEARNING RESOURCES
Refer to "Photosynthesis and Cellular Respiration" (BLM 7-B) for an assessment suggestion.	

PRESCRIBED LEARNING OUTCOMES	SUGGESTIONS FOR INSTRUCTION
Students will...	
7-1-08 *(continued)*	*(continued)*

➢ **Cellular Respiration**

Explain to students that the process by which cells release the energy stored in sugars (obtained from food) is called *cellular respiration*. Provide students with the following word equation:

sugar + oxygen ⟶ carbon dioxide + water + energy

Ask students to answer the following questions about cellular respiration:

1. What are the inputs? (sugar, oxygen)
2. What are the outputs? (carbon dioxide, water, energy)
3. Where does the sugar come from? (food that has been transformed into stored energy in the form of sugar)
4. Where does the oxygen come from? (the environment)
5. What happens to the carbon dioxide, water, and energy? (The carbon dioxide and water are given off as by-products and the energy is used for life processes.)

➢ **Bean Seeds and Cellular Respiration**

Have students complete "Bean Seeds and Cellular Respiration" (BLM 7-C) to observe how it can be proven that bean seeds undergo cellular respiration.

SUGGESTIONS FOR ASSESSMENT

SUGGESTED LEARNING RESOURCES

PRESCRIBED LEARNING OUTCOMES

Students will...

7-1-09 Analyze food webs, using ecological pyramids, to show energy gained or lost at various consumer levels.

Include: producers; primary, secondary, and tertiary consumers.

GLO: C2, C8, D2, E4

7-0-7f ↻ Reflect on prior knowledge and experiences to construct new understanding and apply this new knowledge in other contexts. GLO: A2, C4 (ELA Grade 7, 1.2.1)

7-0-7h Identify and evaluate potential applications of investigation results. GLO: C4

SUGGESTIONS FOR INSTRUCTION

➢ **Ecological Pyramids**

Part A

Have students create a four-link food chain beginning with a specific producer using a local plant. Have students label the three consumers they have included as

- primary consumers (those that eat producers)
- secondary consumers (those that eat primary consumers)
- tertiary consumers (those that eat secondary consumers)

Example:

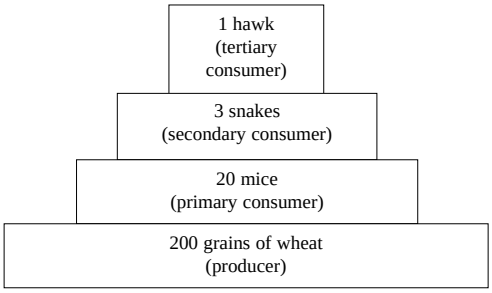
Food Chain

wheat (producer) → mouse (primary consumer) → snake (secondary consumer) → hawk (teritary consumer)

Part B

Present students with the following example of an ecological pyramid and food chain:

Ecological Pyramid



Have students answer the following questions in their science notebooks:

1. Compare and contrast the information provided by the ecological pyramid above and the food chain (from Part A). (Both describe the relationship between the elements of the food chain; however, the pyramid provides additional information related to numerical relationships.)
2. What reason might explain the pyramid shape in the ecological pyramid? (Energy is lost at each level of the pyramid, so the numbers of organisms that are supported become smaller as you move up the food chain.)
3. How much grain is needed to support a hawk (tertiary consumer), assuming it is only eating snakes? Why? (200 grains are needed to support the 20 mice to support the three snakes that the hawk needs to eat.)

Suggestions for Assessment

Journal Reflection

Provide students with the following:

What to Eat?

Four hectares of corn will support 1000 people for one day. If those same hectares of corn were fed to cattle and then the cattle were eaten by people, there would only be enough beef to feed 50 people for one day.

What are the implications of this knowledge to North America? What are the implications to countries where food is in short supply?

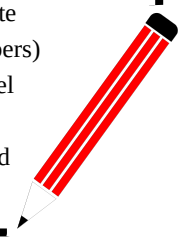
Teacher Notes

Background Information

An *ecological pyramid* is a graphic representation of the relationships among the different components of a food chain. It can illustrate

- the number of organisms at each level (pyramid of numbers)
- the amount of biomass (pyramid of biomass) at each level
- the energy lost at each level (pyramid of energy)

Only a small percentage (approximately 10 percent) of the food energy is available to the next level of a food chain.



Suggested Learning Resources

Nelson Science & Technology 7 (Section 5.10)

Sciencepower 7 (Sections 2.1, 2.3)

Addison Wesley Science & Technology 7 (Chapter 1, Sections 4.3-4.4)

PRESCRIBED LEARNING OUTCOMES

Students will...

7-1-10 Analyze, using ecological pyramids, the implications of the loss of producers and consumers to the transfer of energy within an ecosystem.

GLO: C2, C8, D2, E4

7-0-7h Identify and evaluate potential applications of investigation results. GLO: C4

7-0-9e Be sensitive and responsible in maintaining a balance between the needs of humans and a sustainable environment. GLO: B5

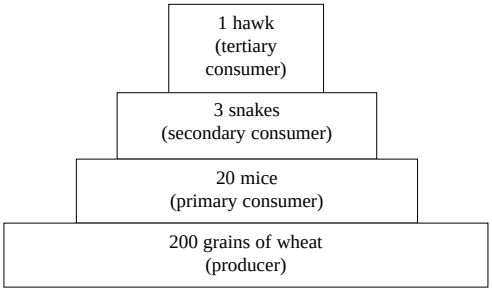
7-0-9f Consider both immediate and long-term effects of their actions. GLO: B5, C4, E3

SUGGESTIONS FOR INSTRUCTION

➢ **Transfer of Energy in an Ecosystem**

Have students use the ecological pyramid from the learning experience suggested for learning outcome 7-1-09 to answer the following questions in their science notebooks:

1. What would happen to the food chain if only 100 grains of wheat were available instead of 200?
2. What might cause a reduction in the amount of wheat available?
3. What other natural or human-caused events could take place, and what effect would they have on the ecological pyramid?



SUGGESTIONS FOR ASSESSMENT

SUGGESTED LEARNING RESOURCES

Extended Response

Provide students with the following:

What Are the Implications?

1. What other food sources exist for mice, snakes, and hawks?
2. Why might it be useful to have more than one food source?
3. What statement can you make regarding the transfer of energy within an ecosystem and the implications of the loss of producers and consumers to this transfer?

Look for:

1. Answers may vary.
2. If one food source is eliminated or reduced, an alternative food source will ensure survival.
3. The loss of producers or consumers disrupts the flow of energy in an ecosystem.

Nelson Science & Technology 7 (Section 5.10)

Sciencepower 7 (Section 2.3)

PRESCRIBED LEARNING OUTCOMES
Students will...
7-1-11 Explain, using ecological pyramids, the potential for bioaccumulation within an ecosystem. GLO: D2, E2, E4
7-0-4c ⊂ Work cooperatively with team members to carry out a plan, and troubleshoot problems as they arise. GLO: C7 (ELA Grade 7, 5.2.1) **7-0-4d** ⊂ Assume various roles to achieve group goals. GLO: C7 (ELA Grade 7, 5.2.2) **7-0-4e** Demonstrate work habits that ensure personal safety, the safety of others, and consideration for the environment. Include: keeping an uncluttered workspace; putting equipment away after use; handling glassware with care; wearing goggles when required; disposing of materials safely and responsibly. GLO: C1
(continued)

SUGGESTIONS FOR INSTRUCTION

➢ **Deadly Links***

Use pylons, chairs, or flagged sticks to stake out a habitat (indoors or outdoors) in which students will be gathering food. Spread white pipe cleaners and coloured pipe cleaners, or white popcorn mixed with coloured popcorn (two-thirds white, one-third coloured) throughout the habitat area. (Any white and coloured substances that students can easily pick up would work, but popcorn is recommended for outdoor use because it is biodegradable.)

Tell students they will be taking part in a food chain learning activity. Assign them roles as primary, secondary, and tertiary consumers (e.g., grasshoppers, shrews, and hawks). There should be approximately three times as many primary as secondary consumers, and three times as many secondary as tertiary consumers.

Conduct the following learning activity:

- Give each of the primary consumers an empty lunch bag (representing their stomachs) and have those students go into the designated habitat area to gather food (allow a 30-second time limit).
- Send in the secondary consumers. These students must capture food bags from the primary consumers (within a 15- to 60-second time limit, depending on size of area). Any captured primary consumer moves to the sidelines.
- Send in the tertiary consumers. These students capture food bags from the primary and secondary consumers, and the remaining secondary consumers continue capturing bags from the primary consumers (allow a 15- to 60-second time limit). Any captured consumer moves to the sidelines.

Ask all students to come together, bringing any food bags they have. Ask those students who have been "consumed" to identify what animal they are and who "ate" them. Ask the remaining consumers to count the number of white and coloured food pieces they each have. Inform students that a pesticide was sprayed on the food supply and that the coloured pieces are poison.

(continued)

***Deadly Links:** Adapted with permission: "Deadly Links", *Project WILD Activity Guide.* Ottawa: Canadian Wildlife Federation, 1999, pp. 299-301. Project WILD is part of the WILD Education family of environmental education programs that emphasize wildlife and other natural resources. For information about workshops and resources, contact <www.wildeducation.org>.

SUGGESTIONS FOR ASSESSMENT

SUGGESTED LEARNING RESOURCES

Teacher Notes

Background Information

People have developed *pesticides* to control organisms, *herbicides* to control unwanted plants, *insecticides* to control unwanted insects, and so on. When pesticides involve the use of poisons, the poisons frequently end up going where they are not wanted. Many toxic chemicals have a way of persisting in the environment and often become concentrated in unexpected and undesirable places. *Bioaccumulation* or *biological amplification* is the process that results in increasing concentrations of a harmful chemical at each higher level of a food chain.

Nelson Science & Technology 7
(Section 5.11)

Further readings and activities may be found at the following websites:

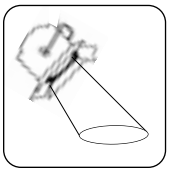
<http://www.schoolnet.ca/learning/teacher/classroom/index_en.html> (Toxic Fish)

<http://www.ec.gc.ca/science/sandemay00/article4_e.html> (Polar Bears at the Top of POPs)

PRESCRIBED LEARNING OUTCOMES	SUGGESTIONS FOR INSTRUCTION
Students will...	
7-1-11 *(continued)*	*(continued)* The following consumers are now "dead:" any primary consumer with coloured pieces of food; any secondary consumer with half or more of the food supply composed of coloured pieces; and the tertiary consumer with the highest proportion of coloured food. Introduce the term *bioaccumulation* and have students use it to explain how the pesticide got into the food chain and how it could affect animals that did not consume the poison directly. Have students discuss the pros and cons of using toxic chemicals, identifying the perspectives of the various groups involved (e.g., farmers want to prevent grasshoppers from eating part of a crop and ensure a supply of the crop for consumers and livestock. Customers at a store do not want to pay more for particular kinds of foods because the supply has become limited, nor do they want to consume food containing large amounts of chemicals. Environmentalists want to ensure the survival of a particular species of animal that is dying because of chemical poisoning.). Further reference material and learning activities can be found on the following web sites: • Learning for a Sustainable Future, "Toxic Fish," <http://www.schoolnet.ca/learning/teacher/classroom/index_en.html> • Environment Canada, "Polar Bears at the Top of POPs," http://www.ec.gc.ca/science/sandemay00/article4_e.html

SUGGESTIONS FOR ASSESSMENT

SUGGESTED LEARNING RESOURCES



Extended Response

Provide students with the following:

Mercury Bioaccumulation

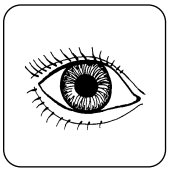
Mercury is a poisonous substance that can affect the functioning of body systems. Mercury levels in water have fluctuated in the past years. In the 1970s, there were high levels of mercury found in some areas due to discharges from pulp and paper mills. Laws have since been implemented to monitor and regulate the amount of mercury that can enter water systems. In addition, quotas have been imposed by the government on the number and type of fish that can be caught. These quotas are placed on large predatory fish only, and do not apply to small fish. Why do you think this is?

Look for:

Mercury accumulates in the larger fish because they eat many smaller fish also containing mercury. This accumulation makes it dangerous for people to eat the large fish.

Scoring Rubric	
Score	**Criteria**
4	The response is correct, complete, and detailed. It contains examples and/or elaboration to support the answer. It includes evidence of higher-order thinking.
3	The response is correct and complete. It contains examples and/or elaboration to support the answer.
2	The response is generally correct and complete. It may contain minor errors. It contains examples and/or elaboration to support the answer.
1	The response is partially correct but is incomplete and/or contains major errors. No examples and/or elaboration to support the answer.

PRESCRIBED LEARNING OUTCOMES	SUGGESTIONS FOR INSTRUCTION
Students will...	
7-1-12 Provide examples of scavengers and decomposers, and describe their role in cycling matter in an ecosystem. Include: micro-organisms. GLO: D2, E1, E2, E3	➢ **Scavengers and Decomposers** Have students read or view videos, CD-ROMS, and other research materials to identify examples of scavengers and decomposers and write a description of the roles they play in the cycling of matter in an ecosystem. (For a BLM of "A Viewer's Discussion Guide for Informational Films/Videos," refer to *5-8 ELA*, BLM-73.)
7-0-2a ➲ Access information using a variety of sources. *Examples: libraries, magazines, community resource people, outdoor experiences, videos, CD-ROMs, Internet…* GLO: C6 (ELA Grade 7, 3.2.2; TFS 2.2.1) **7-0-2c** Make notes using headings and subheadings or graphic organizers appropriate to a topic and reference sources. GLO: C6 (ELA Grade 7, 3.3.2)	
7-1-13 Demonstrate proper use and care of the microscope to observe micro-organisms. Include: preparing wet mounts beginning with the least powerful lens; focussing; drawing specimens; indicating magnification. GLO: C1, C2, C7	➢ **Using a Microscope** Have students identify parts of a microscope on a diagram and list as many points related to the proper use and care of a microscope as possible. Then, as a class, identify all the parts and review information about proper use and care information. (Refer to "The Compound Microscope," BLM 7-D.) As a class, review the basic skills of diagramming what students observe through a microscope and discuss how to determine the power of magnification when viewing a slide.
7-0-5c Select and use tools to observe, measure, and construct. Include: microscopes, a variety of thermometers, graduated cylinders, glassware, balance. GLO: C2, C3, C5 **7-0-5f** Record, compile, and display observations and data, using an appropriate format. GLO: C2, C6 (ELA Grade 7, 3.3.1; Math: SP-III.2.7)	➢ **Observing Micro-organisms** Have students use prepared slides of micro-organisms, as well as a self-prepared wet mount slide of pond water, to observe various types of micro-organisms. Ask students to draw and label diagrams of what they see and indicate the magnification used. Students may also use simple identification guides to identify the organisms they see. **Safety Precaution:** Pond water, especially water from a fish or turtle tank, may contain harmful bacteria and/or protists. Discuss with students the importance of keeping hands and writing utensils away from their mouths when dealing with pond water. Ensure that students wash their hands with soap and warm water after handling water samples.

SUGGESTIONS FOR ASSESSMENT	SUGGESTED LEARNING RESOURCES
	Nelson Science & Technology 7 (Section 5.4) *Sciencepower 7* (Section 2.1) *Addison Wesley Science & Technology 7* (Chapter 1, Section 3.4)
 **Proper Care and Use of a Microscope** When observing and assessing students' use of microscopes, look for indications of the following: Checklist: The student ❑ carries the microscope by the arm and base ❑ cleans the objective and ocular lenses with lens paper only ❑ places the slide on the stage and lowers the objective carefully (watches from the side of the microscope to ensure that the objective does not crush the slide) and focuses while looking through the ocular lens and raising the objective lens ❑ lowers the stage before changing from a lower objective lens to a higher objective lens, then watches from the side of the microscope to ensure that the objective does not hit the stage	*Nelson Science & Technology 7* (Section 5A)

PRESCRIBED LEARNING OUTCOMES

Students will...

7-1-14 Identify beneficial and harmful roles played by micro-organisms.

Examples: beneficial—aid in digestion, composting, food and vaccine production; harmful—cause disease, food spoilage...

GLO: B3, C2, D2

7-0-4c ⊂ Work cooperatively with team members to carry out a plan, and troubleshoot problems as they arise. GLO: C7 (ELA Grade 7, 5.2.1)

7-0-4d ⊂ Assume various roles to achieve group goals. GLO: C7 (ELA Grade 7, 5.2.2)

7-0-4e Demonstrate work habits that ensure personal safety, the safety of others, and consideration for the environment. Include: keeping an uncluttered workspace; putting equipment away after use; handling glassware with care; wearing goggles when required; disposing of materials safely and responsibly. GLO: C1

7-0-5a ⊂ Make observations that are relevant to a specific question. GLO: A1, A2, C2

7-0-5c Select and use tools to observe, measure, and construct. Include: microscopes, a variety of thermometers, graduated cylinders, glassware, balance. GLO: C2, C3, C5

7-0-5f Record, compile, and display observations and data, using an appropriate format. GLO: C2, C6 (ELA Grade 7, 3.3.1; Math: SP-III.2.7)

7-0-7h Identify and evaluate potential applications of investigation results. GLO: C4

7-0-8g Discuss societal, environmental, and economic impacts of scientific and technological endeavours. Include: local and global impacts. GLO: A1, B1, B3, B5

(continued)

SUGGESTIONS FOR INSTRUCTION

➢ The Role of Yeast: Baking Bread

Have students form groups to observe the effect of yeast (a micro-organism) in baking bread.

- Have all groups use the same bread recipe, with half the groups using yeast and half the groups leaving out yeast.
- Ensure that all students view the yeast before and after adding water and sugar. Ask them to write their observations in their science notebooks, noting what yeast needs to grow (i.e., sugar as a food source, water, and warmth).
- Have students bake and compare the two breads, recording their observations in their science notebooks. (The bread containing yeast should be higher, fluffier, and have more bubble holes than the yeastless bread.)

  Extension: Have students view a prepared slide of yeast through a microscope.

➢ Bread Mould

Mould is also a micro-organism. In the previous learning activity students found that yeast needs a food source, water, and warmth to grow and reproduce. Have the class devise a set of experiments to determine what bread mould needs to grow. Discuss the importance of testing only one variable at a time. Using the bread baked in the previous learning activity, have different groups test specific variables such as dry versus slightly moist bread and cold versus warm bread (one kept in the fridge and the other in a warm spot). Have students share their results with the class. Have students answer the following questions in their science notebooks:

1. Knowing what mould needs to grow could assist scientists in growing moulds for medicinal purposes, but mould can also cause food spoilage. How would knowing what mould needs to grow assist people in preventing food spoilage? (They would know what not to provide for mould to grow, such as warmth, water, and air.)
2. What are some things people do to prevent food from moulding? (Keep food dry, cool, and covered.)

(continued)

SUGGESTIONS FOR ASSESSMENT

SUGGESTED LEARNING RESOURCES

Nelson Science & Technology 7 (Section 5.11)

Sciencepower 7 (Section 2.1)

Addison Wesley Science & Technology 7 (Chapter 1, Section 3.4)

Science Safety: A Kindergarten to Senior 4 Resource Manual for Teachers, Schools, and School Divisions (Teacher Reference)

Be Safe! Canadian Edition: A Health and Safety Reference for Science and Technology Curriculum: K-9 (Teacher Reference)

PRESCRIBED LEARNING OUTCOMES	SUGGESTIONS FOR INSTRUCTION
Students will...	
7-1-14 *(continued)*	*(continued)*

➢ **Beneficial and Harmful Roles of Micro-organisms**

Have students view films/videos and/or research the beneficial and harmful roles that micro-organisms play in both natural ecosystems and in humans. Have students share their findings and compile them on a class chart.

Example:

Roles of Micro-organisms

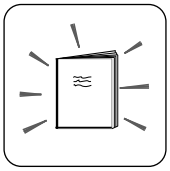
Beneficial Roles	Harmful Roles
Micro-organisms aid in • digestion • composting • vaccine production • food production (e.g., yogurt)	Micro-organisms cause • disease • food to spoil

Have students

- select one of the items from the chart to research
- use their research findings to prepare an information poster, to be posted on a class bulletin board

Encourage students to present their information in an innovative way (e.g., in a newspaper article titled “Mould Gets a Bad Rap,” or using digital photographs of food spoilage caused by micro-organisms).

SUGGESTIONS FOR ASSESSMENT



When assessing students' bread mould experiments, refer to "Experiment Report: Assessment" (BLM 7-R).

SUGGESTED LEARNING RESOURCES

PRESCRIBED LEARNING OUTCOMES

Students will...

7-1-15 Research and describe human food production or preservation techniques that apply a knowledge of micro-organisms.

Examples: bread and yogourt making, food drying, sterilization, refrigeration...

GLO: A5, B2, B3, D1

7-0-1a ➲ Formulate specific questions that lead to investigations. Include: rephrase questions to a testable form; focus research questions. GLO: A1, C2 (ELA Grade 7, 3.1.2; Math: SP-I.1.7)

7-0-2a ➲ Access information using a variety of sources. *Examples: libraries, magazines, community resource people, outdoor experiences, videos, CD-ROMs, Internet…* GLO: C6 (ELA Grade 7, 3.2.2; TFS 2.2.1)

7-0-2b Evaluate the usefulness, currency, and reliability of information, using predetermined criteria. GLO: C6, C8 (ELA Grade 7, 3.2.3; TFS 2.2.2)

7-0-2c Make notes using headings and subheadings or graphic organizers appropriate to a topic and reference sources. GLO: C6 (ELA Grade 7, 3.3.2)

7-0-7a Draw a conclusion that explains investigation results. Include: explaining the cause and effect relationship between the dependent and independent variables; identifying alternative explanations for observations; supporting or rejecting a prediction/hypothesis. GLO: A1, A2, C2 (ELA Grade 7, 3.3.4)

7-0-7g ➲ Communicate methods, results, conclusions, and new knowledge in a variety of ways. *Examples: oral, written, multimedia presentations...* GLO: C6 (ELA Grade 7, 4.4.1)

SUGGESTIONS FOR INSTRUCTION

➢ Food Preservation Techniques

Have students refer to cookbooks, and/or interview their parents/guardians, grandparents, extended family, and/or family friends to identify past and present methods of preserving foods. Students may work in groups or by themselves to collect information. Have students list the different food preservation techniques and indicate which of a micro-organism's basic needs is affected by each preservation technique. Have students record their information in chart form and share it with the class. Create a large class poster with the information collected.

Example:

Effects of Food Preservation Techniques

Food Preservation Technique	Affects Micro-organism's Need for
• freezing	• warmth
• salting	• water
• drying	• water
• pasteurizing	• only moderate warmth
• adding sugar	• water

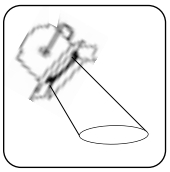
➢ Micro-organisms in the Production of Food

Have students conduct research to identify ways in which micro-organisms are used in large-scale food or beverage production. Have them create cartoon strips describing the process and product.

➢ Food Preparation Safety

Invite a guest speaker from a restaurant or food inspection office to talk to students about safety precautions taken in the preparation of foods. Before the speaker's visit, have each student submit three questions to a class pool of questions to be addressed by the speaker.

SUGGESTIONS FOR ASSESSMENT



Case Scenario

Have students read and complete "The Barbeque," BLM 7-E.

Look for:

The food poisoning from the potato salad caused the illnesses. The food poisoning occurred because the potato salad was not kept in the cooler, and it contained a mayonnaise-based dressing (made from eggs). Harry was extremely ill because he ate two helpings of the potato salad; Alice was not ill because she did not eat any.

Food Practice	Safe/Unsafe Practice
hot dogs kept in the cooler	safe
hamburgers put in the cooler	safe
potato salad not put in the cooler	unsafe
hamburgers and hot dogs well-cooked	safe
cooked meat put on clean plate	safe
salad and fruit not refrigerated (no mayonnaise-based dressing)	safe

Scoring Rubric	
Score	**Criteria**
4	The conclusion is correct. All of the food practices have been correctly identified and categorized. The response is clear, supports the conclusion, and includes evidence of higher-order thinking.
3	The conclusion is correct. The majority of the food practices have been correctly identified and categorized. The response is clear and includes evidence to support the conclusion. Minor errors in reasoning may be present.
2	The conclusion is correct. The majority of the food practices have been correctly identified and categorized. The response includes limited evidence to support the conclusion, errors in reasoning are present, and/or response is unclear.
1	The conclusion is correct. The food practices have not been identified or categorized. The response includes limited evidence to support the conclusion. Errors in reasoning are present and/or an explanation is lacking.

SUGGESTED LEARNING RESOURCES

Nelson Science & Technology 7 (Section 5.7)

Sciencepower 7 (Section 2.1)

Addison Wesley Science & Technology 7 (Chapter 1, Section 3.4)

Notes