Ontario Agri-Food Education Inc.

Marvellous Mushrooms

TEACHER GUIDE **Grade 3**

mushrooms.ca*nada*

Fresh. Simple. Good.

Marvellous Mushrooms

Notes to teachers:

Marvellous Mushrooms has been created as a teaching tool to introduce grade 3 students to the world of mushrooms. It is linked to the Ontario Curriculum, Grades 1-8 in the following subject areas: Health and Physical Education, 1998; Language, 2006; Mathematics, 2005; Social Studies, 2004; and Science and Technology, 2007.

Acknowledgements:

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Before You Get Started!

1. Obtain copies of ***Eating Well with Canada's Food Guide*** and ***Eating Well with Canada's Food Guide: A Resource for Educators and Communicators*** from:

   a. Your Regional Health Unit.
   b. Publications, Health Canada, Ottawa, Ontario K1A 0K9
      i. Tel: 1-866-225-0709
      ii. Fax: 1-613-941-5366
      iii. TTY: 1-800-267-1245;
      iv. Email: publications@hc-sc.gc.ca
      v. Canada's Food Guide - www.healthcanada.gc.ca/foodguide
   c. Health Canada - www.hc-sc.gc.ca

2. Review food allergy information with students.

3. Obtain "Teeny Tiny Mushroom Farm" (Optional)

   Each "farm" consists of inoculated substrate and a casing layer. The outer body of the farm is a durable Styrofoam box with a plastic liner to avoid any leakage. They come with a growth chart that gives instructions step by step, day by day so that the students achieve the expected results. The cost of the farms for educational purposes is $29.99 plus GST for a total of $31.49. In addition, the cost for shipping each farm is $15.00. To order contact:

Whitecrest Mushrooms:
Murray Good
2899 Comarty Drive R.R#1
Putman, Ontario, N0L 2B0
Tel:(519)269-3534
email: mgood@goodfamilyfoods.com
www.goodfamilyfoods.com

Resources: Websites for Teacher and Students

Agriculture and Agri-Food Canada - www.agr.gc.ca
Canada's Food Guide - www.healthcanada.gc.ca/foodguide
Canadian Agriculture at a Glance Teacher's Kit: Lesson Plans - www.statcan.ca/english/kits/agric04/intro.htm (may also be downloaded from the OAFE website)
Canadian Health Network - www.canadian-health-network.ca
Dietitians of Canada - www.dietitians.ca
Discover Healthy Eating - www.city.toronto.on.ca
Dole Nutrition - www.dole5aday.com
Farmer's Market of Ontario - www.farmersmarketsontario.com
Foodland Ontario - www.foodland.gov.on.ca/
Foodland Ontario - Vegetable Availability Guide - www.foodland.gov.on.ca/availabilityv.htm
Growing Canada.ca - www.growingcanada.ca/
Harvest Ontario - www.harvestontario.com/index.html
Health Canada - www.hc-sc.gc.ca/nutrition
Life Cycles Project Society - www.lifecyclesproject.ca/initiatives/food_miles/
Kemptville College - www.kemptvillec.uoguelph.ca/
Mushrooms Canada - www.mushrooms.ca
National Institute of Nutrition - www.ccfn.ca
Nutrition: Health Unit Home Page - www.healthunit.org/nutrition/foodsecurity/localproduce.htm
Ontario Agri-Food Education, Inc. - www.oafe.org
Ontario Farm Fresh Marketing Association - www.ontariofarmfresh.com
Ontario Greenhouse Vegetable Growers - www.ontariogreenhouse.com
Ontario Ministry of Agriculture, Food and Rural Affairs - www.omafra.gov.on.ca
Ridgetown College - www.ridgetownc.on.ca/
Statistics Canada - www.statcan.ca
Statistics Canada: Teacher's Kits - www.statscan.ca/english/kits/kits.htm
The Cap Crew - www.thecapcrew.ca
University of Guelph - www.uoguelph.ca/

What's Just A Farm Away? Marvellous Mushrooms!!!

In this activity, students will first look at what a farm is. Next, they will look at mushroom farming. They will also learn about the six varieties of mushrooms grown in Canada.

Materials Needed:

- Pictures of farms
- Pictures of mushroom farms
- Farming poster (Community Connections resource)
- ***All About Food: Farm Visit Guide***
- Worksheet - ***Marvellous Mushrooms! Who Are We?*** (Appendix A)

Expectations:

Social Studies:

Canada and World Connections: Urban and Rural Communities

Overall Expectations:

- use a variety of resources and tools to gather, process, and communicate geographic information about urban and rural communities.

Specific Expectations:

Inquiry/Research and Communication Skills

- ask questions to gain information about urban and rural communities;
- use appropriate vocabulary to communicate the results of inquiries and observations about urban and rural communities.

Teaching and Learning Strategies:

1. In pairs, students discuss "What is a farm?"
2. Two groups of two students exchange their ideas. In this new group, students record their ideas.
3. As a class, students share their ideas. Teacher writes student ideas on the board.
4. Teacher shows students pictures of a farm. Students compare their ideas of *what a farm is* with the pictures.
5. With the help of the teacher, students describe what a farm is. Students record the information in their notebooks.
6. Next, students look at pictures of a mushroom farm. Students discuss: How is it similar? How is it different? Teacher records information on the board.
7. Students record the information in their notebooks.
8. Through the use of posters and/or an overhead, students are given information about the six varieties of mushrooms grown in Canada.
9. Students complete the worksheet, *Marvellous Mushrooms! Who Are We?* (Appendix A).

Assessment and Evaluation Strategies:

1. Teacher marks the worksheet, *Marvellous Mushrooms! Who Are We?*, for completion.

Enrichment Activities:

1. Students visit a mushroom farm.

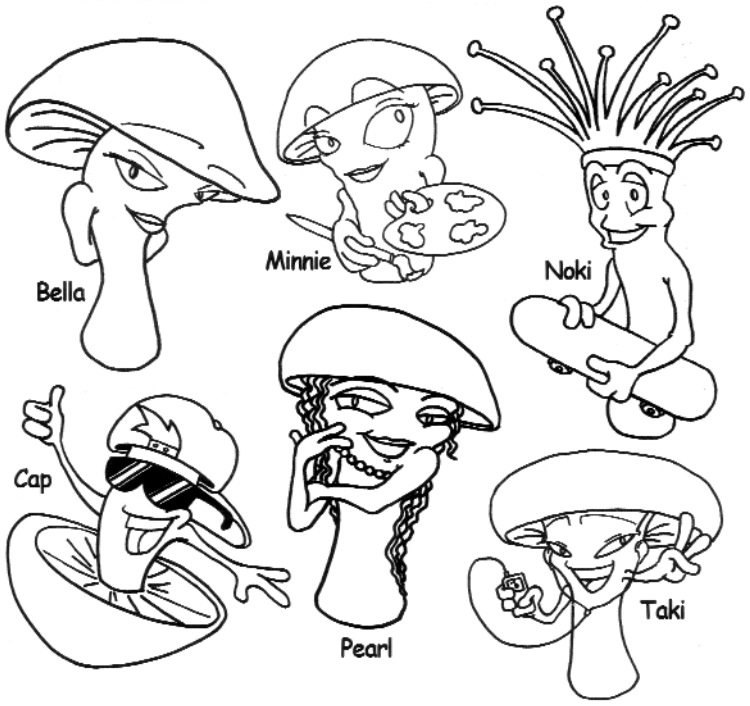
Appendix A

Marvellous Mushrooms!

Who Are We?

The Cap Crew

Colour: Can you help The Cap Crew get their colour back? Grab some markers or crayons and colour away!



Name that Mushroom:

Can you name all six varieties of Mushrooms grown in Canada?

W _____

C _____

O _____

P _____

S _____

E _____

Word Search: Can you find all the words that Minnie has hidden in the word search?

white
crimini
shiitake
fresh
simple
good
oyster
enoki
mushrooms
portabella

Bonus Find: You sauté mushrooms in a

_____

o	y	s	t	e	r	d	n	w	t	q	p
z	x	f	b	t	o	m	l	r	e	v	o
n	f	r	y	i	n	g	p	a	n	x	r
s	k	e	r	h	j	u	d	o	o	g	t
h	a	s	p	w	t	z	h	b	k	r	a
i	b	h	n	i	p	a	g	x	i	e	b
i	g	q	o	t	a	s	i	m	p	l	e
t	r	g	c	r	i	m	i	n	i	o	l
a	s	k	i	l	l	e	t	h	y	s	l
k	c	q	k	w	b	i	f	e	t	z	a
e	v	m	u	s	h	r	o	o	m	s	i

Fungi-Vocabulary

Students will be introduced to the terminology used in the *Marvellous Mushrooms* resource.

Materials Needed:

- List of Vocabulary words *Fungi-Vocabulary* (Appendix B)

Expectations:

Science and Technology:
Life Systems: Growth and Changes in Plants
Overall Expectations:
- investigate similarities and differences in the characteristics of various plants, and ways in which the characteristics of plants relate to the environment in which they grow.

Specific Expectation:
- use appropriate vocabulary, including *stem, leaf, root, pistil, stamen, flower, adaptation*, and *germination*, in oral and written communication.

Teaching and Learning Strategies:

1. Teacher gives students the vocabulary list, *Fungi-Vocabulary* (Appendix B).
2. Teacher leads a class discussion about the terminology to be used in this resource.
3. Teacher creates a word board or list to be used while doing the mushroom activities. **Note:** As students learn new words, they should add them to their list.
4. Using the list of vocabulary words, individually students create a word search.

Assessment and Evaluation Strategies:

1. Teacher marks the word search for completion.

Enrichment Activities:

1. Students create a crossword puzzle or trivia game using the vocabulary list.

Appendix B

Fungi-Vocabulary

The following vocabulary words are used throughout the *Marvellous Mushrooms* resource. There is space at the bottom to add more new words.

- **Antioxidants** are foods that are naturally found in our bodies. They protect against cell damage.
- **Casing** is a layer of peat moss, with limestone added, which is spread over the substrate. The mushrooms grow through this casing.
- **Chlorophyll** is the green colouring matter or parts of plants.
- **Compost** is a mixture of organic matter (farm or garden) to produce soil in which to grow plants.
- **Dietary fibre** is a form of carbohydrate, but it does not give our bodies energy. It is made up of plant materials. Fibre is found in vegetables, fruits, legumes, and grain products.
- **Flush** is the growth of a crop of mushrooms that occurs in a short period of time. Usually there are three separate flushes in one crop.
- **Fungi** are neither plants nor animals. They feed on organic matter.
- **Growing Room** is the climatically controlled room where the mushrooms grow.
- **Harvesting** is the picking or cutting of the mushrooms at the end of the growing period.
- **Mycelium** are web-like fibres which attach to the substrate. These fibres carry the nutrients needed by the mushrooms to grow.
- **Pasteurization** is the process of creating a clean substrate by heating the substrate to destroy any weed seeds, insect eggs or unwanted micro-organisms.
- **Photosynthesis** is the process by which green plants use the energy from the sun to make substances from carbon dioxide and water.
- **Pinning** is the growth of the mushroom up and through the casing layer. It is refered to as pinning because the tiny mushroom caps look similar to pin heads.
- **Spawn** is sterilized grain inoculated with mushroom spores. This is the "seed" used to grow the mushrooms.
- **Spawn run** is a period of time when the humidity, carbon dioxide, and temperature levels are controlled to grow the web-like mycelium.
- **Spent compost** is the used substrate after the mushrooms have been harvested. It is recycled as a soil enhancer.
- **Substrate** is the composted waste products used to provide the mushrooms with all the nutrients needed to grow.

- _____
- _____
- _____

Growing Mushrooms

This activity has several components. Students will make "soil" or substrate, which is the food source for mushrooms, and they will research the stages of producing mushrooms. If a Teeny Tiny Mushroom Farm is purchased, students may actually grow their own mushrooms.

Materials Needed:

- Teeny Tiny Mushroom Farm (optional)
- Clear plastic bottle
- Grass clippings, scraps of vegetable and fruit peelings and other discarded plant material
- Mushrooms Canada - www.mushrooms.ca
- The Cap Crew - www.thecapcrew.ca
- Worksheet - *From Farm to Table* (Appendix C)
- *Marvellous Mushrooms: Teacher Background Information* (Appendix I)

Expectations:

Science and Technology:

Life Systems: Growth and Changes in Plants

Overall Expectations:

- investigate similarities and differences in the characteristics of various plants, and ways in which the characteristics of plants relate to the environment in which they grow;
- demonstrate an understanding that plants grow and change and have distinct characteristics.

Specific Expectations:

Developing Skills of Scientific Investigation and Technological Problem Solving

- follow established safety procedures during science and technology investigations;
- use appropriate science and technology vocabulary, including stem, leaf, root, pistil, stamen, flower, adaptation, and germination, in oral and written communication.

Understanding Basic Concepts

- describe the basic needs of plants, including air, water, light, warmth, and space;
- describe the different ways in which plants are grown for food, and explain the advantages and disadvantages of locally grown and organically produced food, including environmental benefits.

Earth and Space Systems: Soils in the Environment

Overall Expectations:

- investigate the composition and characteristics of different soils;
- demonstrate an understanding of the composition of soils, the types of soils, and the relationship between soils and other living things.

Specific Expectations:

Developing Skills of Scientific Investigation and Technological Problem Solving

- follow established safety procedures during science and technology investigations;
- use scientific inquiry/ experimentation skills;
- investigate the process of composting, and explain some advantages and disadvantages of composting.

Understanding Basic Concepts

- describe the interdependence between the living and non-living things that make up soil.

Data Management and Probability

Overall Expectations:

- predict and investigate the frequency of a specific outcome in a simple probability experiment.

Specific Expectations:

Probability

- predict the frequency of an outcome in a simple probability experiment or game, then perform the experiment, and compare the results with the predictions, using mathematical language.

Teaching and Learning Strategies:

1. Teacher introduces the activity, *Growing Mushrooms*. Students need to be in four or five groups. They will work together for each of the various components of this activity.
2. Following the directions below, students in their groups make "soil" or substrate. **Note:** Mushroom farmers make the food source, called substrate, to grow mushrooms. The teacher and/or students will need to collect the materials for this activity.
   a. Cut an opening in the side of an empty, clear, plastic bottle. The opening needs to be large enough to allow materials to be added and the contents to be mixed.
   b. Cut the collected materials (grass clippings, scraps of vegetable and fruit peelings and other discarded plant material) into small pieces and put them into the plastic container.
   c. Add enough water to moisten the material.
   d. Shake the container gently to mix the materials and the water.
   e. Place the bottle on a windowsill or in a warm area.
3. Teacher assists students in developing an observation sheet.
4. Students predict what they think will happen to the material in one week, two weeks, and one month.
5. Every few days they gently shake the bottle and check to see if the materials are still moist.
6. Students record information.
7. Students compare their predictions with what actually happened at one week, two weeks and one month. Each group shares its findings. Thought Question: How long does it take soil to develop in a natural environment?
8. Using the materials provided, each group is going to do research on one specific stage of mushroom production (spawn production, substrate or compost production, growing stage, harvesting stage, and the packaging and marketing stage). **Note**: The packaging and marketing stage may be included with the harvesting stage if there are not enough students for five groups.
9. Each group prepares a poster explaining the stage it investigated and presents the information to the class.
10. The posters will be displayed in the classroom and/or another location within the school.
11. Using the information from the class presentations, the teacher leads a class discussion to help students summarize the information. Include the following topics: how mushrooms meet their basic needs, mushrooms grown for food, advantages of mushrooms being grown locally, and the environmental benefits of mushrooms.
12. Individually, students do the worksheet *From Farm to Table* (Appendix C).

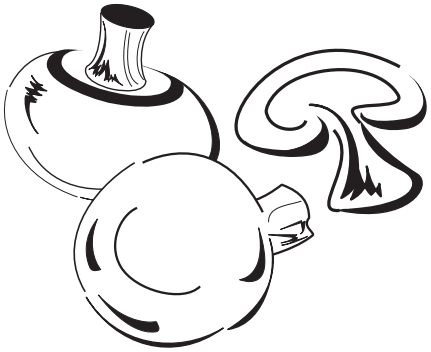
Assessment and Evaluation Strategies:

1. Teacher marks the worksheet, *From Farm to Table*, for completion.

Enrichment Activities:

1. Students conduct the experiment a second time. This time change some of the conditions (e.g., don't add the water, leave the bottle in a dark, cool place, put the bottle on a heating pad). What effects did the changes have on the contents of the bottle? What other conditions could be changed?
2. Students compare what happened in the second experiment to what occurred in the first experiment.

Appendix C



From Farm to Table

Using the information from your research and class discussion, complete the flow chart below.

Stage 1: _____

Stage 2: _____

Stage 3: _____

Stage 4: _____

Stage 5: _____

Story Time

Individually, students will write a short story about one of the six varieties of mushrooms grown in Canada.

Materials Needed:

- *Cap Crew Character Biography* (Appendix D)
- *Rubric* (Appendix E)
- *Marvellous Mushrooms: Teacher Background Information* (Appendix I)

Expectations:

Language:
Writing
Overall Expectations:
- draft and revise their writing, using a variety of informational, literary, and graphic forms and stylistic elements appropriate for the purpose and audience;
- use editing, proofreading, and publishing skills and strategies, and knowledge of language conventions, to correct errors, refine expression, and present their work effectively.

Specific Expectations:

Word Choice
- use words and phrases that will help convey their meaning as specifically as possible.

Sentence Fluency
- vary sentence structures and maintain continuity by using joining words.

Revision
- make revisions to improve the content, clarity, and interest of their written work, using several types of strategies.

Vocabulary
- confirm spellings and word meanings or word choice using several different types of resources.

Punctuation
- use punctuation to help communicate their intended meaning, with a focus on the use of: quotation marks to indicate direct speech, commas to mark grammatical boundaries within sentences; capital letters and final punctuation to mark the beginning and end of sentences.

Grammar
- use parts of speech appropriately to communicate their meaning clearly, with a focus on the use: proper nouns for titles; the possessive pronouns *my, mine, your, yours, his, her, its*; action verbs in the present and simple past tenses; adjectives and adverbs; question words.

Proofreading
- proofread and correct their writing using guidelines developed with peers and the teacher.

Producing Finished Works
- produce pieces of published work to meet identified criteria based on the expectations related to content, organization, style, use of conventions, and use of presentation strategies.

Teaching and Learning Strategies:

1. Each student selects a Cap Crew Character. Using the *Cap Crew Character Biography* (Appendix D), students write a short story about the mushroom variety they have selected.
2. The story should include the following information:
   a. name of the mushroom variety
   b. description of the mushroom
   c. how the mushroom is grown
   d. the personality of the mushroom
3. Students hand in their short stories.

Assessment and Evaluation Strategies:

1. Teacher marks short stories using the *Rubric* (Appendix E).

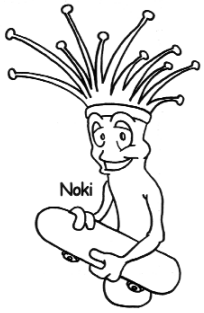
Enrichment Activities:

1. Students present their short stories to a grade 1 class.
2. Individually, students create a mushroom cinquain and present to a kindergarten class.

Marvellous Mushrooms! The Cap Crew

Minnie

Minnie is a crimini mushroom or agaricus bisporus. She is one of Cap's cousins. She is also Bella's little sister. Minnie is very creative and loves to paint. Her favourite thing to paint is outdoor scenery. Minnie is very peaceful, but she does have a competitive spirit when it comes to her favourite sport, soccer. Minnie also enjoys taking care of the environment and hopes that one day she will be a marine biologist.



Noki

Noki is an Enoki mushroom or flammulina veluptipes. Noki is very energetic. He plays different kinds of sports like soccer, hockey, basketball, and skateboarding. He loves them all. Noki is very funny and always has a joke to tell. He is good at cheering his friends up when they are sad. He hopes that if he trains hard enough, he will be able to become a professional sports coach.

Pearl

Pearl is an oyster mushroom or pleurctus ostreatus. She is very stylish and knows everything about fashion. Pearl likes to read fashion magazines. She loves going to the mall with her friends and giving them "make-overs". Pearl has been working very hard in school so that one day she can become a fashion designer.

Bella

Bella is a portabella mushroom or agaricus bisporus. She is one of Cap's cousins. She is also Minnie's big sister. Bella is very shy and quiet. She is also very friendly and enjoys spending time with her friends. As well, she is very graceful and elegant. Bella uses these skills in her favourite activity, dancing. One day, Bella hopes to become a nurse.

Taki

Taki is a shiitake mushroom or lentinus edodes. He knows everything about computers and technology. When his friends have computer problems, he likes to help them. Taki listens to music on his MP3 player and loves to break dance. Taki works very hard at school so that one day he can become a computer software developer.

Cap

Cap is a white mushroom or agaricus bisporus. He is the most popular mushroom in Canada. Cap is very outgoing and likes to make new friends wherever he goes. He loves being active whether it is playing sports, exercising or dancing. Cap is always on the move! He studies hard in school. Someday, Cap hopes to become a teacher.

Appendix E

Rubric - Story Time

Expectation	Criteria	Level 1	Level 2	Level 3	Level 4
Communication -drafts and revises their writing using a variety of informational, literary, and graphic forms and stylistic elements appropriate for the purpose and audience	-drafts and revises writing using a variety of tools	-identifies errors and makes corrections with limited effectiveness	-identifies errors and makes corrections with some effectiveness	-identifies errors and makes corrections with considerable effectiveness	-identifies errors and makes corrections with a high degree of effectiveness
	-uses appropriate communication techniques for purpose and audience	-communicates for the purpose and audience with limited effectiveness	-communicates for the purpose and audience with some effectiveness	-communicates for the purpose and audience with considerable effectiveness	-communicates for the purpose and audience with a high degree of effectiveness
Communication - uses editing, proofreading, and publishing skills and strategies, and knowledge of language conventions to correct errors, refine expressions, and present their work effectively	-uses appropriate language conventions accurately (e.g., spelling, grammar, punctuation, and style)	-uses appropriate conventions with limited accuracy	-uses appropriate conventions with some accuracy	-uses appropriate conventions with considerable accuracy	-uses appropriate conventions with a high degree of accuracy
	-uses editing, and proofreading skills to express and organize their ideas and information	-expresses and organizes ideas and information with limited effectiveness	-expresses and organizes ideas and information with some effectiveness	-expresses and organizes ideas and information with considerable effectiveness	-expresses and organizes ideas and information with a high degree of effectiveness
Application - uses editing, proofreading, and publishing skills and strategies, and knowledge of language conventions to correct errors, refine expressions, and present their work effectively	-produces a short story about one of the six mushroom varieties by transferring ideas to new contexts	-transfers ideas to new contexts with limited effectiveness	-transfers ideas to new contexts with some effectiveness	-transfers ideas to new contexts with considerable effectiveness	-transfers ideas to new contexts with a high degree of effectiveness

Note: A student whose achievement is below level 1 (50%) has not met the expectations for this assignment or activity.

Teacher's Comments/Next Steps: **Level:** _____

Mushroom Surgery

In this lab activity, students will identify and label parts of the mushroom. As well, they will describe what they observe.

Materials Needed:

- Portabella mushrooms (1 per two students)
- Paring knives
- Magnifiers (1 per two students)

Expectations:

Science and Technology:
Life Systems: Growth and Changes in Plants
Overall Expectations:
- investigate similarities and differences in the characteristics of various plants, and ways in which the characteristics of plants relate to the environment in which they grow;
- demonstrate an understanding that plants grow and change and have distinct characteristics.

Specific Expectations:
Developing Skills of Scientific Investigation and Technological Problem Solving
- follow established safety procedures during science and technology investigations;
- observe and compare the parts of a variety of plants;
- use appropriate vocabulary, including *stem, leaf, root, stamen, pistil, flower, adaptation,* and *germination*, in oral and written communication.

Understanding Basic Concepts
- identify the major parts of plants, including *root, stem, flower, stamen, pistil, leaf, seed,* and *fruit*, and describe how each contributes to the plant's survival within the plant's environment.

Teaching and Learning Strategies:

1. Teacher reviews safety when using knives. **Note:** Teacher could prepare mushrooms for the experiment.
2. Students work in pairs.
3. Teacher distributes the Portabella mushrooms (1 per two students).
4. Students identify the following parts of the mushroom: **stem, cap, veil** and **gills**.
5. Individually, in their notebooks, students draw and label a Portabella mushroom.
6. With the help of the teacher, students cut the mushrooms into thin slices.
7. Using magnifiers, students observe and describe the various parts of the mushroom.
8. Students record the information in their notebooks.

Assessment and Evaluation Strategies:

1. Teacher marks mushroom drawing for completion.
2. Teacher marks mushroom observations for completion.

Enrichment Activities:

1. Working in small groups, students design and carry out an experiment to determine if fresh Agaricus mushrooms absorb water.
2. Students present the results of their experiment to the class.

Producing a Mushroom Spore Pattern

In this lab activity, students will observe a mushroom spore pattern. They will describe, record, and label their observations.

Materials Needed:

- Portabella mushrooms - visible dark gills (1 per group)
- Glass bowl or glass (1 per group)
- Sheet of white paper (1 per group)
- Microscope or magnifiers to be shared
- Hair spray

Expectations:

Science and Technology:
Life Systems: Growth and Changes in Plants

Overall Expectations:

- investigate similarities and differences in the characteristics of various plants, and ways in which the characteristics of plants relate to the environment in which they grow.

Specific Expectations:

Developing Skills of Scientific Investigation and Technological Problem Solving

- follow established safety procedures during science and technology investigations;
- use appropriate vocabulary, including *stem, leaf, root, stamen, pistil, flower, adaptation,* and *germination*, in oral and written communication.

Teaching and Learning Strategies:

1. Teacher prepares mushrooms (cuts the mushroom stem off just below the cap).
2. In small groups, students place the mushroom cap gill side down on a sheet of white paper, and then they cover the cap with a glass bowl or glass.
3. Students record in their notebooks what they have done.
4. Leave the mushroom undisturbed for 24 hours.
5. After 24 hours, students carefully remove the bowl and mushroom cap from the paper.
6. Using a microscope or magnifiers, students observe and describe what has happened during the last 24 hours.
7. Students record the information, including a labelled drawing of the spores, in their notebooks.
8. In order to preserve the spore pattern, spray the paper from an angle with hair spray. **Do not do this** until the spores have been observed with the microscope or magnifiers.
9. Individually, students write a report of what they did and what they observed.

Assessment and Evaluation Strategies:

1. Teacher marks reports for completion.

Enrichment Activities:

1. Students share their information with a grade 1 class.

Math is Fungi

In this math activity, students will be applying their math skills in another area of their curriculum.

Materials Needed:

- Mushrooms (variety of samples)
- Mushroom spore information from Activity #6
- *Marvellous Mushrooms: Teacher Background Information* for math problems (Appendix I)

Expectations:

Mathematics:

Number Sense and Numeration

Overall Expectations:

- solve problems involving the addition and subtraction of single- and multi- digit whole numbers using a variety of strategies, and demonstrate an understanding of multiplication and division.

Specific Expectations:

- solve problems involving the addition and subtraction of two-digit numbers, using a variety of mental strategies;
- use estimation when solving problems involving addition and subtraction, to help judge the reasonableness of a solution.

Measurement

Overall Expectations:

- estimate, measure, and record length, perimeter, area, mass, capacity, time, and temperature, using standard units.

Specific Expectations:

Attributes, Units, and Measurement Sense

- estimate, measure, and record the perimeter of two-dimensional shapes, through investigation using standard units;
- estimate, measure, and record area.

Data Management and Probability

Overall Expectations:

- predict and investigate the frequency of a specific outcome in a simple probability experiment.

Specific Expectations:

Probability

- predict the frequency of an outcome in a simple probability experiment or game, then perform the experiment, and compare the results with the predictions, using mathematical language.

Teaching and Learning Strategies:

1. Teacher provides different varieties of mushrooms.
2. In pairs, students select one of the varieties of mushrooms. Next, they measure the diameter, radius and circumference of the mushroom selected.
3. Students record the information in their notebooks and compare their findings.
4. Teacher records the information on the board.
5. Students record the information in their notebooks.
6. Students investigate how many spores a mature mushroom produces in four days. (Refer to Activity #6.)
7. Students solve the following math problems:
   a. If it takes 3 months to produce one mushroom crop, how long would it take to produce 120 crops?
   b. Using the information provided by the teacher, students calculate the percentage of time needed for each stage of the production cycle.
   c. If the production costs of a farm were $750,000.00 each year and the cost of labour (cost of the workers) was 42% of the production cost, how much did the labour cost the farmer (producer)?
   d. If $300 million worth of mushrooms were produced in Ontario in 1997 and the average price received was $4.40 per kilogram, how many kilograms were produced?

Assessment and Evaluation Strategies:

1. Teacher marks math problems for completion

Enrichment Activities:

1. Students determine the price per kilogram of different types of mushrooms.
2. Using a local grocery store flyer or newspaper ads, students compare mushroom prices to other vegetables. How much would 100 grams of mushrooms cost? How much would 100 grams of another kind of vegetable cost?

Media Messages

Students prepare a media presentation. Their goal is to deliver a message to the general public about how safe it is to eat mushrooms produced in Canada after it was reported that someone became ill eating wild mushrooms.

Materials Needed:

- Mushroom posters (Mushrooms Canada or Foodland Ontario)
- Wild mushrooms - information - www.mushrooms.ca
- Information about wild mushrooms from the *Marvellous Mushrooms: Teacher Background Information* (Appendix I)
- *Rubric* (Appendix F)

Expectations:

Language:
Writing
Overall Expectations:
- generate, gather, and organize ideas and information to write for an intended purpose and audience;
- draft and revise their writing, using a variety of informational, literary, and graphic forms and stylistic elements appropriate for the purpose and audience;
- use editing, proofreading, and publishing skills and strategies, and knowledge of language conventions, to correct errors, refine expression, and present their work effectively.

Specific Expectations:
Research
- gather information to support ideas for writing in a variety of ways and/or from a variety of sources.

Word Choice
- use words and phrases that will help convey their meaning as specifically as possible.

Media Literacy
Overall Expectation:
- create a variety of media texts for different purposes and audiences, using appropriate form, conventions, and techniques.

Specific Expectations:
Purpose and Audience
- identify the topic, purpose and audience for media texts they plan to create.

Form
- identify an appropriate form to suit the specific purpose and audience for a media text they plan to create.

Conventions and Techniques
- identify conventions and techniques appropriate to the form chosen for a media text they plan to create.

Producing Media Texts
- produce media texts for specific purposes and audiences, using a few simple media forms and appropriate conventions and techniques (e.g., an information flyer, an information poster, a pamphlet, an ad for radio, or an ad for T.V.).

Teaching and Learning Strategies:

1. In small groups, students research wild mushrooms (www.mushrooms.ca).
2. Teacher leads class in a discussion about the dangers of picking and eating wild mushrooms.
3. Students take on the role of working for a large chain of supermarkets in their advertising department. Recently, there was an article in the newspaper about someone becoming ill from eating **wild** mushrooms. The sale of fresh mushrooms at grocery stores has dropped, even though the mushrooms produced in Canada are safe. Individually, students will develop a media presentation (e.g. an information flyer or poster, a pamphlet, an ad for radio or T.V.) to help increase the sales of Canadian grown mushrooms. They should include the benefits of eating mushrooms produced in Canada.
4. Display the media projects in the school.

Assessment and Evaluation Strategies:

1. Teacher marks media projects using the *Rubric* (Appendix F).

Enrichment Activities:

1. Students prepare a PowerPoint presentation about *Eating Canadian Mushrooms* to be played continually at their local supermarket in the produce section.

Appendix F

Rubric - Media Presentation

Expectation	Criteria	Level 1	Level 2	Level 3	Level 4
Thinking -generate, gather, and organize ideas and information to write for and intended purpose and audience **(Writing)**	-uses planning skills to gather and organize information to support the media presentation	-uses planning skills with limited effectiveness	-uses planning skills with some effectiveness	-uses planning skills with considerable effectiveness	-uses planning skills with a high degree of effectiveness
Communication -draft and revise their writing using a variety of informational, literary, and graphic forms and stylistic elements appropriate for the purpose and audience **(Writing)**	-drafts and revises writing using a variety of tools	-identifies errors and makes corrections with limited effectiveness	-identifies errors and makes corrections with some effectiveness	-identifies errors and makes corrections with considerable effectiveness	-identifies errors and makes corrections with a high degree of effectiveness
Communication -create a variety of media texts for different purposes and audiences, using appropriate form, conventions, and techniques **(Media Literacy)**	-creates and produces appropriate media texts using proper communication techniques for purpose and audience -uses appropriate language conventions accurately (e.g., spelling, grammar, punctuation, and style)	-communicates for the purpose and audience with limited effectiveness -uses appropriate conventions with limited accuracy	-communicates for the purpose and audience with some effectiveness -uses appropriate conventions with some accuracy	-communicates for the purpose and audience with considerable effectiveness -uses appropriate conventions with considerable accuracy	-communicates for the purpose and audience with a high degree of effectiveness -uses appropriate conventions with a high degree of accuracy
Application -create a variety of media texts for different purposes and audiences, using appropriate form, conventions, and techniques **(Media Literacy)**	-produces a media text (e.g., information flyer or poster, pamphlet, a radio or T.V. ad) to inform consumers about the safety of eating Canadian produced mushrooms rather than eating wild mushrooms by transferring ideas to a new context	-transfers ideas to new contexts with limited effectiveness	-transfers ideas to new contexts with some effectiveness	-transfers ideas to new contexts with considerable effectiveness	-transfers ideas to new contexts with a high degree of effectiveness

Note: A student whose achievement is below level 1 (50%) has not met the expectations for this assignment or activity.

Teacher's Comments/Next Steps: **Level:** _____

Be in the Know - Mushroom Nutrition

Students will review ***Eating Well With Canada's Food Guide***, the recommended number of Food Guide Servings per day for their age group, and what a Food Guide Serving looks like for mushrooms. They will also study the nutritional value of mushrooms and the importance of including them in their healthy food choices.

Materials Needed:

- ***Eating Well With Canada's Food Guide***
- Mushrooms Canada - www.mushrooms.ca
- *Marvellous Mushroom Nutrition* (Appendix G)
- *Marvellous Mushrooms: Teacher Background Information* (Appendix I)

Expectations:

Health and Physical Education:
Healthy Living:
Overall Expectation:
- describe the relationship among healthy eating practices, healthy active living, and healthy bodies.

Specific Expectation:
- describe the benefits of healthy food choices, physical activity, and healthy bodies.

Teaching and Learning Strategies:

1. Teacher distributes copies of ***Eating Well With Canada's Food Guide*** to students.
2. Teacher reviews with the students Canada's Food Guide and the Food Guide Servings recommended for their age group highlighting the vegetables and fruit food group.
3. Students review what a Food Guide Serving looks like for raw, cooked, canned, frozen, or dried vegetables and fruit.
4. Students explain what a Food Guide Serving would be for whole and sliced fresh mushrooms.
5. As a class, discuss the importance of including vegetables and fruit in your daily eating habits.
6. Teacher leads a class discussion on the nutritional value of mushrooms: vitamins, minerals, fibre, antioxidants, calories, fat, cholesterol, and sodium.
7. As a class, students discuss the benefits of healthy food choices and healthy bodies.
8. Using the information provided, students complete the *Marvellous Mushroom Nutrition* worksheet (Appendix G).
9. As a class, students discuss their completed worksheets.

Assessment and Evaluation Strategies:

1. Teacher marks the worksheet *Marvellous Mushroom Nutrition* for completion.

Enrichment Activities:

1. Students write a letter to their local newspaper explaining why mushrooms are so nutritious.

Marvellous Mushroom Nutrition

1. Using the chart below, list the nutrients found in mushrooms.

VITAMINS	MINERALS

2. Select one vitamin and explain why it is important. Vitamin:_____

_____

3. Select one mineral and explain why it is important. Mineral:_____

_____

4. Name the two types of fibre: _____ and _____.
Why is fibre important?_____
Mushrooms have _____ fibre.

5. Define antioxidant:_____

6. Mushrooms are also healthy because they are low in _____, and they are
_____, _____, and_____free.

7. Give examples of a Food Guide Serving of mushrooms for:
_____ whole
_____ sliced

8. From your class discussion, explain why mushrooms are healthy (e.g., What benefits do mushrooms provide?). Give 4 reasons.

Supermarket Search - Where are the mushrooms?

Students take a trip to a local supermarket. During their visit they will investigate the various mushrooms available, their cost, and how they may be packaged and purchased.

Materials Needed:

- Arrange for a visit at a local supermarket
- Arrange for the produce manager to present information about the care of mushrooms in the produce section of the supermarket
- Arrange bus transportation
- Field trip information sheet for parents and permission forms for students
- ***All About Food: Farm Visit Guide***
- *Marvellous Mushrooms: Teacher Background Information* (Appendix I)
- *Marvellous Mushrooms: Supermarket Search* (Appendix H)

Expectations:

Science and Technology:
Life Systems: Growth and Changes in Plants
Overall Expectations:
- demonstrate an understanding that plants grow and change and have distinct characteristics.

Specific Expectations:
Understanding Basic Concepts
- describe the different ways in which plants are grown for food, and explain the advantages and disadvantages of locally grown and organically produced food, including environmental benefits.

Teaching and Learning Strategies:

Students do the following in preparation for the field trip to the supermarket:

1. Teacher leads a discussion to determine a definition of supermarket produce.
2. Students record definition on their vocabulary lists.
3. Teacher leads a discussion to review the importance of locally grown food highlighting mushrooms and the fact that they are always available.
4. In small groups, students make a list of the different forms of mushrooms that can be purchased, and all the different types of foods that contain mushrooms (e.g., fresh, canned, frozen, pizza, etc.).
5. As a class, students share their information.
6. Teacher discusses the field trip with students and their assignment, *Marvellous Mushrooms: Supermarket Search* (Appendix H).

Field Trip: Using their assignment sheet, *Marvellous Mushrooms: Supermarket Search,* students do the following:

1. Record the varieties of mushrooms for sale.
2. Compare the price of bulk mushrooms per 500 kg., packaged mushrooms, and sliced mushrooms.
3. Ask: Why does the store sell packaged mushrooms? When loose mushrooms are purchased, why are they put in brown paper bags?

Assessment and Evaluation Strategies:

1. Teacher marks the worksheet, *Marvellous Mushrooms: Supermarket Search* for completion.

Enrichment Activities:

1. In small groups, students locate various products that contain mushrooms and make a list of the products and where they are located in the supermarket.

Marvellous Mushrooms Supermarket Search

Complete the worksheet.

1. List the varieties of fresh Canadian mushrooms available in the supermarket.

a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

2. Compare the price of bulk mushrooms per 500 kg., packaged whole mushrooms, and packaged sliced mushrooms.

Fresh Canadian Mushrooms	Price
Whole	
Whole (packaged)	
Sliced (packaged)	

3. What is the cost of canned mushrooms? What is their country of origin?

4. What nutritional information is provided on the packaged mushrooms?

5. What nutritional information is provided on the canned mushrooms?

6. Does the information differ? Explain.

7. Why should you store loose mushrooms in a brown paper bag?

8. Mushrooms should be stored in the _____. About how long can they be stored there? _____

9. Do not wash your mushrooms until you are _____.

Yummy Mushrooms - What a Marvellous Taste!

Students investigate or share how various cultures including Aboriginal people use mushrooms in their meal preparation. Using favourite mushroom recipes, or ones they have selected, students prepare a Mushroom Buffet.

Materials Needed:

- Mushroom recipes - cookbooks, recipes from home, www.mushrooms.ca
- Electric frying pan(s)
- Microwave oven
- Mushrooms and other food items required for the recipes selected
- Paper plates, plastic forks, napkins

Expectations:

Health and Physical Education:
Healthy Living:
Overall Expectations:
- describe the relationship among healthy eating practices, healthy active living, and healthy bodies.

Specific Expectations:
- identify foods from different cultures and classify them by food groups;
- describe the benefits of healthy food choices, physical activity, and healthy bodies.

Science and Technology:
Life Systems: Growth and Changes in Plants
Overall Expectations:
- demonstrate an understanding that plants grow and change and have distinct characteristics.

Specific Expectations:
Understanding Basic Concepts
- describe ways in which humans from various cultures, including Aboriginal people, use plants for food, shelter, medicine, and clothing.

Teaching and Learning Strategies:

1. Teacher reviews information about food allergies.
2. Teacher leads a class discussion reviewing the importance of making healthy food choices for a healthy body.
3. Teacher and students review the nutritional importance of selecting mushrooms as a healthy vegetables and fruit food guide choice.
4. Teacher leads a class discussion about traditions and culture.
5. In small groups, students share (or investigate) how various cultures including Aboriginal people use mushrooms in their meal preparations. As a class, they share their information.
6. Students bring in their own recipes or find recipes which are representative of various cultures including Aboriginal people.
7. In small groups, students share their recipes. With the help of the teacher each group selects a recipe to be prepared for their Marvellous Mushroom Buffet. **Note:** Select recipes that are easy to prepare in the classroom or in the staff lounge if available for use. Each group shares their recipe with the class.
8. After the recipes have been selected for the Marvellous Mushroom Buffet, students make a wall collage of the mushroom recipes.
9. Teacher facilitates a class discussion as to all the different ways mushrooms could be included in meals or prepared. Teacher makes a list on the board. Students record information in their notebooks.
10. Teacher leads a class discussion about the proper handling and care of mushrooms.
11. Teacher reviews with the students safety procedures used in food preparation.
12. Students prepare the recipes for their Marvellous Mushroom Buffet. Students enjoy their buffet.
13. Students make a collage, *Marvellous Mushrooms! How to Enjoy*, of the various ways mushrooms could be prepared and/or be included in a meal.

Assessment and Evaluation Strategies:

1. Teacher marks collage, *Marvellous Mushrooms! How to Enjoy*, for completion.

Enrichment Activities:

1. Students invite another class and/or administration to share their Marvellous Mushroom Buffet.

Marvellous Mushrooms

Teacher Background Information
For additional information go to Mushroom Canada's website - www.mushrooms.ca

History of the Mushroom:
Mushrooms existed millions of years before humankind. They were gathered by people from the earliest times for food and medicinal purposes. Records show that ancient Romans worshipped mushrooms as the food of the gods. The Japanese cultivated the Shiitake mushroom over two thousand years ago as a luxury item for the wealthy. Oriental societies have historically believed in the healing powers of mushrooms. Cultivation of mushrooms didn't begin in the West until the 18th century when the French began growing them in caves near Paris.

Mushroom Science:
Mushrooms are part of the plant group called fungi. Other examples of fungi are the yeast used in bread-making and the mold that forms on blue cheese. Mushroom fungi differ from plants in many ways. The most notable way is that they obtain all of their nutrients from organic compounds in the soil. As a result, mushrooms do not require light to grow. Mushrooms have no chlorophyll, which is used in photosynthesis.

Economic Impact of the Mushroom:
The production of mushrooms is concentrated in 22 mushroom farms in Ontario with 13 of this total responsible for 80% of the production. Almost all of the mushrooms produced are the white button or Agaricus. The farms are spread along the Highway #401 corridor from Windsor to the Quebec border in order to have easy access to the large urban markets of southern Ontario and Quebec.

The mushroom industry is very labour intensive, employing approximately 2200 people year round. Labour accounts for 42% of production costs. Next to tomatoes, mushrooms are the highest value vegetable crop grown in Ontario.

Mushroom Farming:
Mushroom farming is a highly technical, complex process. It takes up to three weeks for a mushroom farmer to prepare the compost - called substrate - needed to grow the mushrooms. In effect, the farmer must create the food source needed by mushroom spawn to grow. This substrate is then pasteurized to eliminate weed seeds, insects and unwanted micro-organisms. Unlike green plants that are produced from seeds, mushrooms reproduce through microscopic particles called spores produced in the gills under a mushroom cap. Mushroom farmers obtain spawn from sterile laboratories. Spawn are spores that have been inoculated into sterile grain seeds at the laboratory. The spawn is spread on trays full of the substrate in rooms that are carefully climate controlled to promote growth. Their root system consists of a web-like mass called mycelium which allows the mushroom spores to retrieve the nutrients in the substrate. The substrate is covered with a layer of peat moss. Within three weeks small mushrooms appear on the peat moss. This is called pinning.

All harvesting is done by hand. The mushrooms are processed, packed and refrigerated quickly before being shipped to restaurants or food stores within 24 hours of being picked. The whole production process from substrate production to market takes approximately three months. Canadian mushroom farmers produce freshly grown mushrooms twelve months of the year.

Mushroom Production Process:
The production of mushrooms is a complex, exact process.

1. **Spawn Production**
   Mushrooms are fungi that originate from tiny spores. Spores are collected and used to inoculate sterile grain seeds to produce a product called spawn. Mushroom farmers purchase spawn produced in sterile laboratories to be used to 'seed' the compost they prepared.
2. **Compost Production (30 days).**
   Farmers create the food source, called substrate, by mixing materials like waste hay, straw, water and corn cobs. It is mixed frequently to increase the process of decomposing by increasing the amount of oxygen. The resulting compost is a rich organic compound needed to provide the mushroom spawn with the necessary nutrients, carbon and nitrogen for growth. It is then pasteurized to keep the compost clean and free of unwanted insects, weeds and molds.
3. **Growing stage (25 days).**
   The spawn is mixed with the substrate and placed on trays in growing rooms. A layer of peat moss is spread over the substrate because it helps to retain moisture. A web-like mass called mycelium spreads throughout the substrate. Mycelium allows the mushrooms to get the nutrients from the substrate. The growing rooms have carefully controlled temperature, humidity and carbon dioxide levels to promote growth. Soon pin-like mushrooms appear on top of the peat moss.

4. Harvesting stage (21 days).
The mushrooms are picked by hand and quickly processed and chilled to maintain optimum condition. Once the harvesting is completed the growing rooms are steamed at 65.5°C/150°F to eliminate pest infestation before the substrate is removed to be sold to enrich potting soil.

5. Packaging and marketing stage (1 day).
The harvested mushrooms are immediately refrigerated and shipped to restaurants or food stores, arriving within 24 hours of being picked.

On the table mushrooms are used in a variety of dishes from pizza to salads. Mushrooms have the ability to enhance the taste of other foods as well as being tasty and nutritious themselves.

Growing Mushrooms: For more information, go to Mushrooms Canada - www.mushrooms.ca

Enokis Enokis are grown in plastic bottles with the substrate made up of sawdust and grainmeal. Next they are sterilized, inoculated with the mushroom culture and then placed in environmentally controlled grow rooms. Enokis require a colder environment, 7°C/45°F. The mushrooms are harvested after about 90 days and packaged in shrink wrapped bags. The substrate is recycled. Enokis produce only one crop.

Oysters are grown on a range of agricultural and wood waste. After the substrate is pasteurized, it is cooled, inoculated with oyster spawn and then packed into long, tube shaped plastic bags. Holes are punched into the bags for oxygen. The bags are either hung or set on racks in an environmentally controlled building, which has a bit more humidity and fresh air than the Agaricus varieties. The mushrooms are harvested after about 14 days. Pickers cut the stems close to the plastic bags to allow for another flush or growth of mushrooms.

Shiitake mushrooms were originally grown on natural oak logs. This took a very long time - up to four years - and they only grew in the spring and fall. With new technology, Shiitake mushrooms grow much faster on artificial oak logs. The substrate material (artificial oak logs) is packed into a poly bag, sterilized, inoculated with spawn, and then placed in environmentally controlled rooms. It takes about seven weeks for the man-made logs to produce Shiitake mushrooms. In seven days they are ready to harvest. After the harvest, the log is soaked in ice cold water for 1 hour. This reactivates the mushroom mycelia to grow again. The log starts to grow again. With this new process it takes about four months rather than the six year cycle on the natural logs.
How to grow (Agaricus) White, Crimini and Portabella mushrooms is in the *Marvellous Mushrooms* glossy.

Food Safety of Mushrooms:

Canadian cultivated mushrooms are very safe to eat! **First**, the growing rooms are sterilized with steam between crops. **Then**, the growth medium, substrate, is pasteurized before the mushroom mycelia are planted in the substrate.

Mushroom pickers are well trained in personal hygiene. They wash their hands frequently, wear hair nets, and are not permitted to wear any jewelry. These are the first steps in Mushrooms Canada's HACCP-based On-Farm Food Safety Program. HACCP was developed for NASA to prevent astronauts from getting any sickness from food. The principles of HACCP are applied to mushrooms grown and packed in Canada.

The Mushrooms Canada On-Farm Food Safety (OFFS) program was developed over a seven-year period by Mushrooms Canada and the Guelph Food Technology Centre (GFTC). The GFTC is recognized as a world-class food-safety training centre. The Mushrooms Canada program complies with the Food Safety Enhancement Program of the Canadian Food Inspection Agency (CFIA) and international standards of HACCP. Mushrooms Canada encourages its members to enroll in the On-Farm Food Safety (OFFS) programs.

Buyers of **fresh Canadian mushrooms** can be assured that Canadian mushroom farmers comply with the international standards of food safety.

Home Food Safety and Care of Mushrooms:

For more information on how to purchase, serve and store as well as a taste profile, go to Mushrooms Canada - www.mushrooms.ca

Mushrooms are delicate. Take extra care to prevent bruising, preserve high quality and maintain great taste. Here are some helpful handling tips that will ensure your mushrooms are good and tasty:

- Always keep mushrooms in the refrigerator between the temperatures of 0°C to 2°C (32°F to 36°F).
- When mushrooms are purchased loose, they should be stored in a brown paper bag as they will breathe better and stay firm longer.
- Packaged mushrooms keep well in the refrigerator, but once the package has been opened, they should be stored in a brown paper bag.
- Mushrooms are best when they are used within a few days of purchase, but can be kept up to a week.
- Prior to use, wipe mushrooms with a damp cloth or rinse in cold water and pat dry with paper towels. Do not wash mushrooms until you are ready to use them, as they may discolour.

How to Select Mushrooms:

- Select fresh mushrooms that are firm to the touch, are uniform in colour, and have a slightly shiny surface.
- Do not be alarmed if there are tiny particles of peat moss on some of the mushrooms. They are completely harmless and may be brushed off prior to use.

Eating Wild Mushrooms: Health Alert!

Mushrooms Canada advises the public of the potential health risks associated with picking and eating wild mushrooms. Edible mushrooms may appear similar to poisonous mushrooms. Unless you are an expert at mushroom identification or are advised by an expert, our advice is to not consume wild mushrooms.

If poisonous wild mushrooms are consumed, it may take several days for symptoms to develop; these may include but are not limited to: nausea, vomiting, stomach cramps, and diarrhea. More severe poisonings may include sweating, convulsions, hallucinations, coma and even death. Mushrooms Canada takes no responsibility for the picking and consumption of wild mushrooms.

Canadian mushroom growers offer a wide selection of mushroom varieties to satisfy every taste and farm grown mushrooms are always safe to eat.

Additional information for eating wild mushrooms from the Ontario Regional Poison Information Centre can be found at www.sickkids.ca/mediaroom/custom/mushroomalert06.asp

Mushroom Nutrition:

The benefits of healthy eating last a lifetime! They should be developed and encouraged from an early age. There is scientific research that provides convincing evidence that healthy food choices including mushrooms may reduce the risk of developing nutrition related problems (e.g. heart disease, cancer, obesity, hypertension, osteoporosis, anemia, dental decay and some bowel disorders). Weak bones, poor teeth, growth, resistance to infection and performance in school have been linked to poor nutrition in children. It is critical that each one of us take a close look at our food choices and the impact that these choices have on our bodies today as well as in the future.

When you think of one serving of fresh Canadian mushrooms, think of low calories, a valuable source of fibre and carbohydrate, fat, sodium, and cholesterol free! One Canada Food Guide Serving of mushrooms is a half-cup or 125 ml of sliced, cooked, fresh mushrooms, or 4 or 5 whole raw, sliced, or cooked fresh mushrooms.

Including fresh mushrooms in everyday meals is a great way to boost vitamin and mineral intake while adding virtually no calories, fat or sodium. Tossing sliced mushrooms into green salads, soups, stews, stir-fries, omelets, as well as pasta and rice dishes is easy and quick. Grilling whole portabellas makes a tasty low-fat “burger” and sautéed fresh mushrooms lend a savoury depth of flavour to chicken, beef and fish.

Fresh mushrooms are included in the white/tan/brown category of the colour classification for vegetables and fruit. A half-cup or 125 ml serving of mushrooms is also one of the vegetable choices for consumers who are building their individualized Canada's Food Guide on the Health Canada website (www.hc-sc.gc.ca).

Fibre is necessary to help maintain a healthy digestive system. There are two types of fibre: soluble and insoluble. Mushrooms have both soluble and insoluble fibre. Soluble fibre helps reduce bad cholesterol.

Antioxidants are chemicals that are in the body naturally; they protect against cell damage, which occurs when oxygen is being burned by the body to produce energy. Recent research has found mushrooms contain a powerful antioxidant called l-ergothioneine, which is heat-stable, therefore, it is present in both raw and cooked mushrooms. Antioxidant activity is enhanced by the presence of selenium.

Vitamins

When it comes to the B vitamins (niacin, riboflavin, pantothenic acid, thiamin, and vitamin B6), fresh mushrooms make a good choice. They also make an important contribution to the daily intake of folate. Listed below are the nutrient amounts and % Daily Values (%DV) for the important water-soluble vitamins found in mushrooms.

Mushroom (100 grams) (4-5 medium mushrooms)	Folate	Niacin B3	Pantothenic Acid	Riboflavin B3	Thiamin B1	Vitamin B6
Crimini, uncooked	3%	19%	15%	29%	6%	6%
Enoki, uncooked	13%	30%	11%	10%	12%	4%
Oyster, uncooked (5)	7%	25%	13%	21%	8%	6%
Portabella, uncooked	5%	23%	15%	28%	5%	5%
Shiitake, cooked	5%	7%	36%	10%	2%	8%
White Button, uncooked	4%	18%	15%	24%	5%	5%

Minerals

Cooking and serving fresh mushrooms every day is a smart way to get more of the minerals essential to a healthy body and an active life. Fresh mushrooms contain a wide variety of minerals (copper, iron, magnesium, phosphorus, potassium, selenium, and zinc), and they are naturally very low in sodium. Try fresh mushrooms in dips, spreads, stuffed with savoury ingredients and baked, or on a nutritious veggie pizza. Listed below are the nutrient amounts and % Daily Values (%DV) for the important minerals found in mushrooms.

Mushroom (100 grams) (4-5 medium mushrooms)	Copper	Iron	Magnesium	Phosphorus	Potassium	Selenium	Zinc
Crimini, uncooked	25%	2%	2%	12%	13%	37%	7%
Enoki, uncooked	5%	6%	4%	11%	11%	3%	4%
Oyster,uncooked (5)	12%	7%	5%	12%	12%	4%	5%
Portabella, uncooked	20%	3%	3%	13%	14%	16%	4%
Shiitake, cooked	45%	2%	3%	3%	3%	35%	9%
White Button uncooked	16%	3%	2%	9%	9%	13%	3%

Know why these vitamins and minerals are important to maintain a healthy body!

NUTRIENT	PURPOSE
VITAMINS	
Niacin Vitamin B3	- releases energy from carbohydrates, fats, and proteins - needed for a healthy nervous system
Pantothenic Acid Vitamin B5	- releases energy from carbohydrates, fats, and proteins - needed for a healthy nervous system
Riboflavin Vitamin B2	- releases energy from carbohydrates, fats, and proteins - enzyme essential to all areas of metabolism
Thiamin Vitamin B1	- turns carbohydrates into energy - required for muscle coordination and a healthy nervous system
Vitamin B6	- helps body make use of carbohydrates and proteins - required for a healthy nervous system - is a factor in tissue formation
Folacin	- helps build red blood cells - protect against neural tube defects during pregnancy

NUTRIENT	PURPOSE
MINERALS	
Copper	- is found in all body cells
Iron	- is a component of haemoglobin - healthy red blood cells - is important in the transfer of oxygen
Magnesium	- helps maintain nerve and muscle cells - helps build and maintain tissue and bones - helps make proteins
Phosphorous	- works with calcium to build strong bones and teeth - is a component of every cell - helps cell growth and repair
Potassium	- helps to keep your body's fluids balanced in and out of body cells - helps maintain blood pressure
Selenium	- helps the heart work properly - is involved in metabolism - acts as an antioxidant with Vitamin E
Zinc	- helps the body use carbohydrates, proteins, fats, and Vitamin A - helps heal wounds and make blood - helps in growth and maintenance of cells

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mushrooms.canada

Fresh. Simple. Good.

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