

Choosing Tomorrow's Menu

Sustainable Resources 11 - Agriculture

Health and Career Education/Planning 10

Home Economics: Foods and Nutrition 8-12

Physical Education 11

Social Studies 10-11

written by Jim Wiese

aitc.ca/bc

Table of Contents

Introduction	6
Choosing Tomorrow’s Menu	6
Goals and Objectives of the Module	7
Module Overview and Curriculum Connections	7
Curriculum Matrix	8
Module Planning Chart	13
Teaching Strategies Used in the Module	19
Critical Thinking in the Module	20
Integration and Choosing Tomorrow’s Menu	20
Pre-Module Activities	21
Pre-Module Activity	23
Take a Stand	23
Teaching Activities	26
Concept 1	26
Activity 1.1 – Agriculture in Our Daily Lives	27
Activity 1.2 – Now and Then, Here or There	34
Activity 1.3 – Agriculture in British Columbia	39
Concept 2	45
Activity 2.1 – Grow it or Raise it	46
Activity 2.2 – Move it, Sort it and Process it	53
Activity 2.3 – Sell it	59
Activity 2.4 – Field of Dreams	64
Concept 3	70
Activity 3.1 – Food and Food Products in BC and the World	71
Activity 3.2 – Moving it Along	77
Activity 3.3 – Meeting the Challenge	81
Activity 3.4 – Working Together	87
Concept 4	92
Activity 4.1 – Increasing the Yield	93
Activity 4.2 – What’s New?	99
Activity 4.3 – Price Check on Aisle 2	105
Activity 4.4 – This is My Future - Presentations	110
Concept 5	113
Activity 5.1 – You Are What You Eat	114
Activity 5.2 – It’s All in the Fine Print	122
Activity 5.3 – Making it Fit	130
Concept 6	137
Activity 6.1 – Sustainable Agriculture – The Game	138
Activity 6.2 – BC’s Best Diet	147
Activity 6.3 – The Sustainability Times	151
Appendix	157
Additional Activities	158
Critical Thinking in the Classroom	167
Constructivism in Education	167
Resource List	169
10 Reasons to Buy Locally	170
Choosing Tomorrow’s Menu Word Search	171

Introduction

written by Jim Wiese

Introduction

Choosing Tomorrow's Menu

Food is one of the basic necessities of life, along with air, water, clothing and shelter. Food is also something we seldom think about, except when we're hungry. Few consider all of the important roles plants and animals play in our lives. First, plants and animals supply the food we need to live. Other plants, trees, also supply the raw materials we need to build our homes and businesses. In addition to food and shelter, plants and animals give us materials for use in clothing, medicine, cosmetics and other objects we use everyday. However, it's the food these plants and animals supply and the nutrition it contains that is of primary importance.

In 2006, Health Canada revised Canada's Food Guide. This new version is modified to now include the recommended number of Food Guide Servings per Day as it relates to the age and sex of the individual. If you have the proper number and type of food groups recommended for your age and sex, and use other health tips found in the guide, it will help:

- Meet your daily needs for vitamins, minerals and other nutrients.
- Reduce your risk of obesity, Type 2 diabetes, heart disease, certain types of cancer and osteoporosis.
- Contribute to your overall health and vitality.

In addition to the nutrition that food gives us, food also plays a role in our community, our province, our country and the world. Agriculture and agricultural land plays a role in the establishment and development of our towns, cities and province. Communities in British Columbia produce food for our province, for Canada, and for the world. This food comes from the agriculture, aquaculture and commercial fisheries industries. Food is also processed and sold, often for export. In 2005, total consumer sales in these industries in BC were valued at \$20.9 billion and supported 280,430 jobs.

The largest values of farm products in BC come from the following (2005 average):

- potatoes and field vegetables – \$348,000,000
- greenhouse vegetable - \$192,000,000
- berries and grapes - \$116,000,000
- floriculture and nursery - \$424,000,000
- cattle and calves - \$288,000,000
- dairy products - \$371,000,000
- poultry and eggs - \$319,000,000
- salmon - \$277,000,000

At the same time, BC imports \$3.3 billion in farm and food products. This globalization of the food industry is based on an economic theory that every nation and region should specialize in one or two globally traded commodities. They specialize in resources they can produce cheaply enough to compete with every other producer. The money received from exporting these commodities is then used to buy food for local consumption. According to this theory, everyone will benefit. Recent events, including product recalls and climate change, suggest there is dark side to this theory. If nothing else, energy is necessary to transport a food product half way around the world to get to our dinner plate. This energy has a hidden or embedded cost (called embodied energy), a cost that must be paid. There are consequences in the food we eat. The food on our plate has nutritional value, environmental value, social value and economic value. They all play a part in the lives we live.

It is this globalization of the food industry and its effect on local farms and the nutritional value of the food we eat that is at the heart of the Choosing Tomorrow's Menu module. This global strategy poses many questions. What foods should be included in a healthy diet and how can we ensure their nutritional value? What food and agricultural products does British Columbia already raise and grow? What role does agriculture play in BC and its communities? What role does technology play in agriculture? How can we make agriculture part of our communities and create a more sustainable, healthy lifestyle? What is sustainable agriculture and do our current practices lead our province toward a sustainable future? What challenges do the decisions we make today create for the world we will see tomorrow? These and other questions will serve as the focus of the Choosing Tomorrow's Menu module.

It's all about making the right choices today that will lead to tomorrow's menu. Those choices begin with the food we eat and how we support the agricultural industry in British Columbia.

Goals and Objectives of the Module

This module was created to help secondary students explore food, nutrition, and sustainable agriculture in the British Columbia, as well as the relationship between agriculture, the environment and society. It will do this through an investigation of the following concepts:

Concept 1 – Agriculture has played and continues to play an important role in the exploration and development of British Columbia and the lives of its people and communities, including the First Nations.

Concept 2 – Agriculture has many components. Some of these components play a major role in enhancing food and agricultural product production.

Concept 3 – Sustainable agriculture is necessary to ensure that food will always be there when we need it. Where food comes from and how it is produced and processed has consequences.

Concept 4 – Technology plays a part in a sustainable agriculture future.

Concept 5 – There are many factors involved in a healthy lifestyle. Good nutrition and exercise are beneficial to healthy living and are part of a balanced lifestyle. The choices we make about the food we eat will affect our lives both today and in the future.

Concept 6 – We can make personal choices about the food we eat and where the food comes from. The choices we make about agriculture will affect the challenges we will face and the future we will create.

Module Overview and Curriculum Connections

The overview below shows how the prescribed learning outcomes for several secondary courses can be fully or substantially reached using the module activities. The prescribed learning outcomes are connected to the Integrated Resource Packages for Sustainable Resources 11, Health and Career Education 8 and 9, Planning 10, Home Economics: Foods and Nutrition 8 – 12, Physical Education 11 and Social Studies 10 and 11. The specific Prescribed Learning Outcomes are listed after the Curriculum Matrix (<http://www.bced.gov.bc.ca/irp>).

The topic of food, nutrition and sustainable agriculture is a complex one that cuts across several curriculum areas. The greater topic of food, nutrition and sustainable agriculture has been broken into several smaller modules that include only those activities that address the prescribed learning outcomes for each course. The entire curriculum package is shown here and is available for download as well.

Curriculum Matrix

Concept	Sustainable Resources 11	Health and Career Education/ Planning 10	Home Economics: Foods and Nutrition	Physical Education	Social Studies
1 - Agriculture has played and continues to play an important role in the exploration and development of British Columbia and the lives of its people and communities, including the First Nations.	A1				Gr. 10
2 – Agriculture has many components. Some of these components play a major role in enhancing food and agricultural product production.	A2, A3, F1		C5 (Gr. 10 - 12)		

Concept	Sustainable Resources 11	Health and Career Education/ Planning 10	Home Economics: Foods and Nutrition	Physical Education	Social Studies
3 – Sustainable agriculture is necessary to ensure that food will always be there when we need it. Where food comes from and how it is produced and processed has consequences.	A3, A4		D1-2 (Gr. 8 – 12)		Gr. 11
4 – Technology plays a part in a sustainable agriculture future.	A4, A5, F1		D1-2 (Gr. 10 – 12)		Gr. 11
5 – There are many factors involved in a healthy lifestyle. Good nutrition and exercise are beneficial to healthy living and are part of a balanced lifestyle. The choices we make about the food we eat will affect our lives both today and in the future.		HCE – Gr. 8, 9, Planning10	C1-5 (Gr. 8 – 12)	Gr. 11	

Concept	Sustainable Resources 11	Health and Career Education/ Planning 10	Home Economics: Foods and Nutrition	Physical Education	Social Studies
6 – We can make personal choices about the food we eat and where the food comes from. The choices we make about agriculture will affect the challenges we will face and the future we will create.	A6		D1-2 (Gr. 8 – 12)		Gr. 11

Specific PLO links to curriculum

Students who have fully met the Prescribed Learning Outcome are able to:

Sustainable Resources 11

Sustainable Agriculture

- A1 analyse the environmental, social, and economic significance of agriculture at the local, provincial, and global levels
- A2 outline components of agricultural systems and ways of enhancing agriculture production
- A3 assess current practices related to sustainable management of agricultural resources in British Columbia
- A4 investigate current practices related to the development of commercial agriculture products
- A5 illustrate various roles of technology in agricultural practices
- A6 analyse challenges and opportunities faced by agriculture industries in British Columbia
- F1 research career and job opportunities in resource industries and related services

Health and Career Education

Grade 8

Health – Healthy Living

- Set personal goals for attaining and maintaining a healthy lifestyle
- Analyse influences on eating habits, including family, peers, and media

Grade 9

Health – Healthy Living

- Relate the characteristics of a healthy lifestyle to their ability to maximize personal potential.
- Analyse how healthy eating habits can support a healthy lifestyle.

Planning 10

- C1 analyse factors that influence health (e.g. physical activity, nutrition, stress management)
- C2 analyse health information for validity and personal relevance.
- C5 evaluate the potential effects of an individual's health related decisions on self, family and community.

Home Economics: Foods and Nutrition 8 to 12

Grade 8

Nutrition and Healthy Eating

- C1 describe the importance of nutrition and other factors that contribute to health
- C2 use Eating Well with Canada's Food Guide to plan simple, nutritious dishes and snacks.
- C3 use product labels to identify and compare the nutritional value of a variety of food products.

Social, Economic and Cultural Influences

- D1 describe factors that influence personal food choice

Grade 9

Nutrition and Healthy Eating

- C2 use Eating Well with Canada's Food Guide to plan meals and snacks for a nutritionally balanced diet.
- C4 identify and compare the ingredients and nutritional value of various commercial products.

Social, Economic and Cultural Influences

- D1 describe factors that influence personal food choice

Grade 10

Nutrition and Healthy Eating

C1 demonstrate an understanding of the following nutrients and their relationship to healthy living:

- a variety of protein choices
- simple and complex carbohydrates
- saturated, unsaturated and trans fats
- micronutrients, including vitamins and minerals

C2 create nutritious menus for a variety of dietary and budget considerations using Eating Well with Canada's Food Guide.

C5 evaluate commercial food products including:

- interpreting information on food labels
- analyzing food labels for nutritional labels
- developing and using criteria to compare similar food products
- Social, Economic and Cultural Influences

D1 describe a variety of food marketing techniques

D2 identify factors that affect food production and supply, especially in Canada today.

Grade 11

Nutrition and Healthy Eating

C2 create nutrition plans within a specified budget for a variety of dietary considerations that meet the recommendations from Eating Well with Canada's Food Guide.

C5 identify types of food additives and enrichments and their function in food products.

Social, Economic and Cultural Influences

D1 analyse the effect of food marketing practices on consumer behaviour.

D2 demonstrate an awareness of environmental and health issues related to the production and consumption of food.

Grade 12 –

Nutrition and Healthy Eating

C1 apply principles from Eating Well with Canada's Food Guide and other reliable sources to analyse menus and make recommendations for particular dietary needs.

C5 critique the use of additives and enrichments, use of pesticides and nutrition and health statements about foods.

Social, Economic and Cultural Influences

D2 analyse global and environmental health issues related to the production and consumption of food.

Physical Education

Grade 11 – Active Living

design and implement plans for balance, healthy living, including:

- nutrition
- exercise
- rest
- work

Social Studies

Grade 10 – Environment: Canada from 1815 to 1914

E3 evaluate attitude and practices in resource development in British Columbia from 1815 to 1914 and their impact on contemporary resource management.

Grade 11 – Human Geography

Assess environmental challenges facing Canada, including global warming ozone layer depletion and freshwater quality and supply

Module Planning Chart

The chart below should help teachers plan a unit on food, nutrition and sustainable agriculture or as they prepare to teach individual lessons.

Section	Activity	Time	Materials
Pre-Module Activity	Take a Stand	30 minutes	<ul style="list-style-type: none">• BLM – Take a Stand Inventory Student Sheet• Position signs for the wall
Concept 1 – Agriculture has played and continues to play an important role in British Columbia and the lives of its people and communities, including the First Nations.	Activity 1.1 – Agriculture in Our Daily Lives	10 minutes to hand out inventory sheets one day and 30 minutes the next day to answer the questions	<ul style="list-style-type: none">• BLM – Activity 1.1– Agriculture in Our Daily Lives Student Sheet• Canada’s Food Guide (either print copy or on line access)

Section	Activity	Time	Materials
	Activity 1.2 – Now and Then, Here or There	60 minutes for activity with extension done as homework	<ul style="list-style-type: none"> • BLM – Activity 1.2 – Here and There, Now and Then Student Sheet • Computer with access to the Internet • Feeding frenzy DVD segment
	Activity 1.3 – Agriculture in British Columbia	60 minutes	<ul style="list-style-type: none"> • BLM – Activity 1.3 – Agriculture in British Columbia Student Sheet • Pencil or pen • History of Agriculture DVD segment • Television and DVD player or other broadcast system
Concept 2 – Agriculture has many components. Some of these components play a major role in enhancing food and agricultural product production.	Activity 2.1 – Grow it or Raise it	60 minutes	<ul style="list-style-type: none"> • BLM – Activity 2.1 – Grow it or Raise it • Field to Fork, Barnston Island, Glen Valley Organic Co-op Farm and Food Democracy DVD segments
	Activity 2.2 – Move it, Sort it and Process it	60 minutes	<ul style="list-style-type: none"> • BLM – Activity 2.2 – Move it, Sort it and Process it Student Sheet • Put Your Money Where Your Mouth Is DVD segment • Television and DVD player or other broadcast system

Section	Activity	Time	Materials
	Activity 2.3 – Sell it	60 minutes	<ul style="list-style-type: none"> • BLM – Activity 2.3 – Sell it Student Sheet • Magazines to cut up for pictures • Felt pens or coloured pencils • Colored paper • White paper
	Activity 2.4 – Fields for your Future - Career Profile	30 minutes for the first power point presentation. Parts other several classes for students to research the job that most interests them.	<ul style="list-style-type: none"> • BLM – Activity 2.4 – Career Profile Student Sheet • Fields for Your Future DVD with Power Point presentation • Television and DVD player or other broadcast system • Computer with Internet access
Concept 3 – Sustainable agriculture is necessary to ensure that food will always be there when we need it. Where food comes from and how it is produced and processed has consequences.	Activity 3.1 – Food and Food Products in BC and the World	60 minutes	<ul style="list-style-type: none"> • BLM – Activity 3.1 – Food and Food Products in BC and the World Student Sheet • The Sustainability Road Show DVD segment • Television and DVD player or other broadcast system
	Activity 3.2 – Moving it Along	Two 60 minute classes	<ul style="list-style-type: none"> • BLM – Activity 3.2 – Moving it Along student sheet • pencil or pen

Section	Activity	Time	Materials
	Activity 3.3 – Meeting the Challenge	60 minutes	<ul style="list-style-type: none"> • BLM – Activity 3.3 – Meeting the Challenge Student Sheet • pencil or pen • Modern Farming Challenges DVD segment • Television and DVD player or other broadcast system
	Activity 3.4 – Working Together	60 – 120 minutes	<ul style="list-style-type: none"> • BLM – Activity 3.4 – Working Together Students Sheet • pencil or pen • sheets for human graph • Sustainable Urban Farming and Wildlife Habitat Conservation DVD segments • Television and DVD player or other broadcast system
Concept 4 – Technology plays a part in a sustainable agriculture future.	Activity 4.1 – Increasing the Yield	60 minutes	<ul style="list-style-type: none"> • BLM – Activity 4.1 – Increasing the Yield Student Sheet • pencil or pen
	Activity 4.2 – What’s New?	60 minutes	<ul style="list-style-type: none"> • BLM – Activity 4.2 – What’s New? Student Sheet

Section	Activity	Time	Materials
	Activity 4.3 – Price Check on Aisle 2	60 minutes to read the activity and start the questions; 1 more class period may be needed to complete the extension question.	<ul style="list-style-type: none"> • BLM - Activity 4.3 – Price Check on Aisle 2 Student Sheet • Computers with Internet access for further research on enrichment question
	Activity 4.4 – This is My Future - Presentations	60 minutes to start the activity and part of the next few days to complete it. Another 60 minutes will be required for student presentation	<ul style="list-style-type: none"> • BLM – Activity 4.4 – This is My Future – Presentations Student Sheet • Computer with Internet access • Poster board • Felts or coloured pencils
Concept 5 – There are many factors involved in a healthy lifestyle. Good nutrition and exercise are beneficial to healthy living and are part of a balanced lifestyle. The choices we make about the food we eat will affect our lives both today and in the future.	Activity 5.1 – You Are What You Eat	10 minutes to hand out inventory sheets one day and 60 minutes the next day to complete the chart and answer the questions	<ul style="list-style-type: none"> • BLM – Activity 5.1 – You Are What You Eat Student Sheet • Pencil or pen • Computer with Internet access or a copy of Eating Well with Canada's Food Guide
	Activity 5.2 – It's All in the Fine Print	60 minutes	<ul style="list-style-type: none"> • BLM – Activity 5.2 – It's All in the Fine Print Student Sheet • Nutrition labels from a many common food products

Section	Activity	Time	Materials
	Activity 5.3 – Making it Fit	60 minutes	BLM – Activity 5.3 – Making it Fit Student Sheet Computer with Internet access
Concept 6 – We can make personal choices about the food we eat and where the food comes from. The choices we make about agriculture will affect the challenges we will face and the future we will create.	Activity 6.1 – Sustainable Agriculture – The Game	2 – 3 class periods	<ul style="list-style-type: none"> • BLM – Activity 6.1 – Sustainable Agriculture – The Game Student Sheet • Poster board • Felt Pens • Objects to make game pieces • Paper for game rules
	Activity 6.2 – BC’s Best Diet	2 – 3 class periods	<ul style="list-style-type: none"> • BLM – Activity 6.2 – BC’s Best Student Sheet • Poster board • Felt pens • Pencil or pen
	Activity 6.3 – The Sustainability Times	2 – 3 class periods	<ul style="list-style-type: none"> • BLM – Activity 6.3 – The Sustainability Times Student Sheet • sample newspaper • paper ^a pencil or pen • coloured pencils or felts • large poster paper if you choose to make it look like a newspaper at the end

Teaching Strategies Used in the Module

Choosing Tomorrow's Menu offers many complete lessons for minds-on, discovery-oriented teaching in several secondary courses. Each lesson in this module has clearly defined content objectives supported and enriched with links to other appropriate learning resources. This includes other learning resources, such as videos, DVDs, or print materials available with this module by e-mail order through the Agriculture in the Classroom Foundation (<http://www.aitc.ca/bc/>). Some of the video segments can also be downloaded from the Greater Vancouver Television site (<http://www.gvtv.ca/>).

Each activity includes the following:

- Teacher Information
 - Overview/Purpose
 - PLO Connections
 - Lesson Objectives
 - Materials and Resources
 - Background Information
 - Student misconceptions
 - Teacher notes
 - Safety considerations (if any)
 - Web resources
 - Learning Activities
 - Meeting Individual Needs
 - Enrichment
 - Assessment
 - Suggested Answers to Questions on Student Sheets

- Student Information
 - BLM - Student Activity Sheet

The activities in this module can be used as a stand-alone curriculum or can be used to complement and enrich your own curriculum. You are encouraged to consider how these lessons can meet the needs of your students, match the curriculum and fit with your own teaching style.

The activities in Choosing Tomorrow's Menu module are grouped in a way that encourages the use of a constructivist teaching strategy. See the Appendix for more information on Constructivism in Education.

Critical Thinking in the Module

In all grades and across all subjects, students' ability to successfully think through the challenges posed by the curriculum and in their daily lives is recognized to be of critical importance. Often, the labels used to describe these challenges differ. Depending on the subject, they may be called problems, issues, decisions, tasks, inquiries or dilemmas. Regardless of the wording, at the heart of these challenges is the ability to think critically, to make thoughtful judgments about what to believe, or how to act. This module supports the use of critical thinking in the classroom. Refer to the Appendix for more information on Critical Thinking in the Classroom.

Integration and Choosing Tomorrow's Menu

The traditional delivery model for secondary schools involves single-subject instruction. The trouble is, the separate-subject approach too often leaves students with a disconnected view of knowledge. It also fails to reflect the way that people attack problems in the real world. When knowledge and learning is compartmentalized, kids get no view of the big picture. Life itself is holistic. The real world presents us with complex events that aren't divided into neat subject areas for fifty-minute periods. Real living requires us to draw on many domains of knowledge, multiple strategies of thinking and diverse ways of knowing.

Recently, teachers have begun crossing subject boundaries, translating models from one field to another, applying promising procedures from other subjects, designing cross-curricular investigations, and developing rich thematic units. These classroom practices involve students in long-term, deep, sophisticated inquiry. The practices show a belief that students can learn subject matter amid holistic, integrated experiences, and not just through separate sequential lessons. They believe learning must be authentic and tied to real life situations.

Real life learning is a central tenant of Choosing Tomorrow's Menu. This thematic approach to food, nutrition and sustainable agriculture allows for secondary teachers to work with and support the ideas that are being taught in other subject areas. It's difficult to fully understand the concept of nutrition, taught in Home Economics, without understanding the role that exercise, taught in Physical Education, plays in a healthy life style. It's hard to grasp the implications of sustainable agriculture, taught in Sustainable Resources 11, without examining the politics and economics of globalization, taught in Social Studies classes.

Many teachers think of integration solely in terms that fuse elements from different curriculum areas into one new, larger subject. Integration can also be accomplished by inserting appropriate knowledge from one curriculum area into the framework of another or by correlating and drawing connections between different subject areas. These latter forms of integration of content are the forms of integration that are more easily accomplished at the secondary school level. More important, this type of integration helps students understand the complexities of the world in which they live, see the relations between the different subjects they are taught, and transform fragmented bits of information into a seamless web of knowledge. (Web site quote)

Teachers who use Choosing Tomorrow's Menu are encouraged to look for opportunities to expand their lessons to show this connectedness and help students understand the complexities involved in sustainable agriculture.

Pre-Module Activities

written by Jim Wiese

aitc.ca/bc

Pre-Module Activity

Take a Stand

Overview/Purpose – to have students examine their own lives in order to become aware of the role agriculture has in their lives; to have students express their own knowledge about agriculture and sustainability in the British Columbia.

PLO's connections – This activity is an introduction to the module and is appropriate to use at the beginning of any units on food, nutrition and sustainable agriculture.

Lesson Objectives – by the end of the lesson, students should be aware of their own beliefs and knowledge about food, nutrition and sustainable agriculture. They will return to this survey at the end of the unit and look for changes in their beliefs and knowledge.

Materials and Resources

- BLM - Take a Stand Inventory Student Sheets
- 5 wall sheets with caption of "Strongly Agree," "Tend to Agree," "Uncertain," "Tend to Disagree," and "Strongly Disagree"

Background Information

Student Misconceptions

Students may not have a good idea of what "sustainable" means. At the beginning of the unit, it is important to get them to think about and discuss what the word means to them. During the unit, they can modify their ideas.

Teacher Notes

Students will come to this learning experience with a variety of levels of knowledge and understanding about food, nutrition and sustainable agriculture. By doing this activity, students will begin to examine what they already know about the topics and generate their own questions. The teacher can use this information as the lessons progress to direct their instruction.

Time – 50 minutes. More time may be necessary, depending on the time needed to discuss student answers to the questions.

Presentation Suggestions

Take a Stand is an activity to record your students' previous knowledge on food, nutrition and sustainable agriculture. It uses a series of questions to assess their knowledge and attitudes on the topic and then create a human graph to discuss their answers.

1. Give students 5 – 10 minutes to record their answers to the questions in the inventory individually. Remind students that there are no right or wrong answers.
2. Debrief the class with a Human Graph. This technique requires students to physically indicate their agreement/disagreement or preference on an issue. The Human Graph quickly plots the total group response like a tally.
 - Post five sheets of paper along one wall in the classroom– they should say “Strongly Agree,” “Tend to Agree,” “Uncertain,” “Tend to Disagree,” and “Strongly Disagree.”
 - After students have finished the inventory, go over their answers. As you debrief each question, students stand in a line in front of the word that represents their answer, creating a Human Graph, a bar graph of student answers.
 - Once in position, have different students explain why they are standing in their particular location. Other students can respond to their ideas as well.
 - As students give their responses, other students can move from their original position as they modify or rethink their opinions.
 - This oral exercise prepares students for later writing expressions. You can also use this exercise for a learning log or journal entry.
3. Have students share the questions they have about food, nutrition and sustainable agriculture. You might consider posting their questions on a sheet of poster paper. As you progress through the unit, you can refer to these questions as discover their answers. Some questions may still need to be answered at the end of the unit or may not have simple answers. Food, nutrition and sustainable agriculture are a complex topic.

Meeting Individual Needs

1. Before students start the inventory, ensure that all students know what the words mean. You can collect pictures of food, nutrition, and agriculture and post them around the classroom for visual learners.
2. An alternate way to use this activity is to collect pictures that represent each of the questions on the Take a Stand inventory. For example, for question 4 concerning the high cost of food, you could show a grocery bill for a family of 4, or for question 6 concerning technology, you could show a picture of a tractor plowing a field.

Extension or Enrichment Suggestions

1. Have students write in a journal or learning log about their initial ideas on food, nutrition and agriculture. They can reflect on these initial ideas as part of their final assignment or unit assessment.
2. Student could also create a K-W-L (know-wonder-learn) on the topic of food, nutrition, and agriculture. What do they already know, what do they wonder about and what do they want to learn.

Assessment

Have students include the results of their Take a Stand inventory to their portfolio. They can reflect back on the results of this activity in as part of a self-assessment activity at the end of the unit.

Student Activity Sheet – Pre-module Activity

Name: _____

Date: _____

Take a Stand

Read each statement below and write the number of the answer that best indicates your honest feeling.

- 1 = strongly agree
- 2 = tend to agree
- 3 = uncertain
- 4 = tend to disagree
- 5 = strongly disagree

1. Because of our skills and technology, we no longer depend on the environment for our basic needs.
2. The cost of food is too high.
3. We don't have to worry about future generations, they can take care of the environment and create the food they need to live.
4. Hydroponics, poultry barns and fish farms are a good way to raise more food in a smaller area and with fewer people.
5. The agriculture and farms are more of a problem for people who live in rural areas than those who live in a city.
6. Technology is good. It will help us get out of the problems we face today.
7. We need more laws to help take care of the environment.
8. There is little I can do personally to solve environmental problems and make the world more sustainable.
9. A healthy environment is something we all need.
10. British Columbia is a large province and we can easily increase the amount of land we use to farm or raise livestock.
11. There is no such thing as global warming. The temperature change is part of a larger cycle that has happened in the past, is changing now and will change in the future.
12. I should be able to eat any food that I want, no matter where it comes from, or if I can afford to pay for it.
13. It's possible to eat a healthy meal at a fast food restaurant.
14. We need to help our farmers, through things like farm subsidies, food marketing boards and support for the agriculture land commission. This help will ensure we have food for our future.
15. First Nations people didn't know anything about agriculture until European settlers arrived.
16. Five questions I have about food, nutrition, and sustainable agriculture are:

Teaching Activities

Concept 1

Agriculture has played and continues to play an important role in the exploration and development of British Columbia and in the lives of its people and communities, including the First Nations.

Facts:

- People eat food and use agricultural products every day.
- The food we eat and agricultural products we use have changed and will change over time.
- Graphs are a useful tool to look at and interpret data, including agricultural production.

Attitudes:

- The food we eat and the agricultural products we use reflect culture, geography, climate and wealth.
- The food we eat, the agricultural products we buy and the agricultural processes we use have changed in the past and can change in the future.

Activity 1.1 – Agriculture in Our Daily Lives

Overview/Purpose – to allow students to investigate the many ways that plants, animals, plant products and animal products are used in everyday life.

- PLO's connections
- Sustainable Resources 11
- Sustainable Agriculture
- A1 analyse the environmental, social, and economic significance of agriculture at the local, provincial, and global levels
- Social Studies
- Grade 10 – Environment: Canada from 1815 to 1914
- E3 – evaluate attitude and practices in resource development in British Columbia from 1815 to 1914 and their impact on contemporary resource management.

Lesson Objectives – by the end of the lesson, students will understand that they and their families currently use plants, animals, plant products and animal products and have used them in the past. They play an important part in our current lives and played an important part in the history of British Columbia.

Materials and Resources

- BLM – Activity 1.1– Agriculture in Our Daily Lives Student Sheet
- Canada's Food Guide (either print copy or on line access)

Background Information

Student Misconceptions

Few of us think about the plants and animals around us. Yet they play an important part in our lives. They supply the food we need to live and grow. Large plants, trees, supply the raw materials we need to build homes and businesses. In addition to food, some animals give us the materials we use for clothing and others provide companionship. We use plants and animals everyday and seldom give them a thought. Students may have a limited idea about the role plants, animals, and their products play in their lives. Make sure students look for both the plants and animals they may use for food and for the plant and animal products they may not have considered.

Teacher Notes

The food we eat is one way we use plants and animals. They form the basis of good nutrition. Canada's first Food Guide was introduced in July, 1942. Since then, the Food Guide has been transformed many times, changing as new research gives us improved nutrition suggestions. The most recent version includes adjustments for age and sex, as well as tips that help create a healthy lifestyle. Their recommended amount and type of food will help:

- Meet your needs for vitamins, minerals and other nutrients
- Reduce your risk of obesity, type 2 diabetes, heart disease, certain types of cancer and osteoporosis.
- Contribute to your overall health and vitality.

In addition, this activity introduces the many ways that plant and animal products are used. For example, the airbag in your car contains cornstarch, diabetic test strips contain an enzyme found in horseradish, and tennis racket strings are made from sheep intestines.

Time – This activity is best done over a 24-hour period. Give students the activity sheet at the end of one class and have them record the plants, animals and their products they use for the next 24 hours. Give students 30 minutes in class the next day to answer the questions at the end of the activity.

Web Resources

Health Canada

You can get more information about Canada's Food Guide at:

http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/index_e.html

Greater Vancouver Television

The Greater Vancouver Television website has many short videos on sustainability. Visit the site for more videos on the topic of sustainability.

<http://www.gvtv.ca/>.

BC Agriculture in the Classroom Foundation

The BC Agriculture in the Classroom Foundation website has other curriculum modules on food, nutrition and sustainable agriculture that students and teacher can use to supplement this module.

<http://www.aitc.ca/bc/>

Presentation Suggestions

1. Hand out the student activity sheets.
2. Have students list the plant, animal, plant product and animal products that they have already used that day. Clarify any questions students have about completing the list.
3. Have students continue to list the agricultural products they use for the next 24 hours. Remind them that it will include both the plants and animals they eat, as well as the plant and animal products they use.
4. The next day, have students answer the questions on the worksheet.
5. If time permits, have students compare the food they eat with Canada's Food Guide. They can do this by placing each food they eat into its proper food group then comparing their diet with Canada's Food Guide. The Food Guide recommendations are linked to both the age and sex of the individual.

Recommended Number of Food Group Servings per Day

Food Groups	Teens 14 - 18 (Male)	Teens 14 - 18 (Female)
Vegetables and Fruit	8	7
Grain Products	7	6
Milk and Alternatives	3 – 4	3 – 4
Meat and Alternatives	3	2

Meeting Individual Needs

To help students recognize how foods fit in each category, have them collect pictures from magazines or draw them. Each picture should give the name of the food, the food group it is part of and the size of one serving. This will also help the visual learner.

Extension or Enrichment Suggestions

1. Have students keep track of how much their family spends per week on food. If time permits, have students track this for several weeks and find the average amount spent per week. Have students calculate the amount of money their family would spend in a year for food if they continue spending at this same rate. How much money would the entire class spend on food in a year? How important is food and agriculture to British Columbia from an economic point of view?
2. Have students collect their family food purchases for a week, listing the food and amount of each item they purchase. Next, multiply that amount by 52 to see how much food their family eats in a year. Are your students close to the Canadian average? According to statistics, an average Canadian consumes these amounts of food every year:
 - 63.9 kg of flour and cereal products
 - 13.6 kg of poultry
 - 63.2 L of milk
 - 13 dozen eggs
 - 4.3 L of yogurt
 - 8.8 kg of cheese
 - 7 kg of butter or margarine
 - 90 L of coffee
 - 77 kg of vegetables
 - 133.8 kg of fruit
 - 25 L of juice
 - 6.9 kg of fish
 - 27 kg of red meat
 - 5.7 kg of rice
 - 75 kg of potatoes
 - 6.4 L of ice cream

Assessment

Completion of the activity is important. Have students put the completed activity into their portfolio. They can review their diet at the end of the unit and see if they would like to make or have made changes since they started the unit.

Suggested Answers to Questions on Student Sheets

Student answers will vary.

Student Activity Sheet 1.1

Name: _____

Date: _____

Agriculture in Our Daily Lives

Although we don't think about it, we use plants, animals, and the products that come from them every day. The food we eat, the homes we live in, and the products we use come from plants and animals. In this activity you will investigate the ways we use plants, animals and the products that come from them.

Materials

- Agriculture in Our Daily Lives Worksheet
- Pencil or pen

Procedure

1. List all the plant, animal and plant or animal products that you use in a 24-hour period.
2. When the list is complete, sort the items by making a check in the appropriate box as to whether the item is a plant, an animal, a plant product or an animal product.
3. Next to the check, list what the plant or animal is, or where the plant or animal product comes from. Several examples are given below:

Item	Plant	Animal	Plant Product	Animal Product
Toast			X Wheat	
Lettuce	X			
Shirt			X Cotton	
Hot Dog		X Meat	X Bun (wheat)	
Belt				X Leather from a Cow

Agriculture in Our Daily Lives Questions:

1. Besides food, what other uses do you have for plants and animals?
2. How many different items did you list? Were there any items that surprised you? If so, which ones.
3. If there were no animals, how would your diet be different? How would your life be different? What would your diet be like if you were a vegetarian (a diet that excludes meat, fish and poultry) or a vegan (excludes the use of animals for food, clothing or any other purposes)?
4. What is a human need? How many of the items in your list would you classify as a human need?
5. What is a human want? How many of the items in your list would you classify as a human want?
6. Compare your list of human needs and wants with another student in the class. How are your lists the same? How are your lists different?

Extension

7. If time permits, place each food you eat into the food groups where it belongs. Compare your diet with Canada's Food Guide.

Recommended Number of Food Group Servings per Day

Food Groups	Teens 14 - 18 (Male)	Teens 14 - 18 (Female)
Vegetables and Fruit	8	7
Grain Products	7	6
Milk and Alternatives	3 – 4	3 – 4
Meat and Alternatives	3	2

Does your daily diet demonstrate nutritious, healthy eating?

8. Where does your local grocery store get the food that your family eats? Are any plant or animal products grown, raised or produced in your local community?

Agri-facts: Did you know that 97% of the farms in BC are family owned? In 1951, there were 26,406 farms in British Columbia. In 2006, that number had dropped to 19,844. Currently, only 1 in 46 Canadians now lives on a farm.

Activity 1.2 – Now and Then, Here or There

Overview/Purpose – to allow students to investigate where some common foods are grown or raised and to begin to recognize the distance that food travels. They will also investigate the changes in food that have happened over the past several generations.

PLO connections

Sustainable Resources 11 - Sustainable Agriculture

A1 analyse the environmental, social, and economic significance of agriculture at the local, provincial, and global levels

Social Studies

Grade 10 – Environment: Canada from 1815 to 1914

E3 evaluate attitude and practices in resource development in British Columbia from 1815 to 1914 and their impact on contemporary resource management.

Lesson Objectives – By the end of the lesson, students should be able to identify several agricultural products that are grown in British Columbia and recognize current food products that their parents and grandparents may not have eaten.

Materials and Resources

BLM – Activity 1.2 – Here and There, Now and Then Student Sheet
Computer with access to the Internet
Feeding Frenzy, DVD segment

Background Information

Student Misconceptions

Students will come to class with a variety of backgrounds that may help or inhibit their learning in this module. There has been a general disconnect in today's society. We fail to see the connection between the foods we eat and where they come from. Many students may have never visited a farm or understand how food gets from the field to their fork. Recognize this disconnect and work to build a better idea of where our food and agricultural products come from.

Teacher Notes

Agriculture is a general term that refers to the production of food, fiber and other goods through farming and forestry. Agriculture in Canada today ranges from organic herb farms on Vancouver Island to wheat fields on the prairies. There is such a variety in what is grown or raised and how it is grown or raised that there is no such thing as a typical farm.

Broadly speaking, there are four main areas of agricultural activity:

- Livestock and Poultry – farm animals
- Forage – plants grown to feed livestock and poultry
- Grain – cereal grasses such as wheat or oats
- Special Crops – anything else that is planted, such as flowers, fruits, or vegetables

Each of these agricultural activities produces a variety of products for consumers to buy. Each of these products is called a commodity. For example, raising livestock produces commodities such as milk, wool, and beef.

Time – allow students 60 minutes to research the agricultural products and complete the chart. The extension question, which the students discuss with their parents and/or grandparents, can be done as homework.

Web Resources

InfoBasket – This site is a link to agri-food information in British Columbia

<http://www.infobasket.gov.bc.ca>

BC Ministry of Agriculture, Food and Fisheries: This ministry is committed to providing support for a competitive and profitable industry providing safe, high quality food for consumers and export markets. Includes links to stats on agriculture, aquaculture and Food in BC.

<http://www.agf.gov.bc.ca/>

Agriculture and Agri-Food Canada – This site has a variety to information on agriculture in Canada.

<http://www.agr.gc.ca>

Presentation Suggestions

1. Since this activity is best done with student Internet access, make sure that you sign up for the computer room or the traveling computer cart. If you don't have computers with Internet access, copy pages from the Web Resources page that will help students complete the chart and answer the questions.
2. Bring several food items to class. Ask the class if they know where they are grown or raised. Use a mix of items. For example, you might be able to have fresh produce from a local farm, produce from the USA, Mexico, or South America, canned food from several other countries.
3. After students have tried to figure out where each came from, tell students where each came from. Tell students that research has shown that every food item on the plate of the average North American has traveled about 1500 miles (2400 km) to move from the farm where it was grown or raised to get to your plate.
4. Show the Feeding Frenzy, DVD segment. Have students compare the differences between a farm in three fifty year time periods - 1908, 1958, and 2008. How are the ways that we get food different than First Nations people?

Meeting Individual Needs

Make sure that all students know each of the agricultural or food products on the list. You can discuss each of them and give examples.

Extension or Enrichment Suggestions

Invite a grandparent or senior citizen to talk to the class about the foods they ate when they lived in British Columbia or another Canadian province. This could include an elder from a local First Nations community. How were their experiences different than what the students see today?

Assessment

Students may not be able to get all the information they need to complete the chart. Assessment should be on effort and their ability to understand the questions at the end of the activity.

Suggested Answers to Questions on Student Sheets

1. Which agricultural products only come from countries other than Canada? (Student answers will vary. Rice, spices, sugar, chocolate (cocoa), coffee and tea are all agricultural products that come mainly from other countries.)
2. Which agricultural products only come from other provinces than British Columbia? (Student answers will vary. Besides the things listed in question 1, most of the other products also come from British Columbia. Some provinces are known for their agricultural products, such as Alberta beef, Saskatchewan grain, or Prince Edward Island potatoes and lobster.)
3. Which agricultural products come within 160 km of where you live? (Student answers will vary, depending on where they live.)
4. Why do you think we import agricultural products from other countries? What are the benefits for both them and us? (We import some agricultural products because they can't be grown or raised in Canada – e.g. cocoa, bananas, etc. We also import agricultural products because they can be raised or grown more cheaply in some countries – e.g. China and Mexico. It benefits us because we can get cheaper food and things that are out of season. It benefits the other countries farmers because they can sell products that might not be bought at home.)
5. What do you think might be a problem with buying food products that are raised or grown outside of British Columbia? (There is an energy cost associated with the transportation of food from one country to another. There may also be problems with food quality, food regulations, labour practices, etc. in foreign countries.)
6. If you could only eat agricultural products that were raised in British Columbia, what food would you miss the most? Why? (Student answers will vary.)
7. Ask your parents or your grandparents what agricultural and food products that they now eat that they didn't eat when they were your age. Were there differences in what they ate in different seasons? (Responses will vary. Many older people may speak of fewer food choices when they were young. This was especially true in the winter, when root crops and canned vegetables were the only things they could get. There has also been an increase in food from other cultures.)

Student Activity Sheet 1.2

Name: _____

Date: _____

Now and Then, Here and There

The list below includes many food and agricultural products. Place a mark in the appropriate column if the food or agricultural product is grown or processed within 160 km of your community, elsewhere in BC, in another province in Canada or somewhere else in the world. Some of the products may be raised, grown or processed in several places.

You will need to research where these foods come from using the Internet. The following websites are a good place to start for information on agricultural products in British Columbia and Canada.

BC Agriculture in the Classroom Foundation – www.aitc.ca/bc/bcs_agriculture

InfoBasket – This site is a link to agri-food information in British Columbia www.infobasket.gov.bc.ca

BC Ministry of Agriculture, Food and Fisheries: This ministry is committed to providing support for a competitive and profitable industry providing safe, high quality food for consumers and export markets. Includes links to stats on agriculture, aquaculture and Food in BC. www.agf.gov.bc.ca/

Agriculture and Agri-Food Canada – This site has a variety to information on agriculture in Canada. www.agr.gc.ca

Here and There, Now and Then Questions

1. Which agricultural products only come from countries other than Canada?
2. Which agricultural products only come from other provinces than British Columbia?
3. Which agricultural products come within 160 km of where you live?
4. Why do you think we import agricultural products from other countries? What are the benefits for both them and us?
5. What do you think might be a problem with buying food products that are raised or grown outside of British Columbia?
6. If you could only eat agricultural products that were raised in British Columbia, what food would you miss the most? Why?

Extension

7. Ask your parents or your grandparents what agricultural and food products that they now eat that they didn't eat when they were your age. Were there differences in what they ate in different seasons (eg. – winter or summer differences)?

Data Collection Sheet

Food or Agricultural Product	Within 160 km of your community	Elsewhere in BC	Another province in Canada	Somewhere else in the World
Wheat (flour and bread)				
Cheese, butter and margarine				
Cows and beef products				
Sheep and Goats				
Milk and milk products				
Root vegetables (carrots/potatoes)				
Leafy vegetables (lettuce, spinach)				
Apples				
Berries (blueberries, strawberries, etc.)				
Greenhouse Vegetables (tomatoes, peppers, cucumbers)				
Poultry (chicken, duck, turkey)				
Fish and shellfish				
Eggs				
Rice				
Coffee/Tea				
Chocolate				
Mushrooms				
Cooking oil				
Sugar				
Salt/Spices				
Pigs and pork products				

Activity 1.3 – Agriculture in British Columbia

Overview/Purpose - to allow students to explore the history of British Columbia and examine the role that farming played in its growth, especially the Lower Mainland region of the province.

PLO connections

Sustainable Resources 11 - Sustainable Agriculture

A1 analyse the environmental, social, and economic significance of agriculture at the local, provincial, and global levels

Social Studies

Grade 10 – Environment: Canada from 1815 to 1914

E3 evaluate attitude and practices in resource development in British Columbia from 1815 to 1914 and their impact on contemporary resource management.

Lesson Objectives – by the end of the lesson students will recognize the role that agriculture played in the exploration and development of British Columbia.

Materials and Resources

BLM – Activity 1.3 – Agriculture in British Columbia Student Sheet

Pencil or pen

History of Agriculture DVD segment. If you don't have a copy of the DVD, you can also type "History of Agriculture in the Search Stories and Videos section on the GVTV web site at <http://www.gvtv.ca/>.

Background Information

Student Misconceptions

There has recently been a disconnection between the food we eat and where it comes from. Many students have only a vague idea about agriculture, farms and farming. They may also not realize the importance that farming played in the early days of our province, as well as the role it plays today.

Teacher Notes

It's been said that the economy of early British Columbia was built on the 4 "F's" – fur, forestry, farming and fishing. Shortly after Captain Vancouver sailed into the Georgia Straits, the Hudson's Bay Company established Fort Langley in 1827 to support the fur trade. They also cleared land and created a farm that stretched for thousands of acres. This farm initially provided food for just the people living at the Fort to make it self-sufficient. Eventually the farm grew so many vegetables, they began selling their products to others. It quickly reached the point where agricultural products were traded more often than fur trade products. Local farming continues to be a major source of food for British Columbia, as well as for exports around the world.

An increasing population in British Columbia, especially the Lower Mainland, has caused a growth in cit-

ies and a shift of housing into areas previously only used for agriculture. This change has created a discussion around competing land interests. How can our land best be used and what role does agriculture play?

Since 1973 agricultural land in British Columbia has been protected by the Agricultural Land Commission Act. This act recognizes agricultural land as a “scarce and important resource.” The Agricultural Land Reserve (ALR) covers approximately 4.7 million hectares and includes both private and public lands that may be farmed, forested, or vacant land. These BC lands have the potential for agricultural production. Some ALR blocks of land cover thousands of hectares while others are relatively small parcels of only a few hectares (1 hectare = 2.47 acres). Less than 5% of BC is considered suitable for agriculture.

Time – 60 minutes

Web Resources

Google Search words and phrases – you can use a Google or Yahoo search using “agriculture”, “farming history” or “BC agricultural land reserve” to find more information on these topics.

Presentation Suggestions

1. Ask students if they have even visited a farm. Invite them to tell of their experiences. What was grown there? Do any students have a relative who is a farmer or who works on a farm?
2. You can use the History of Agriculture video as either an introduction or a review of the activities students do. It is important because it introduces the concept of the Agricultural Land Reserve (ALR). A video viewing student worksheet can be found in the Appendix.

Meeting Individual Needs

1. The video will cover some of the information that students are to read. By showing it you will help visual learners.
2. Since this activity involves reading for understanding, you may wish to use an advance organizer to help students whose reading ability may not be strong. In an advance organizer, students are given a form to fill out as they read each paragraph. For each paragraph, students write down the time they started to read it, the main idea the paragraph is about and a few facts they found interesting in their reading. This allows students to read and comprehend in small intervals. They can use the information they collect to answer the questions in the Check for Understanding section. A sample is given below.

Advance Organizer for Agriculture in British Columbia

	Main Idea	Time	Interesting facts
First paragraph			
Second paragraph			
Third paragraph			
Fourth paragraph			
Fifth paragraph			
Sixth paragraph			
Seventh paragraph			
Eighth paragraph			

Extension or Enrichment Suggestions

1. Have students research the Agricultural Land Reserve. Are there decisions that the ALR is making in their own community? What are the issues?
2. Have students research some of the other “F’s” that were important in British Columbia. Which ones are still important? Are they capable of being sustainable?

Assessment

You can use the Check for Understanding questions as a representation of student learning and it can become part of their portfolio. In addition, you could have a class discussion about the role of the Agricultural Land Reserve today (Extension Question). One way to collect student ideas about the ALR is through a two-color cluster. Write ALR on the front board with a + above it and a – below it. Have students offer the positive (+) and negative (-) issues that arise from the discussion. Write each with a different colored marker.

Suggested Answers to Questions on Student Sheets

Check for Understanding

1. What are the 4 “F’s” and how did they help in the growth of early British Columbia? (The 4 “F’s” are furs, farming, forests and fishing. They are the industries that brought people to British Columbia and fueled our province’s development.)
2. Where was the first Hudson’s Bay Company fort? What did it do? (The first Hudson’s Bay Company was at Fort Langley in the Lower Mainland. It initially was used to support the fur industry, but later started farming and was a jumping off place for the gold rush in 1857.)
3. How was more farmland created in the Fraser Valley? (More farmland was created by draining Sumas Lake in the 1920’s.)
4. What happened to farming after World War II? (Farming became more mechanized, with more machinery, fertilizers, etc. It also became less sustainable.)
5. What is threatening farmland today? What helps protect it? (One threat to farming is the need for more land for houses. As the number of people increase, there is pressure to put new houses on land that was previously used for farming.)
6. What is sustainability? How is agriculture a part of it? (Sustainable living might best be defined as a lifestyle that could be sustained for many generations without exhausting any natural resources. Sustainable agriculture refers to the ability of a farm to produce agricultural products forever without needing a lot from the outside world. It must be a part of any discussion about sustainable living.)

Extension

Do you think farmland needs to be protected? Is the Agricultural Land Reserve still important today? Explain your thinking. (Student answers will vary. Hopefully, they will recognize that the Agricultural Land Reserve plays an important part of our lives today and is still necessary.)

Student Activity Sheet 1.3

Name: _____

Date: _____

Agriculture in British Columbia

Humans have lived in southwestern British Columbia for over 10,000 years. For most of that time, First Nations people fished, hunted and gathered other food in the region. BC's location on the west coast of North America kept from being explored by early European explorers. Eventually they came and found a land rich with fish, forests and fertile soil. It's been said that the economy of early British Columbia was built on the 4 "F's" – fur, forestry, farming and fishing.

The Hudson's Bay Company established Fort Langley in 1827 to support the fur trade. They also cleared the forest to create a farm that stretched for thousands of acres. This farm initially provided food for the people living at the Fort, making it self-sufficient. Eventually the Fort began selling agricultural products to others. It quickly reached the point where agricultural products were traded more often than fur trade products. Farming was an important industry that helped open BC.

In 1857, gold was discovered in the sand bars of the Fraser River and life in the Lower Mainland changed as gold miners came from around the world. Most of the miners traveled further up the Fraser Canyon to the source of the gold, but many others settled the Lower Mainland and began farming. They primarily settled close to the Fraser River, because it was the primary means of transportation. These first farms were sustainable. Sustainable agriculture refers to the ability of a farm to produce agricultural products forever without needing much from the outside world. Sustainable agriculture also refers to the ability of a farm to produce food indefinitely, without causing severe or irreversible damage to ecosystem health. It integrates three main goals: environmental stewardship, farm profitability and prosperous farming communities.

Similarly, the abundance of salmon brought many people to BC. It's understandable that commercial fishing for salmon began shortly after the arrival of Europeans on the West Coast. The Hudson's Bay Company shipped salted salmon from Fort Langley to the Hawaiian Islands starting in 1835, and the first salmon cannery opened in 1876. When the Canadian Pacific Railway was completed in 1887 it was possible to more easily ship fresh, frozen and canned Salmon to markets in eastern Canada and the United States. By the start of the 20th century (1900 AD), 70 canneries were in operation. Since then, salmon fishing has remained an important part of the BC economy and for many communities a way of life.

Farming wasn't always easy. Lower Mainland farmers struggled with floods from the Fraser River. In addition, this area was forested and farmers had massive trees to clear before they could plant their crops. Sumas Lake (33,000 acres between Chilliwack and Abbotsford) was drained in the 1920s to control flooding and create more farmland. To encourage farmers to settle the area B.C. Electric Rail opened, linking Fraser Valley farmers with markets as far away as New Westminster and Vancouver. Farming was seen as a necessary component in the development of the province.

After World War II, the mechanization of agriculture began to grow. Tractors and fertilizers allowed more food to be grown on the same size land. In addition, freezing, canning and other food processes allowed local agricultural products to travel to further markets. Mechanization and fertilizers made farms less sustainable. These new farms needed machinery, fertilizers and other products to raise the food, as well as distant markets to sell their food in order to make a living.

Today urbanization has started to encroach on farms as more people move to the cities. Better roads allow people to live further away from their jobs in the city and the value of farmland increased. Farmland was sold for housing. In 1972, the Agricultural Land Reserve (ALR) was established to protect farmland. Farmland is still threatened by urbanization but changes in intensive production technologies allow the Lower Mainland to ship food all over the world.

Agriculture is part of any discussion of sustainable living. Sustainable living might best be defined as a lifestyle that could be sustained for many generations without exhausting any natural resources. Sustainability is a goal or guide, and we can make lifestyle tradeoffs favoring sustainability where practical. Most often these tradeoffs involve transportation, housing, energy, and diet.

Agriculture in British Columbia Questions

1. What are the 4 "F's" and how did they help in the growth of early British Columbia?
2. Where was the first Hudson's Bay Company fort? What did it do?
3. How was more farmland created in the Fraser Valley?
4. What happened to farming after World War II?
5. What is threatening farmland today? What helps protect it?
6. What is sustainability? How is agriculture a part of it?

Extension

Do you think farmland needs to be protected? Is the Agricultural Land Reserve still important today? Explain your thinking.

Agri-facts: Did you know that it takes the hides of 3000 cows to make all the footballs that the NFL uses in just one season?

Concept 2

Agriculture has many components. Some of these components play a major role in enhancing food and agricultural product production.

Facts:

- There are many steps involved in bringing food and agricultural products from field to fork, from plough to plate.
- The way these steps are taken can have an effect on social, environmental and economic factors in society.
- The jobs in the agricultural industry are diverse and changing.

Attitudes:

- The agricultural industry requires hard work and creativity to stay competitive in Canadian and world markets.

Activity 2.1 – Grow it or Raise it

Overview/Purpose - to allow students to investigate the issues in agriculture and to begin to examine the views that various stakeholders have on these issues.

PLO's connections

Sustainable Resources 11 - Sustainable Agriculture

A2 outline components of agricultural systems and ways of enhancing agriculture production

Home Economics: Foods and Nutrition 8 to 12

Grade 10

Social, Economic and Cultural Influences

D2 identify factors that affect food production and supply, especially in Canada today.

Grade 11

Social, Economic and Cultural Influences

D2 demonstrate an awareness of environmental and health issues related to the production and consumption of food.

Grade 12 –

Social, Economic and Cultural Influences

D2 analyse global and environmental health issues related to the production and consumption of food.

Lesson Objectives – by the end of the lesson students will recognize some of the changes that have occurred in farming and the production of food for our consumption over the past 200 years.

Materials and Resources

BLM – Activity 2.1 – Grow it or Raise it

Field to Fork, Barnston Island, Glen Valley Organic Co-op Farm and Food Democracy DVD segments.

These are part of the DVD compilation available with this module. If you don't have a copy of the DVD, you can also type "Field to Fork", "Barnston Island", "Glen Valley Organic Co-op Farm" and "Food Democracy" in the Search Stories and Videos section on the GVTV web site at <http://www.gvtv.ca/>.

Background Information

Student Misconceptions

Students may not be aware of the techniques that are used to bring food to their local grocery stores and eventually to their tables. There may some vocal students who will begin to discuss cruelty to animals and environmental issues that arise with intensive agriculture.

Students may have forgotten how to make a histogram. You may want to review the process before you start because students will make a histogram as part of the activity.

Teacher Notes

Although plants and animals are important, agricultural land is disappearing all over the world because of many factors, such as soil erosion, the spread of cities, and pollution. In British Columbia, only 5% of the total land is suitable for various agricultural practices. The remaining 95% is mostly mountainous, rocky or forested.

Population and economic pressures have caused farming, ranching, and fishing practices to change over the years. Limited space and an increased need for low-cost food have caused more intensive agricultural techniques, such as factory farms, confinement rearing and salmon farms to be introduced and expanded. These techniques have both benefits and risks. Society will decide which techniques they agree with.

Time – 60 minutes

Web Resources

Google Search words and phrases – you can use a Google or Yahoo search using “agricultural practices”, “factory farms”, “confinement rearing” or “fish farms” to find more information on these topics.

Presentation Suggestions

1. Writing-to-Learn strategies allow students to assemble information by taking notes about subject matter. Before students begin the reading, have them draw a line down the center of a piece of paper. Label the left column “Benefits of the New Agricultural Practices” and the right column “Risks of the New Agricultural Practices.” As they read this section, have them write notes about the information in the appropriate column. They can use these notes to answer the Check for Understanding questions, as well as later in the Application and Review section.
2. Use the Field to Fork, Barnston Island, Glen Valley Organic Co-op Farm and Food Democracy DVDs as a springboard for discussion about the link between farmers and the people who eat their food. How does the food get from the field to the markets for people to purchase and later eat? A video viewing student worksheet can be found in the Appendix.

Meeting Individual Needs

The writing strategy included in the Presentation Suggestions is especially beneficial for students who struggle with reading. It organizes their thoughts and allows them to read for understanding and collect information they can use later in the lesson and in the unit.

Extension or Enrichment Suggestions

The extension activity has students assess these new agricultural practices for their sustainability. Any of them can be researched in more depth. The letter to the editor can let students take one side of the issue or the other.

Assessment

If students do the letter to the editor suggestion in the extension, look for depth of understanding in their presentation. A simple rubric is shown below:

Letter to the Editor

Assessment Rubric

Aspect	Not Yet Within Expectations	Meets Expectations (Minimal Level)	Fully Meet Expectations	Exceeds Expectations
Snapshot	The student is unable to meet basic requirements of the task without close, ongoing assistance. Unable to provide a relevant extension.	The work satisfies most basic requirements, but it is flawed or incomplete. May produce a simple extension.	The work satisfies basic requirements of the task. If asked, the student can produce a relevant extension or further illustration.	The work is complete, accurate, efficient, and insightful. The student may volunteer an alternative procedure, an extension, or an application.
Outcome/ Objective	Student is unable to decide on a topic or to write a five-sentence paragraph on either side of the issue.	Student decides on the topic and their point of view and can write a five-sentence paragraph with a main idea, three supporting sentences and a concluding sentence.	Student decides on the topic and their point of view and can write two paragraphs defending their point of view.	Student decides on the topic and their point of view and can write at least five paragraphs that use multiple sources to defend their point of view.

Suggested Answers to Questions on Student Sheets

Check for Understanding

1. What are the four main areas of agricultural activity? List them and give an example of something in each. (Livestock and poultry – e.g., beef cattle and chickens; Forage – e.g., hay and clover; Grains – e.g., wheat and oats; Special Crops – e.g., blueberries and flowers)
2. Make a histogram graph of the agricultural products that are produced in the Lower Mainland and the % of BC they total. Which agricultural products show the largest percentage of BC's production? (The histogram will show that cranberries and greenhouse vegetables are two agricultural products that the lower mainland produces in large percentages.)
3. Why have agricultural practices changed over the years? (Student answers will vary. The two most important reasons are an increase in population and changes in the economy – the practices allow farmers to produce more food for less money.)

4. What agricultural practices have increased the amount of food that farmers, ranchers, and fishers can produce? (Student answers will vary. The major practices for farmers are genetic manipulation of seeds, fertilizer use, increased machinery and hydroponic greenhouses; for ranchers are selective breeding, confinement rearing and feed changes; and for fishers are fish farms.)
5. What are the positive effects of the new agricultural practices? (Student answers will vary. They could include an increase in the amount of food that is produced and an increase in the amount of money a farmer, rancher or fisher can make.)
6. What are the negative effects of the new agricultural practices? (Student answers will vary. They could include environmental issues, genetic issues related to monocultures or aesthetic issues, like smell near confined rearing locations.)
7. What alternatives could be used to replace the new agricultural practices? (Student answers will vary. They could include things like organic farming, free range chicken, or wild salmon.)

Extensions

1. How are the new agricultural practices sustainable? How are they not sustainable? (Student answers will vary.)
2. Write an editorial for the local newspaper either for or against one of the new agricultural practices. (Students points of view will vary. Look for openness to both points of view when students are researching their issue.)

Student Activity Sheet 2.1

Name: _____

Date: _____

Grow it or Raise it

Agriculture in British Columbia today ranges from organic herb farms on Vancouver Island to wheat fields in the interior. There is such a variety in what is grown or raised and how it is grown or raised that there is no such thing as a typical farm.

Broadly speaking, there are four main areas of agricultural activity:

- Livestock and poultry – farm animals (dairy cattle, beef cattle, swine, sheep, poultry and horses). They may be raised for meat (such as cattle or turkeys), something they produce (such as milk, eggs or wool), as pets (such as horses) or for breeding stock to sell to other livestock and poultry producers.
- Forage – plants grown to feed livestock and poultry (such as grass and clover); they may be grown to be eaten by animals on pasture or may be harvested and processed into commodities such as hay or animal-feed pellets.
- Grain – cereal grasses such as wheat and oats; the most common grains in Canada are wheat, barley, oats and rye and they are either made into products (such as flour) for human consumption, or as feed for farm animals; oilseeds are a category of plants grown primarily for the oil from their seeds (such as soybeans, Canola, flaxseeds and sunflowers).
- Special crops – anything else that is planted, such as flowers, fruits, berries, or vegetables; they can either be grown in the an open field or in a greenhouse.

Agriculture is an important part of the whole province of British Columbia. But the Lower Mainland plays a significant role. According to the 2001 Census of Agriculture, farms in southwestern BC represent just over 1.5% of the total farmed area in British Columbia. However the region is incredibly productive, accounting for approximately:

- 17 % of the total number of farms;
- 21 % of total farm capital value;
- 30% of total farm income; and
- 61% of all greenhouse space

These farms raise a variety of agricultural products as shown in the chart below:

Lower Mainland Agricultural Specialties, as Share of BC Production

Commodity	Share of BC Production (%)
Field vegetables	44
Greenhouse vegetables	68
Greenhouse flowers	57
Mushrooms	58
Berries (excluding cranberries)	36
Cranberries	92

Commodity	Share of BC Production (%)
Grapes	4
Nursery (young plants)	29
Dairy	13
Livestock	4
Poultry and eggs	26

Source: Stats Can 2001

These products help farmers meet the demand for food in BC and around the world. Demand for food has increased due to an increasing population and a decrease in available farmland. There are many practices that farmers, ranchers and fishermen do to increase their products. Each practice produces more food and yet creates other challenges.

Changing Farm Practices

In order to grow more cereal and pulse grains, farmers have changed their farming practices. They need to grow more food per acre of land. To do this, they use genetic manipulation to produce seeds for plants that grow faster, produce more nutritious seeds and fruits, and are more resistant to drought, insects and disease. Farmers use more fertilizer to supply and replace missing soil nutrients and to increase crop yields. They also use large machines to increase the amount of food that can be produced by each worker. Another method to grow plants (i.e. – tomatoes, peppers, cucumbers) is hydroponics, a gardening method in which plants are grown in a greenhouse without soil. Plants are instead grown in a chemical nutrient solution.

These farming practices have risks, which concern many people. Excess fertilizer can run off into streams, fewer people are employed in the farm industry, and some question the use of genetically modified seeds.

Changing Ranch Practices

Demand for more protein has also changed the way ranchers raise pigs, chickens, and cattle. Factory farming, or confinement rearing, is a method of raising large numbers of animals in a relatively small area under conditions that ensure rapid growth. Confinement rearing includes bringing food to the animals. This is often through computerization and automation, rather than having them forage in a field. The use of selective breeding also ensures that animals will grow faster and produce more meat protein. Diseases are controlled through the use of medicines and vaccines. In general, factory farming using confinement methods produces meat, milk, or eggs in less time and at lower costs than is possible with conventional animal raising practices. Examples of factory farming are chicken houses that hold thousands of chickens, or farms that house large numbers cows or pigs in confined pens, and cattle feedlots.

Changing Fish Practices

Initially, fish were caught in their native environment with hooks, spears and nets. Using these methods, fishing boats were able to catch a steady supply of fish for decades. However, over fishing, habitat destruction, manmade obstructions (i.e. - dams, canals), and pollution have greatly decreased the number of fish caught each year.

This decrease in fish has led to an increase in the amount of aquatic products, especially salmon, that are raised using aquaculture techniques. Similar to other intensive farming techniques, salmon farms

raise large numbers of fish in a confined space. Salmon farms monitor and control diet, dissolved oxygen, and growth rates to maximize fish protein for processing.

Grow it or Raise it Questions

1. What are the four main areas of agricultural activity? List them and give an example of something in each.
2. Make a histogram graph of the agricultural products that are produced in the Lower Mainland and the % of BC they total. Which agricultural products show the largest percentage of BC's production?
3. Why have agricultural practices changed over the years?
4. What agricultural practices have increased the amount of food that farmers, ranchers, and fishers can produce?
5. What are the positive effects of the new agricultural practices?
6. What are the negative effects of the new agricultural practices?
7. What alternatives could be used to replace the new agricultural practices?

Extensions

1. How are the new agricultural practices sustainable? How are they not sustainable?
2. Write an editorial for the local newspaper either for or against one of the new agricultural practices.

Activity 2.2 – Move it, Sort it and Process it

Overview/Purpose – this activity uses a DVD to allow students to look at the steps in getting food and agricultural products to market.

PLO's connections

Sustainable Resources 11 - Sustainable Agriculture

A2 outline components of agricultural systems and ways of enhancing agriculture production

Home Economics: Foods and Nutrition 8 to 12

Grade 10

Social, Economic and Cultural Influences

D2 identify factors that affect food production and supply, especially in Canada today.

Grade 11

Social, Economic and Cultural Influences

D2 demonstrate an awareness of environmental and health issues related to the production and consumption of food.

Grade 12 –

Social, Economic and Cultural Influences

D2 analyse global and environmental health issues related to the production and consumption of food.

Lesson Objectives – by the end of this activity, students should be able to identify the main steps that get food from the farmer to the dinner table.

Materials and Resources

BLM – Activity 2.2 – Move it, Sort it and Process it

Put Your Money Where Your Mouth Is video on the DVD compilation

Television and DVD player or other broadcast system

Background Information

Student Misconceptions

Students may not realize the number of steps that food can go through on the journey from the farmer's field to the market where it is purchased for dinner.

Teacher Notes

This activity is a short introduction to the many steps involved in getting from the farmer's fields to our family table. The focus is on steps of production, distribution and marketing. The next activity will include industries that are needed to support these three areas.

Production is the act of making products. In agriculture, there are several resources that are needed to produce the food we will eventually eat. What is needed will depend on the agricultural product that is grown or raised and how that is done. For example, in traditional farms, plants and animals need the basics of life – water, soil, air and sunlight for plants and food and water for animals. People are also needed to ensure that the products are taken care of while they grow and when it is time to take them to market. The changing agricultural practices may add to these needs. There may be more housing, specialized fertilizers and pesticides, vitamins and vaccinations.

Distribution is how food gets from farms to markets. There are three main components of food distribution: transportation infrastructure (such as roads, vehicles, rail transport, airports and ports); food handling technology and regulation (such as refrigeration, food processing and storage); and logistics (supplies information on need and demand). There are many ways that food is distributed. Food may be purchased by consumers directly from the farmer at a farmer's market. The method requires a lot of the farmer's time. This is an example of direct marketing. Retail distributors can also purchase the products from the farmer and sell them to wholesalers or retailers. These distributors can sell agricultural products locally, throughout British Columbia and Canada, or elsewhere in the world. Transportation plays a major part in distribution.

Marketing is the way that food is sold. Marketing practices include advertising, distribution, and selling. It tries to anticipate consumer needs and wants or will try to influence them through advertising and product placement. Free trade agreements, tariffs on imported goods and quotas are ways that governments try to regulate the market.

Time – 60 minutes to view video and answer questions

Web Resources

Google or Yahoo Search Words – you can use a Google or Yahoo search using “food distribution” or “food marketing” to find more information on these topics.

Presentation Suggestions

1. Bring in a picture of a chocolate cake. Tell students that you want to make a chocolate cake and need their help. Ask students what is needed to make a chocolate cake and listen to their ideas. They may have different experiences in cooking.
2. Hand out BLM – Activity 2.2 – Move it, Sort it and Process it Student Sheet and have students read the first part – How to Grow a Chocolate Cake. Ask students which way they would choose. Which of the steps in Method 2 surprised them the most?
3. Show the video Put Your Money Where Your Mouth Is. Have students fill out the chart on the student sheet while the video is playing. After showing the video, have students share what they have written in their chart and ensure that everyone has the information.
4. Give students the remainder of the class to complete the extension question.

Meeting Individual Needs

Visual learners may want to draw a picture on the extension question.

Extension or Enrichment Suggestions

Have students look at the ingredients on another food product, such as potato chips or soup, and have them try to create a diagram of how the product was made. They should include each ingredient if possible.

Assessment

Have students place their student sheet in their portfolio. It will reflect the start of their understanding of how an agricultural product gets from a farmer's field to a family dinner table.

Suggested Answers to Questions on Student Sheets

1. Why is food a political, social and economic issue? (Student answers will vary. They may include the idea that food involves political consideration that support farms and farmers, that farmers are a part of the community and our Canadian society and that the food farmers grow and raise and the money they make are an important part of the Canadian economy.)
2. Complete the table below.

Agricultural Steps from Field to Fork	What is it?	Examples	Why it's important
Production	How food is grown.	It can be done in traditional ways with water, soil and air or in greenhouses.	Food is one of the things we all need to survive. Farmers need to sell the food in order to keep their farms operating.
Distribution	How food gets to the market.	It can be done by direct marketing or through distributors. It can be influenced by Free Trade Agreements or Direct Marketing Boards	It's how food gets from the farms to our table. It is part of a larger industry.
Marketing	How the food is sold.	Marketing is part of the sales pitch. It includes things like product placement and product loyalty.	It is how consumer purchases are influenced.

3. What was one thing you learned from the video that surprised you the most? (Student answers will vary.)
4. What role do Free Trade agreements and marketing boards have on agriculture? (Free trade agreements allow more trade between countries. Marketing boards try to help industries sell their product in BC, in Canada and around the world. Food brokers help with both marketing and distribution.)

Extension

5. Create a diagram that shows the journey of a wheat seed from the time that a farmer buys a bag of seed until it ends up on your table as a slice of bread. Include in your diagram as many of the natural resources and human resources that you can think would be involved in this journey. What you are creating is a diagram of an industry, one called agriculture. (Student diagrams will vary. They should include such things as the planting of the seeds and the various aspects of getting it to grow (water, fertilizers, pesticides, etc.). After the wheat plant is mature and the seed is ready, the wheat is harvested, transported to the mill, ground into flour. The flour then is transported to a bakery where it is mixed with other things and baked to make the bread. The bread is sliced and put in a bag, transported to the local market and purchased. Thus it ultimately finds its way to your dinner table.)

Student Activity Sheet 2.2

Name: _____

Date: _____

Move it, Sort it and Process it

Read the following and see which way you'd make a chocolate cake.

How To Grow a Chocolate Cake

Method 1

1. Plant a chocolate cake seed.

Method 2

1. Plant a field of wheat, harvest grain, ship to flour mill, and grind into flour.
2. Raise chickens and collect eggs.
3. Raise cows and collect milk. Make some of the milk into butter.
4. Plant sugar beets, harvest and process into sugar.
5. Import vanilla beans and cocoa beans from tropical countries. Process into liquid vanilla and chocolate.
6. Mine sodium bicarbonate and mix with acid salts and starch to create baking powder.
7. Combine products of first six steps and bake until done.

Which of these two methods do we use today? Obviously it's Method 2. We may not realize all that goes into making something as common as a chocolate cake.

Now watch the Put Your Money Where Your Mouth Is video and answer the following questions:

1. Why is food a political, social and economic issue?
2. Complete the table below.

Agricultural Steps from Field to Fork	What is it?	Examples	Why it's important
Production			
Distribution			
Marketing			

3. What was one thing you learned from the video that surprised you the most?
4. What role do Free Trade agreements and marketing boards have on agriculture?

Extension

5. Create a diagram that shows the journey of a wheat seed from the time that a farmer buys a bag of seed until it ends up on your table as a slice of bread. Include in your diagram as many of the natural resources and human resources that you can think would be involved in this journey. What you are creating is a diagram of an industry, one called agriculture.

Activity 2.3 – Sell it

Overview/Purpose – this activity will let students investigate how food is sold. It will introduce the role of foreign markets and marketing boards.

PLO's connections

Sustainable Resources 11 - Sustainable Agriculture

A2 outline components of agricultural systems and ways of enhancing agriculture production

Home Economics: Foods and Nutrition 8 to 12

Grade 10

Social, Economic and Cultural Influences

D2 identify factors that affect food production and supply, especially in Canada today.

Grade 11

Social, Economic and Cultural Influences

D2 demonstrate an awareness of environmental and health issues related to the production and consumption of food.

Grade 12 –

Social, Economic and Cultural Influences

D2 analyse global and environmental health issues related to the production and consumption of food.

Lesson Objectives – by the end of the lesson students will have created advertising for an agricultural product.

Materials and Resources

BLM – Activity 2.3 – Sell it Student Sheet

Magazines to cut up for pictures

Felt pens or coloured pencils

Colored paper

Background Information

Student Misconceptions

Students may not realize how marketing affects the choices they make everyday. We are bombarded with advertising messages on television, radio, magazine, the Internet and even bus shelters. This advertising influences the decisions we make with every purchase.

Teacher Notes

Advertising is a form of communication that typically attempts to persuade potential customers to

purchase or consume more of a particular brand, product or service. Many advertisements are designed to get consumers to increase their consumption of the advertised product through the creation and reinforcement of “brand image” and “brand loyalty”. Advertising agencies use every means possible to get the “buy me” message to the consumer.

While advertising can be seen as necessary for economic growth, it may also have social costs. Consumers can be led to consume more of a product than they need or can consume or can purchase products that help the economy of other countries at the expense of their own.

A marketing board is an organization that helps the producers of a specific product try to market their product and increase consumption. They most commonly exist to help sell farm products such as milk, eggs, or beef, and are funded by the farmers of those crops.

The sales of an agricultural product is influenced by a country’s economic policies. Free trade agreements are designed to open foreign markets to our products, while tariffs on imported goods and quotas are designed to protect local farms and markets.

Time – allow 60 minutes for students to complete the activity

Web Resources

Google or Yahoo Search words - you can use a Google or Yahoo search using “food marketing” or “marketing techniques” to find more information on these topics.

Presentation Suggestions

1. Bring in several examples of food advertising. These can include both print and video. Ask students how each advertisement affects them. What do they like about the advertisement? You can have them recall some of the previous activity’s video on marketing. Image and customer loyalty are two things that they should try to achieve.
2. Hand out the student sheets and tell students that they are going to create an advertising campaign for the food or food product of their choice. Students can either work on their advertisements either as an individual or as a pair. They may present their advertisement to the class the next day.
3. Have materials ready for students to use in the creation of their advertisement.

Meeting Individual Needs

1. It will be especially important that students are able to look at several examples of a completed advertisement.
2. If students are going to make a video or perform a skit as their advertisement, have them create a storyboard and script of what they are going to do. The storyboard works in much the same way as a comic strip.

Extension or Enrichment Suggestions

Have students present their advertisement to the class on the next day.

Assessment

This is a good representation of student understanding of these Prescribed Learning Outcomes and could be an integral part of the student portfolio. Use the rubric below to help guide it's assessment. If you choose to have students present their advertisement to the class, you could include a peer evaluation of each advertisement.

Sell it

Assessment Rubric

Aspect	Not Yet Within Expectations (1)	Meets Expectations (2) (Minimal Level)	Fully Meets Expectations (3)	Exceeds Expectations (4)
Snapshot	The student is unable to meet basic requirements of the task without close, ongoing assistance. Unable to provide a relevant extension.	The work satisfies most basic requirements, but it is flawed or incomplete. May produce a simple extension.	The work satisfies basic requirements of the task. If asked, the student can produce a relevant extension or further illustration.	The work is complete, accurate, efficient, and insightful. The student may volunteer an alternative procedure, an extension, or an application.
Outcome/ Objective				
Presentation	Presentation is unattractive and lacks colour. Few visuals are included.	Presentation is mostly attractive and contains some colour. Uses a few visuals.	Presentation is attractive and colourful. Suitable visuals are included.	Presentation is attractive and colourful. Suitable visuals are included. Presentation is original and creative

Aspect	Not Yet Within Expectations (1)	Meets Expectations (2) (Minimal Level)	Fully Meets Expectations (3)	Exceeds Expectations (4)
Content	Presentation includes few facts about the product. Has no closing review.	Presentation includes some facts about the product. Has a weak closure.	Presentation includes many facts about the product. Has a closing review that summarizes why the product is good.	Presentation includes numerous facts about the product. Has a closing review that summarizes why the product is good. Content includes facts that show further research.
Effectiveness	Presentation is ineffective in promoting the product.	Presentation is slightly effective in promoting the product.	Presentation is effective in promoting the product.	Presentation is very effective in promoting the product.

Student Activity Sheet 2.3

Name: _____

Date: _____

Sell it

Congratulations, you have been chosen to market and sell a BC agricultural product. Your job is to create an advertising campaign to tell consumers about the product you have chosen. Use the following guidelines to design and create your own advertisement for your agricultural product. You can create a marketing board that you work for, such as the Eat Best Egg Marketing board. You will produce an original, creative and colourful advertisement for your product that promotes it as part of a healthy, nutritious diet.

You can create any of the following advertising devices:

- Media – a one page advertisement for a newspaper or magazine
- Poster – a large advertisement for use in a bus shelter
- Television – a one minute advertisement for use during the Super Bowl
- Radio – a one minute advertisement for use on a popular radio station
- Infomercial – a two minute commercial that for use on a Sunday morning talk show
- Pop up – an ad that can be used on the Internet or mobile device

Advertising is a form of communication that typically attempts to persuade potential customers to purchase or consume more of a particular brand, product or service. Many advertisements are designed to get consumers to increase their consumption of the advertised product through the creation and reinforcement of “brand image” and “brand loyalty”. Advertising agencies use every means possible to get the “buy me” message to the consumer.

Activity 2.4 – Field of Dreams

Overview/Purpose – to allow students to research current careers and job opportunities related to the agriculture industry and sustainable agriculture.

PLO's Connections

Sustainable Resources 11- Sustainable Agriculture

F1 – research careers and job opportunities in resource industries and related services

Lesson Objectives – by the end of the activity, students will have investigated a job or career of their choice and know the basic requirements for that job or career.

Materials and Resources

BLM – Activity 2.4 – Career Profile Student Sheet

Fields for Your Future Power Point presentation on DVD

Computer with Internet access

Background Information

Student Misconceptions

Students may not realize the range of jobs and careers that are related to agriculture. They can be as diverse as pest control and agricultural research to computers, business management and heavy mechanics. It's also true that the jobs that are emerging from new technologies related to sustainable agriculture may not even exist today.

Teacher Notes

When students think about a job or career in food, nutrition or sustainable agriculture, they may think, "boring" or "not for me." Try to imagine your life without food in it everyday. Food, nutrition and agriculture is something we all should know more about and if we want it to be available in the future, then we should consider whether it's sustainable. In doing this activity, we want students to start to explore a range of job and career opportunities that are available now or will be in the future. The careers students will explore can be involved in the many aspects of food, nutrition and agriculture as it moves from field to fork, from plough to plate. All these careers can be involved in our province's agricultural sustainability.

Time – 30 minutes for the first power point presentation. Parts of several other classes for students to research the job that most interests them.

Web Resources

Human Resources and Social Development Canada (HRSD)

This site links to the National Occupational Classification (NOC) document that gives information on a number of jobs and careers. It gives the main duties for the job, employment requirements, including education, and additional information about the job.

<http://www23.hrdc-drhc.gc.ca>

WorkInfoNet

Makes useful labour market and career information accessible to British Columbians. See "Quicklinks" drop down menu on side for many more links.

<http://workinonet.bc.ca/>

Workfutures BC

Looks at occupational outlooks in British Columbia.

<http://www.workfutures.bc.ca/>

Presentation Suggestions

1. Before starting the activity, have students brainstorm jobs that they think may be linked to food, nutrition and sustainable agriculture. Many on the jobs they think of may be included on the career exploration list in the activity and some they may not have considered. Discuss the jobs and careers that are included in the activity sheet. Note to students that if they have a job or career involved in the agricultural sector that is not included, they can use it in their career search with your authorization.
2. Show students the Fields for Your Future PowerPoint presentation. While viewing it they can include information on several of the career options presented in the presentation.
3. Show the students how to use the Web Links to find more job and educational information. As homework, or the next day, have them use the Web Links to find job information that is of interest to them.
4. There are .pdf Career Profiles for all the people shown in the PowerPoint presentation. You may want to print copies of these for students to use as they research their chosen jobs and careers.

Meeting Individual Needs

Some students may need more help navigating the Internet searches to find the information needed to complete the activity sheet. You may consider letting the students work in pairs or teams to complete the work.

Extension or Enrichment Suggestions

This career exploration covers employment in the agricultural sector. As a companion to this activity, invite several local people who are employed in the agricultural sector to your class to speak about their career. This can show students how a knowledge of food, nutrition and sustainable agriculture can be valuable as a part of a job.

Assessment

This activity is based on a student exploration of several careers. It will most likely be assessed as a completed assignment without evaluation. Ensure that students remain on task during their research and don't get diverted to other websites while researching on the computer.

Suggested Answers to Questions on Student Sheets

Student answers on the activity sheet will vary depending on the careers they choose.

Student Activity Sheet 2.4

Name: _____

Date: _____

Field of Dreams

What do you think when you hear the word agriculture? Is it a career you might be interested in? Before you say no to this career path, explore some of the jobs that involve food, nutrition and agriculture. There are currently agricultural related jobs in everything from guest ranch owner to food product tester, from pest management to financial management, from fish farms on the coast to greenhouses in the Fraser Valley. You may choose to be in a career who's future depends on finding efficient ways to grow and produce food or one that leads to a more sustainable province. All of these jobs and careers involve energy in one form or another.

In this activity, you are going to investigate five different careers in the food, nutrition and sustainable agriculture fields that most interest you from the list below. You'll begin by viewing a PowerPoint presentation that will open several careers to you. You will then use the Internet or other resources to research them, complete a comparison chart and answer the questions.

Food, Nutrition and Sustainable Agriculture Jobs and Careers:

Quality Control Technician – Tests food products and production processes to ensure they meet predetermined standard for quality and safety.

Sustainability Project Manager – Coordinates practical, project-based solutions that strengthen the long-term sustainability of a community or region.

Fish Farm Technician – Helps grow and cultivate fish and maintain fish farm premises and equipment.

Agricultural Research Technician – Conducts experimental research to improve plant and animal production techniques and protect the environment.

Land Use Planner – Plans for managing land resources to best meet the social, economic and environmental needs of a community or region.

Sales Agronomist – Provides crop production and marketing advice to farmers and sells crop inputs such as seed, fertilizer and herbicides.

Farm Manager – Plans and coordinates the overall direction, financial management, human resources and marketing activities of a farm business.

Food Product Technologist – Applies research and technology to develop new food and beverage products that are safe and appealing to consumers.

Agricultural Equipment Technician – Certified to service and repair farm equipment such as tractors, tillage, seeding and harvesting equipment.

Greenhouse Technician – Plans and carries out a wide range of tasks to do with growing, maintaining and harvesting greenhouse crops.

Guest Ranch Owner/Operator – Manages a working ranch and shares educational and recreational ranch experiences with guests from around the world.

Agricultural Finance Specialist – Builds and maintains customer relationships, provides financial advice and markets financial products to a portfolio of farm clients.

Other – investigate any other energy career with the authorization of your teacher.

Procedure:

1. Make a chart like the one below on a separate sheet of paper. You may need several lines for each career to enter the information you find. Complete the chart using the five careers you selected. Use the websites below to help you find the information you need.

Career Name	What they do	Education or Training Required	Job Outlook	Salary	What you'd like about this job
1.					
2.					
3.					
4.					
5.					

2. Choose one career you are most interested in and write two questions you would like to ask a person who works in this career area:

1.

2.

3. For two of the careers you selected, what are the things that could be done to make them more sustainable? Would your suggested change affect the job in any way? For example, if you were involved in bringing agriculture products to market, you could drive a more fuel-efficient truck, which would lead to less climate change. However, purchasing a new vehicle might be expensive.

- 1.

- 2.

Extensions

Use the website information to explore other jobs and careers that are currently available in the agriculture and sustainability field.

National Occupational Classification

You can find more job and educational information through the National Occupational Classification (NOC) website. Select a category of job under the "Occupational Description" heading and then look for the job or career you are interested in. You will find the main duties for the job, employment requirements, including education, and additional information about the job.

<http://www23.hrdc-drhc.gc.ca>

WorkInfoNet

Makes useful labour market and career information accessible to British Columbians. See "Quicklinks" drop down menu on side for many more links.

<http://workinfonet.bc.ca/>

Workfutures BC

Looks at occupational outlooks in British Columbia.

<http://www.workfutures.bc.ca/>

Concept 3

Sustainable agriculture is necessary to ensure that food will always be there when we need it. Where food comes from and how it is produced and processed has consequences.

Facts:

- The agricultural industry works in BC is ever changing.
- The agricultural industry provides a wide variety of employment opportunities.
- Agricultural choices are linked to transportation and energy use.
- Soil and water are two important components of sustainable agriculture.

Attitudes:

- There are pros and cons to agricultural choices.
- Change in agricultural practices is inevitable.

Activity 3.1 – Food and Food Products in BC and the World

Overview/Purpose – to allow students to investigate sustainable agriculture and some of the issues related to it, including consumerism.

PLO's connections

Sustainable Resources 11- Sustainable Agriculture

A1 analyse the environmental, social, and economic significance of agriculture at the local, provincial, and global levels

A2 outline components of agricultural systems and ways of enhancing agriculture production

A3 assess current practices related to sustainable management of agricultural resources in British Columbia

A4 investigate current practices related to the development of commercial agriculture products

Home Economics: Foods and Nutrition 8 to 12

Grade 8

Social, Economic and Cultural Influences

D1 describe factors that influence personal food choice

Grade 9

Social, Economic and Cultural Influences

D1 describe factors that influence personal food choice

Grade 10

Social, Economic and Cultural Influences

D1 describe a variety of food marketing techniques

D2 identify factors that affect food production and supply, especially in Canada today.

Grade 11

Social, Economic and Cultural Influences

D1 analyse the effect of food marketing practices on consumer behaviour.

D2 demonstrate an awareness of environmental and health issues related to the production and consumption of food.

Grade 12 –

Social, Economic and Cultural Influences

D2 analyse global and environmental health issues related to the production and consumption of food.

Social Studies

Grade 11 – Human Geography

- Assess environmental challenges facing Canada, including global warming ozone layer depletion and freshwater quality and supply

Lesson Objectives – by the end of the lesson students will be able to identify several issues related to agriculture and sustainability.

Materials and Resources

BLM – Activity 3.1 – Food and Food Products in BC and the World Student Sheet

The Sustainability Road Show DVD segment

Television and DVD player

Background Information

Student Misconceptions

Students may not understand that our economy is built on the concept of consumerism. People buy products and services from others and sell our own products and services to make money to make that happen. While that works in theory, the question is whether or not it's sustainable.

Teacher Notes

This globalization of the food industry is based on an economic theory that every nation and region should specialize in one or two globally traded commodities. These commodities are ones they can produce cheaply enough to compete with every other producer. The money received from exporting those commodities is then used to buy food for local consumption. According to this theory, every one will benefit. Recent events, including climate change, suggests that there is dark side to this theory. If nothing else, it takes energy to transport a food product half-way around the world to get to your dinner plate. This energy use has a hidden cost which must be paid to the environment.

Time – 60 minutes

Web Resources

Google Search words and phrases – you can use a Google or Yahoo search using “agricultural production”, “consumerism” or “agriculture globalization” to find more information on these topics.

Presentation Suggestions

1. Bring in an agricultural product that students commonly eat, such as an egg, a loaf of bread, or a can of salmon. Ask students where they originally come from. (They should be able to identify a chicken farm, a wheat farm and the oceans.) Next ask them if each is a sustainable agricultural product. Are they sure that each will always be there in the future? If not, what can stop that from happening? (They might be able to say that diseases like the bird flu, drought and over fishing may influence whether these products will always be there.)
2. Introduce the concepts of consumerism and sustainability. Have students discuss whether these two terms are mutually exclusive. Is it possible to have both?
3. Show The Sustainability Road Show DVD segment and have students answer the questions on the worksheet.

Meeting Individual Needs

You can use a Venn diagram to discuss consumerism and sustainability. There will be ideas and issues that support one idea or the other alone and some that will support both.

Extension or Enrichment Suggestions

Have students choose one of the Agricultural Issues on the chart, which are discussed briefly in the DVD, and have them research it. They can present their learning to the class the next day.

Assessment

The activity gives students an overview of sustainability. The student sheet could be assessed for its completeness. Student understanding of the concept of agricultural sustainability will be better assessed in later activities.

Suggested Answers to Questions on Student Sheets

1. What is sustainability? (Sustainability means taking care of the environment for the future in ways that allow the economic and social development in the present.)
2. What is consumerism? (Consumerism is an economic idea that places the emphasis on consumption of resources and products.)
3. Fill out the following chart:

Agricultural Issue	What is the issue?	Why is it an issue?
Land Use	What is the best use for land?	Land can have many uses – farms, houses, etc.
Agricultural Yield	What is the best way to increase the amount of food a piece of land can produce?	Increasing yield leads to more food for the world and dollars for the farmer.
GMO – genetically modified organism	We can alter the genetics of certain agricultural products to make them more resistant to disease, healthier, etc.	There is some disagreement if GMO products do more harm than good.
Pesticides	Insects need to be controlled to increase yield.	Pesticides can harm organisms other than the ones that are targeted.
Water	Water can be bought and sold like any other commodity.	Water is one resource that Canada has that the world wants as an export. Is that the best thing for our country?
Air	Air quality is a health concern.	Transportation of agricultural products is one cause of decreased air quality.

4. List two interesting facts or ideas that you learned in the video that you didn't know before. (Student answers will vary.)
5. Why is the idea of choice important when we look at sustainable agriculture? (Student answers will vary. The choices we make today will have a great impact on the agricultural future we face and the world we leave future generations.)
6. What choices do you think we should make to have a sustainable agriculture?
(Student answer will vary.)

Student Activity Sheet 3.1

Name: _____

Date: _____

Food and Food Products in BC and the World

Sustainable resources are something we should all work for. It may be easier to see a sustainable resource in other industries. You can imagine a way that trees are replaced at the same rate they are harvested so that we will always have trees and sustainable forestry. Similarly, you might imagine we can do the same thing with energy, fish, and mining. How does this relate to agriculture? Are the issues similar? After all, we need to eat in order to survive. Does that put a special burden on agriculture? Sustainable agriculture means taking care of the environment in ways that allow farmers and ranchers to continue to produce the food we need while still making a profit.

Before we start, let's look at a couple of questions:

- In what ways can a farmer increase the amount of an agricultural product he can raise or grow?
- Are there, or should there be, any limits on what a farmer does in order to produce this food?
- Are our current agricultural practices sustainable?

After you have thought about and discussed those questions, watch The Sustainability Road Show DVD and answer the following questions as you watch.

The Sustainability Road Show Questions

1. What is sustainability?
2. What is consumerism?
3. Fill out the following chart:

Agricultural Issue	What is the issue?	Why is it an issue?
Land Use		
Agricultural Yield		
GMO – genetically modified organism		

Agricultural Issue	What is the issue?	Why is it an issue?
Pesticides		
Water		
Air		

4. List two interesting facts or ideas that you learned in the video that you didn't know before.
5. Why is the idea of choice important when we look at sustainable agriculture?
6. What choices do you think we should make to have a sustainable agriculture industry?

Activity 3.2 – Moving it Along

Overview/Purpose – to examine where food and food products we eat are grown, raised or processed.

PLO's connections

Sustainable Resources 11- Sustainable Agriculture

- A1 analyse the environmental, social, and economic significance of agriculture at the local, provincial, and global levels
- A2 outline components of agricultural systems and ways of enhancing agriculture production
- A3 assess current practices related to sustainable management of agricultural resources in British Columbia

Home Economics: Foods and Nutrition 8 to 12

Grade 8

Social, Economic and Cultural Influences

- D1 describe factors that influence personal food choice

Grade 10

Social, Economic and Cultural Influences

- D2 identify factors that affect food production and supply, especially in Canada today.

Grade 11

Social, Economic and Cultural Influences

- D2 demonstrate an awareness of environmental and health issues related to the production and consumption of food.

Grade 12

Social, Economic and Cultural Influences

- D2 analyse global and environmental health issues related to the production and consumption of food.

Social Studies

Grade 11 – Human Geography

- Assess environmental challenges facing Canada, including global warming ozone layer depletion and freshwater quality and supply

Lesson Objectives – by the end of the lesson, students will be able to identify the effect of the globalization of the food industry by analyzing the distance that common foods travel to get to the average dinner plate.

Materials and Resources

BLM – Activity 3.2 – Moving it Along student sheet
pencil or pen

Background Information

Student Misconceptions

Students should be familiar with some of the basic concepts of globalization. Globalization is the theory that each country should specialize in one or two commodities that they grow or raise the most efficiently and with the least cost. These are then sold to other countries around the world. The money gained by selling these commodities is then used to purchase the other things the country needs.

Teacher Notes

Globalization is just one of the challenges that farmers face today. With globalization, farmers in British Columbia must be able to raise or grow their products more efficiently and at a cheaper cost than farms in foreign countries. There are many other challenges that British Columbia farmers face today. In addition to urban conflict over land use, they also need to be experts in business, weather forecasting and new agricultural practices if they want to make a profit and have enough money to support their family. In addition to these challenges, farmers also face the challenges from imported foods and a lack of awareness by the general public of where the foods and food products that are grown or raised or processed. This lack of awareness and an understanding of the environmental consequences of eating globally are at the heart of the “eat local” initiatives.

Time – 1 or 2 class periods of 60 minutes each

Web Resources

Google Search words and phrases – you can use a Google or Yahoo search using “locavore”, “100 mile diet”, “eat local initiatives” or “globalization” to find more information on these topics.

Presentation Suggestions

1. Hold up an article of clothing. Ask students where it comes from. They may first say, “The department store.” Probe the response further by asking where the store got it. What country manufactured it and where did the materials to make the article come from? Often there will be a place on the label that tells where it was manufactured.

2. Next, hold up a piece of fruit or a vegetable. Ask students where this comes from. They may again answer, "The grocery store." Again probe deeper and try to find out where the fruit or vegetable came from. Did it come from a local farm, from somewhere else in BC, from another province in Canada, or from another country. There are sometimes labels on fruit that will help with identification of the country of origin.
3. Finally ask, "How do these products get to our stores and ultimately to us. There is usually a lot of transportation involved – trucks, trains, ships and maybe even planes. Note that all these forms of transportation produce greenhouse gases that contribute to global warming.
4. Tell students that they are going to be food detectives. They are going to take a food or food product and work backwards, trying to find out how far the food had to travel to get to your local community. This activity can be done individually, in pairs or in small groups.

Meeting Individual Needs

The use of an actual item to introduce the activity will help the visual learners. You can make a product map, from start to finish, to help students see all the steps involved in each product.

Extension or Enrichment Suggestions

Have students present their findings to the rest of the class. Each presentation should be short, with each student showing their poster and the kilometers that their products traveled.

Assessment

If students present their posters, the rubric in the appendix can be used for assessment purposes.

Student Activity Sheet 3.2

Name: _____

Date: _____

Moving it Along

When the average North American sits down to eat, each food or ingredient has traveled at least 1500 miles (2400 km) from the farm where it was raised or grown to be on a dinner plate. In this activity, you're going to track down where some of your favorite foods come from and determine how many miles or kilometers it traveled to become part of your meal.

Procedure

1. Work with your teacher to choose two or three food or food products (in cans or boxes) that you normally eat. Include at least one fresh food item.
2. Research where each food comes from.
 - You may need to ask the grocery store personnel about where their fresh food comes from.
 - Many food products list the food processing country on the can or box. You should also find out if the food processing country raises or grows the food they process or they import it from another country.
3. Calculate the number of miles or kilometers that each food or food product traveled from farm to your community.
4. Prepare a poster of your findings. You should include a map of the world showing the location where each food originated and an arrow should show its path to your community. Include the number of kilometers each item traveled to get to your plate.

Extension

Are any of the foods or food products grown or raised in your local community? What difference would purchasing local food and food products have on the environment, the local economy and the community where you live?

Activity 3.3 – Meeting the Challenge

Overview/Purpose - to examine some of the challenges to agricultural production in an urban area.

PLO's connections

Sustainable Resources 11- Sustainable Agriculture

- A1 analyse the environmental, social, and economic significance of agriculture at the local, provincial, and global levels
- A2 outline components of agricultural systems and ways of enhancing agriculture production
- A3 assess current practices related to sustainable management of agricultural resources in British Columbia

Home Economics: Foods and Nutrition 8 to 12

Grade 8

Social, Economic and Cultural Influences

- D1 describe factors that influence personal food choice

Grade 10

Social, Economic and Cultural Influences

- D2 identify factors that affect food production and supply, especially in Canada today.

Grade 11

Social, Economic and Cultural Influences

- D2 demonstrate an awareness of environmental and health issues related to the production and consumption of food.

Grade 12

Social, Economic and Cultural Influences

- D2 analyse global and environmental health issues related to the production and consumption of food.

Social Studies

Grade 11 – Human Geography

- Assess environmental challenges facing Canada including global warming, ozone layer depletion and freshwater quality and supply

Lesson Objectives

Materials and Resources

BLM – Activity 3.3 – Meeting the Challenge Student Sheet

pencil or pen

Modern Farming Challenges DVD segment. If you don't have a copy of the DVD, you can also type "Modern Farming Challenges" in the Search Stories and Videos section on the GVTV web site at <http://www.gvtv.ca/>.

Background Information

Student Misconceptions

Students may not understand all the issues that farmers face today. Farming is like running a small business and it requires farmers to have a wide variety of knowledge and skills.

Teacher Notes

There are many challenges that farmers face today. In addition to urban conflict, they also need to be experts in business, weather forecasting and new agricultural practices if they want to make a profit and have enough money to support their family.

Time – 60 minutes

Web Resources

Google Search words and phrases – you can use a Google or Yahoo search using "agricultural challenges" or "agroforestry" to find more information on these topics.

Presentation Suggestions

1. Ask students if they know how farming was done 100 years ago. They may have seen movies that were set on farms at that time. Then ask how farms have changed now.
2. Use the Modern Farming Challenges video as a follow up to this activity. After students have completed the activity and watched the video, have a discussion about farming. How many students would want to be farmers? What kinds of education and training does a farmer need in order to be successful? What are the benefits and challenges to farmers in the Lower Mainland? A video viewing student worksheet can be found in the Appendix.
3. There are additional science activities that students can use to investigate the role of soil in plant growth. These activities can be found in the Appendix.
4. The Extension question touches on the role of the Agricultural Land Reserve (ALR) in protecting land for agricultural production. If you haven't already previously shown the Barnston Island video, use it as a lead in to a discussion on soil types and how they might affect the growth of plants. A video viewing student worksheet is in the Appendix.
5. After showing the Barnston Island video and class discussion, have students read the editorial called "A blow for sanity". Although the Barnston Island decision has been made, there will be other, similar challenges to other ALR land.

Meeting Individual Needs

1. This activity uses reading and two videos to initiate student learning. This should be beneficial to a wide variety of learning styles.
2. If students have a difficult time reading the materials, you might consider using a guided reading strategy where several of the stronger readers in class read a paragraph each. Stop at the end of each paragraph and have other students paraphrase the paragraph and tell what they think the most important thing that they paragraph said.

Extension or Enrichment Suggestions

Have students research land that is part of the Agricultural Land Reserve. Are there any locations near your community? Are they currently being farmed or ranched? What role do they play in the community?

Arrange a field trip to a local farm or ranch. Talk with the farmers or ranchers about how they grow or raise the food you eat. What are the biggest challenges they see in agriculture today?

Assessment

This activity is an introduction to the Agricultural Land Commission Act and the ALR. The student sheet can be assessed for completeness and added to the student portfolio.

Suggested Answers to Questions on Student Sheets

1. What Act protects farmland in BC? When did it come into effect? (Since 1973, agricultural land in BC has been protected by the Agricultural Land Commission Act. This act recognizes agricultural land as a "scarce and important resource.")
2. What area of BC has a wide variety to productive farmland? What agricultural products does it produce? (Southwestern BC. Lower Mainland farms grow field vegetables, berries, dairy, poultry and eggs, mushrooms and greenhouse produce (tomatoes, peppers and cucumbers).)
3. Besides food, what are some of the other benefits of farmland? (Its green space helps the local ecosystem through water infiltration, soil conservation, air quality, and habitat preservation.)
4. What other interests want farmland in the Lower Mainland? What would they use it for? (Cities and housing developers want the farmland. They wanted to build houses and businesses on it.)
5. What is agroforestry? How does it benefit the environment? (Agroforestry blends agriculture and forestry practices. It is a benefit to the environment by providing biodiversity, wildlife habitat, and increased green space. It also helps with nutrient cycling.)

Extension

Do you think that agricultural land in the Lower Mainland should be protected? Explain your answer. (Student answers will vary. They may agree that the land needs to be protected so we can have a steady, local supply of food. Others may disagree and think that all land should be treated the same and it should be sold for whatever use will get the highest dollar value.)

Student Activity Sheet 3.3

Name: _____

Date: _____

Meeting the Challenge

There is a battle over farmland in British Columbia. For example, the Greater Vancouver region, which houses about 50% of the province's population, is an area with competing land interests. According to the 2001 Census of Agriculture, farms in southwestern BC represent just over 1.5% of the total farmed area in British Columbia. However the region is incredibly productive, accounting for approximately:

- 17 % of the total number of farms;
- 21 % of total farm capital value;
- 30% of total farm income; and
- 61% of all greenhouse space

Since 1973, agricultural land in BC has been protected by the Agricultural Land Commission Act. This act recognizes agricultural land as a "scarce and important resource." Less than 5% of BC is considered suitable for agriculture. However, about 16% of Southwestern BC is in the Agricultural Land Reserve (ALR).

Farmland is important to all of us. It contributes to the regional economy, supplies the region with a diverse supply of high-quality local foods, and provides green space for humans and wildlife.

Southwestern BC is one of the most productive agricultural areas in Canada, due to its rich soils, excellent climate and proximity to Canada's third largest urban market. The region generates approximately 30% of BC's total farm income. Lower Mainland farms grow field vegetables, berries, dairy, poultry, eggs, mushrooms, and greenhouse produce (tomatoes, peppers and cucumbers). By producing food locally, we become more self-sufficient and help create food security.

Agricultural land benefits the region in other ways. Its green space helps the local ecosystem through water infiltration, soil conservation, air quality, and habitat preservation. While farmers are primarily responsible for growing food, they are also stewards of the land.

Given that food is a basic need, cities were often established near land that was good for agriculture. However, as communities grew, competition for the land started to develop. Farmland was wanted for housing and business development. Also, as houses were built closer to farming areas, conflict sometimes developed over noise, smells, dust, and pesticide use. At the same time, farmers faced challenges as a result of increased runoff from new houses, trespassing, theft, and damage to crops and equipment.

Many initiatives have been undertaken to raise the profile of agriculture in British Columbia. In the Lower Mainland, most of the agricultural lands in the region are also protected from urban development by designation as Lower Mainland Green Zone in the Livable Region Strategic Plan. As part of this and other initiatives, many municipalities have undertaken local agricultural studies, looking at such issues as land use and economic viability.

While the area of land in the ALR has remained relatively stable, there have been changes in farm demographics over the past several years. The number of farms in the British Columbia has decreased significantly. Cultivated area has remained more or less unchanged while average farm size has increased. Family farms are being replaced by farming businesses.

Recently, agriculture has teamed with forestry to create a new concept – agroforestry. Agroforestry

creates new market opportunities by helping landowners diversify their products, markets, and farm income. Agroforestry is a management approach that purposefully integrates the growing of trees with crops or livestock. Thus it is a type of co-management approach, which strives to optimize the benefits and productivity of various system components from the land rather than maximizing one component. In essence, the combination of trees and shrubs with agricultural crops or animals can make better use of available land and sunlight resulting in greater production per hectare than conventional agriculture and forestry. Nutrient cycling can be enhanced and vegetation management (weed control) costs are less with this approach. In addition this approach can enhance the environment by providing biodiversity, wildlife habitat, and increased green space.

Nonetheless balancing urban development, while maintaining a viable agricultural sector, is still a continuing challenge. Urban – rural conflicts, increased competition in the marketplace due to trade liberalization, and environmental challenges such as changing weather patterns impact agricultural viability.

Check for Understanding

1. What Act protects farmland in BC? When did it come into effect?
2. What area of BC has a wide variety to productive farmland? What agricultural products does it produce?
3. Besides food, what are some of the other benefits of farmland?
4. What other interests want farmland in the Lower Mainland? What would they use it for?
5. What is agroforestry? How does it benefit the environment?

Extension

Do you think that agricultural land in British Columbia should be protected? Explain your answer.

Agri-Facts: Did you know that the agriculture and food industry is a \$9 billion industry in BC involving over 120 different products and employing over 190,000 British Columbians.

A Blow for Sanity

In the end, there was really no other answer that made any sense for Barnston Island or for the region as a whole.

The Agricultural Land Commission in its decision last month to choose farming over industrial use, struck a blow for sanity.

It ruled that 1,100 acres covering most of the pastoral Fraser River Island will remain in the Agricultural Land Reserve (ALR).

Had it approved the proposal to develop a business/industrial park there, a select group of land owners would have reaped immense profits. It might also have become an important base of industrial land on the river, and possibly an inland port site to handle containers.

Lined up in favour of farmland preservation were an array of other island users and groups. Many rightly called Barnston a jewel in the Fraser that should not be paved over.

Each reduction in ALR land rips at the fabric of the interconnected agriculture industry in the region. It undercuts our ability to feed ourselves locally and should only be done with clear justification.

Lifting most of Barnston out of the ALR would have been the single largest exclusion in decades - nearly matching all the ALR land removed in the Lower Mainland in the past five years.

Approving redevelopment there would have, in effect, declared open season on ALR land elsewhere, fueling more intensified land speculation and making a mockery of the principles behind both the reserve and the Livable Region Strategic Plan.

In its ruling, the commission systematically dismantled the specific arguments in favour of industrializing Barnston.

It found the soils are adequate and the island is indeed farmable – a logical conclusion since even the developer's paid agrologist called Barnston fertile.

Finally, commissioners refused to consider the "community need" argument – that development is needed to satisfy a pending industrial land shortage – because it wasn't backed by the Metro Vancouver Regional District, which governs the island.

This was the right decision at the right time to push back fears that the integrity of the ALR is crumbling.

- Surrey Leader

Activity 3.4 – Working Together

Overview/Purpose - to allow students to investigate some of the issues involved in sustainable agriculture and to discuss them as a class.

PLO's connections

Sustainable Resources 11- Sustainable Agriculture

A1 analyse the environmental, social, and economic significance of agriculture at the local, provincial, and global levels

A2 outline components of agricultural systems and ways of enhancing agriculture production

A3 assess current practices related to sustainable management of agricultural resources in British Columbia

Home Economics: Foods and Nutrition 8 to 12

Grade 8

Social, Economic and Cultural Influences

D1 describe factors that influence personal food choice

Grade 10

Social, Economic and Cultural Influences

D2 identify factors that affect food production and supply, especially in Canada today.

Grade 11

Social, Economic and Cultural Influences

D2 demonstrate an awareness of environmental and health issues related to the production and consumption of food.

Grade 12

Social, Economic and Cultural Influences

D2 analyse global and environmental health issues related to the production and consumption of food.

Social Studies

Grade 11 – Human Geography

- Assess environmental challenges facing Canada, including global warming ozone layer depletion and freshwater quality and supply

Lesson Objectives – by the end of the lesson, students will be able identify their position on several agricultural issues and back their positions with an informed decision.

Materials and Resources

BLM – Activity 3.4 – Working Together Students Sheet
pencil or pen
sheets for human graph

Sustainable Urban Farming and Wildlife Habitat Conservation DVD segments. If you don't have a copy of the DVD, you can also type "Sustainable Urban Farming" and "Wildlife Habitat Conservation" in the Search Stories and Videos section on the GVTV web site at <http://www.gvtv.ca/>.

Background Information

Student Misconceptions

Students may not realize that agriculture needs to be just as sustainable as any other business. We often think of sustainability in terms of energy, forestry or fishing. Farms need to be operated in manner that provides for both the farmer's livelihood and the land he works. The farms need to be able to provide food for both today and tomorrow.

Teacher Notes

Sustainable agriculture refers to the ability of a farm to produce agricultural products forever without using up the natural resources. Two key issues in sustainable agriculture are:

1. the long-term effects of farm practices on the soil's properties essential for crop productivity, and
2. the long-term availability of products (such as fertilizer, energy or machinery) necessary to operate the farm.

It is important to recognize that the farms have to be able to provide enough money for the farmer to raise his or her family. It is a balancing act to maintain both the farmer and the farm.

Time – 60 – 120 minutes

Web Resources

Ecological Footprint – This site lets students input their own information and calculate the size of their ecological footprint – the amount of earth that is necessary to support them with their current lifestyle.

<http://www.myfootprint.org/>.

Presentation Suggestions

1. One way to discuss the issue of sustainability is with a human graph. By requiring students to physically indicate their agreement/disagreement or preference on an issue, the human graph quickly plots the total group response.
 - Post five sheets of paper on the wall – they should say "Strongly Agree," "Agree," "Neutral," "Disagree," and "Strongly Disagree."
 - As you debrief the questions, have students stand in a line in front of the word that represents their feeling.
 - Once in position, have different students explain why they are standing in a particular location.

- As students give their responses, other students can move as they modify or rethink their opinions. The oral exercise prepares students for later writing expressions.
2. Use Sustainable Urban Farming and Wildlife Habitat Conservation videos as either an introduction or a summary to the class discussion on sustainability in agriculture. A video viewing student worksheet can be found in the Appendix.

Meeting Individual Needs

Have students make an outline of their ideas before they answer the extension questions. This tool will help them organize their thoughts prior to their writing.

Extension or Enrichment Suggestions

One way to look at your impact on the environment is to measure your “ecological footprint”, the amount of land that is necessary to support your lifestyle. Students can measure the size of their ecological footprint using an on-line calculator. One is located at <http://www.myfootprint.org/>.

Assessment

There are no right or wrong answers to the question at the end of the activity. What is more important is that students can provide a good reason for their belief. We want informed decisions for the answers, not just a quick answer that has not been considered.

Student Activity Sheet 3.4

Name: _____

Date: _____

Working Together

Sustainable agriculture integrates three main goals: environmental stewardship, farm profitability, and prosperous farming communities. In sustainable agriculture a farm has to be able to produce its farm products for a very long time without consuming all its natural resources.

A century ago, most farms raised both crops and livestock. The two were highly complementary, both environmentally and economically. However, the current picture has changed drastically since then. Crop and animal producers now may still be dependent on one another to some degree, but the interaction is between farmers and not within the farm itself. This is a result of a trend toward separation and specialization of crop and animal production systems.

There are several issues involved in creating sustainable agriculture for crops. They include the long-term effects of various farming practices on the soil that are essential for crop productivity and the long-term availability of products (such as fertilizer, energy or machinery) necessary to operate the farm. Practices that can cause long-term damage to soil include excessive tilling (leading to erosion) and irrigation without enough drainage (leading to accumulation of salt or other chemicals in the soil).

Similarly, raising poultry and other livestock needs to be sustainable. Practices of selective breeding, animal nutrition and confinement rearing all need to be viewed with a view toward sustainability.

While air and sunlight are generally available in most geographic locations, crops also depend on soil nutrients and the availability of water. When farmers grow and harvest crops, they remove some of these nutrients from the soil. Without replenishment, the land would suffer from nutrient depletion and couldn't be used for further farming. Sustainable agriculture depends on replenishing the soil while minimizing the use of non-renewable resources, such as natural gas (used in converting atmospheric nitrogen into synthetic fertilizer), or mineral ores (e.g., phosphate). Nitrogen loss is one important nutrient that must be replenished every time a crop is grown. Possible sources of sustainable nitrogen that would include:

1. recycling crop waste and livestock manure,
2. growing legume crops (such as beans) and forages (such as alfalfa) that form symbioses with nitrogen-fixing bacteria that return nitrogen to the soil,
3. adapting the current industrial nitrogen fixation process to use hydrogen made by electrolysis (perhaps using electricity from solar cells or windmills) instead of natural gas, or
4. genetically engineering (non-legume) crops to form nitrogen-fixing symbioses.

Sustainable options for replacing other nutrients, such as phosphorus and potassium, are more limited.

At the basis of sustainable agriculture is the realization that there is a finite supply of natural resources. Agriculture that is inefficient will eventually exhaust the available resources or make the resources too expensive. Agriculture that relies on fertilizers and machinery that are extracted from the earth's crust or produced by factories, are not sustainable. Unsustainable agriculture continues because it is financially more cost-effective than sustainable agriculture in the short term. However, it's the long-term we should be concerned about.

A farm must also generate revenue. The way that crops are sold is also part of the sustainability equation. Fresh food sold from a farm stand requires little additional energy, aside from what's used for cultivation, harvest, and transportation (including consumers). Food sold at a remote location, whether at a farmer's market or the supermarket, incurs a different energy cost for materials, labour, and transportation. Buying local agricultural products, when possible, is more sustainable than buying food that comes from great distances.

When farm products are sold a great distance away, there is an even more complex system involved in which the farmers form the first link in a chain that leads to the consumer. This practice can create greater revenue but it is vulnerable to fluctuations caused by things such as labour issues, oil prices, and global economic conditions including interest rates, futures markets, and farm product prices.

Check for Understanding

Read each statement below and write the number of the answer that best indicates your honest feeling. Be prepared to defend your answer and give a reason for your response.

- 1 = strongly agree
- 2 = tend to agree
- 3 = uncertain
- 4 = tend to disagree
- 5 = strongly disagree

1. Because of our agricultural knowledge and technology, the trend toward separation and specialization of crop and animal production systems is good and necessary.
2. Soil will never run out of the nutrients it needs to grow plants.
3. We don't have to worry about future generations, they can take care of the environment.
4. A person living in the city doesn't have to worry about sustainable agriculture or conserving the environment.
5. The environment is more of a problem for people who live in rural areas than those who live in a city.
6. The use of technology in agriculture is bad.
7. We all use many agricultural products in our daily lives so agriculture concerns us all.
8. There is little I can do personally to help support sustainable agriculture.
9. A healthy environment is something we all need.
10. When natural resources are used up in one area, we can always move on to another area.
11. Sustainable agricultural practices and local agricultural products need to be supported to ensure there will be food for the future.

Extension

Do you think that agricultural land should be protected by the Agricultural Protection Land Act? Do we still need the ALR? Explain your answer.

Concept 4

Technology plays a part in a sustainable agriculture future.

Facts:

- Technology is linked to agricultural options.
- There will continue to be many career opportunities in the agricultural sectors.

Attitudes:

- Technology and agriculture will continue to change.
- Research and development are essential for future food and agricultural products.
- The new career opportunities will be different than the ones available today.

aitc.ca/bc

Activity 4.1 – Increasing the Yield

Overview/Purpose – to allow students to begin to explore some of the new techniques that farmers are using to increase the amount of food they grow or raise.

PLO's connections

Sustainable Resources 11- Sustainable Agriculture

- A1 analyse the environmental, social, and economic significance of agriculture at the local, provincial, and global levels
- A2 outline components of agricultural systems and ways of enhancing agriculture production
- A3 assess current practices related to sustainable management of agricultural resources in British Columbia
- A4 investigate current practices related to the development of commercial agriculture products
- A5 illustrate various roles of technology in agricultural practices

Home Economics: Foods and Nutrition 8 to 12

Grade 10

Social, Economic and Cultural Influences

- D2 identify factors that affect food production and supply, especially in Canada today.

Grade 11

Social, Economic and Cultural Influences

- D2 demonstrate an awareness of environmental and health issues related to the production and consumption of food.

Grade 12

Social, Economic and Cultural Influences

- D2 analyse global and environmental health issues related to the production and consumption of food.

Social Studies

Grade 11 – Human Geography

- Assess environmental challenges facing Canada, including global warming ozone layer depletion and freshwater quality and supply

Lesson Objectives – by the end of the activity, students will be able to identify several techniques that farmers and ranchers use to increase the amount of food they raise or grow.

Materials and Resources

BLM – Activity 4.1 – Increasing the Yield Student Sheet

Background Information

Student Misconceptions

Students may think that all farmers do is plant a seed and wait for Mother Nature to do the rest. Nothing could be further from the truth. Farming and ranching require keeping up with technology to ensure that farmers and ranchers will get the most out of their land. They also have a long-term view of their land – it has to be sustainable for their lives and the lives of their children.

Teacher Notes

While technology has solved a lot of the world's problems, it is important to recognize its limitations. In agriculture, crop yield (sometimes called agricultural output) is not only a measure of the amount of a crop per unit area of land, but it also involves the seed generation of the plant itself. In general farmers look for a 1:3 ratio for seed generation, e.g. one grain of wheat needs to produce a stalk that produces 3 grains in order to sustain human life. At a ratio of 1:5 a surplus can begin. The higher the yield, the more surplus seed there is. This surplus can be sold, livestock can use it for feed and the farm can generate more money.

However, increasing crop yields have come with a cost. Pesticides used for insect control and herbicides used for weed control can be harmful to other organisms. Genetically modified plants and animals both increase yield and decrease biodiversity. Fertilizers can run off a field and into streams and rivers creating problems with their ecosystem. It seems like every technological solution creates its own set of problems that must be dealt with as well. It's important to remember that it is the technological choices we make with our food that will be a part of the world we leave the next generation.

Time – 60 minutes

Web Resources

Google or Yahoo Search Words – you can use a Google or Yahoo search using “crop yield” or “genetically modified organism” to find more information on these topics.

BC Agriculture in the Classroom Foundation – Investigating biotechnology
www.aitc.ca/bc/resources/secondary-resources

Presentation Suggestions

1. Ask students what they think of technology's ability to solve the problems that agriculture faces. Do they see technology as a good thing or a bad thing? Can it solve all the problems we face today?
2. Have students read the student sheet and answer the questions.
3. After the activity is complete, ask about their ideas on technology now. What should the role of technology be in our lives?

Meeting Individual Needs

If students have difficulty reading, use a guided reading strategy. For example, you could use popcorn reading where you read one paragraph and then you choose another student to read the next one, continuing like this until the section has been read. You can stop after each paragraph to discuss the important points.

Extension or Enrichment Suggestions

Have students read the book *Silent Spring* by Rachel Carson. It is widely credited with helping launch the environmental movement. It was her claim, in 1962, that DDT was causing thinner eggshells and was resulting in reproductive problems and death of many bird species. There is now a widespread ban on DDT. Her book and the DDT is still controversial with some who say that DDT restrictions and other environmental regulations restrict economic growth. This is a good example of bioaccumulation or biomagnification.

Assessment

This lesson should be assessed when completed and added to the student's portfolio. The information will be valuable in the next lesson as well.

Suggested Answers to Questions on Student Sheets

1. What are some of the issues in agriculture yield that technology has helped with? (improved agricultural yield, more food feeds more people)
2. What are some of the problems that technology creates when dealing with agricultural issues? (biodiversity with a lack of different kinds of seeds, pesticide use can affect other organisms)
3. What are some ideas that can help protect the environment and make agriculture more sustainable? (improved soil tillage, soil management, crop rotation, and more effective fertilizers)
4. What are the 5 agroforestry systems in use in BC? Explain each. (BC currently uses alley cropping, silvopasture, shelter and timberbelts, windbreaks, hedgerows, integrated riparian management and forest farming.)

Student Activity Sheet 4.1

Name: _____

Date: _____

Increasing the Yield

Our goal for the future is agricultural sustainability. Simply put, we want to make sure that we don't do anything now that will harm our ability to eat in the future. This means taking care of the environment in ways that allow farmers and ranchers to continue to produce food and make a profit.

In the early 1990's, Canada developed a Green Plan for Agriculture. The Green Plan encourages all people in agriculture to consider the key environmental issues of soil management, water management and wildlife habitat conservation when setting up an operation. In addition, communities must develop plans that do not allow urban areas to spread to available farmland.

In 1992, Canada also became the first industrialized country to sign the Convention on Biological Diversity. This is an international treaty that commits Canadians to doing all they can to ensure the survival of all species of domestic and wild animals. One of the goals of the convention is to:

"... protect traditional indigenous knowledge about the use of the earth's animals and plants and to encourage the sharing of any economic benefits that might arise from using such traditional knowledge . . ."

What does this have to do with modern agricultural practices? Plenty. All the plants and animals we use in agriculture today were once wild species that were slowly brought into cultivation. Indigenous knowledge – what First Nations Peoples know about local plants and animals – was not generally considered important to agriculture as settlers established farms in Canada with familiar crops from their home countries. Indigenous knowledge seemed even less important as we moved toward industrialized agriculture. Not only that, we are also creating seed varieties and livestock and poultry stock that have limited genetic variation to produce more food on less land. This process creates a genetically modified organism (GMO) that decreases biodiversity. Biodiversity is the variation of a species within an ecosystem, biome, or for the entire Earth. Biodiversity is often used as a measure of the health of an ecosystem.

As we look for solutions to world food shortages, we can't afford to ignore the indigenous knowledge. Because this knowledge is often passed down orally, it is important to take it seriously while there are still people around who know what they're talking about. One way that indigenous knowledge is being used is in fishery forecasts. First Nation Peoples who have lived along BC's rivers for hundreds of years recognize slight differences in river organisms, like insect populations and water flow that can influence the number of salmon returning each year. Their input is valuable in predicting the number of fish that can be harvested.

Currently, 50% of the Earth's surface is used for farming (both grazing and growing food). Farms and agriculture also produce about 13% of the worldwide greenhouse gas emissions. An increase in greenhouse gases means more heat from the Earth is reflected back and can lead to climate change. CO₂ (carbon dioxide) emission is considered negligible because plants are able to absorb the CO₂ from some steps in the agricultural processes (like trucking) and use it in photosynthesis. In its simplest form, photosynthesis in plants take in CO₂ (carbon dioxide) and H₂O (water) and the energy of sunlight to produce C₆H₁₂O₆ (sugar) and O₂ (oxygen).

Some agricultural byproducts produce greenhouse gases in the atmosphere. The biggest problem comes from CH₄ (methane) production from microbes in rice paddies and in the stomachs of cattle and

sheep and N₂O (nitrous oxide), which comes from manure and other fertilizers.

To combat some of the environmental and economic challenges that agriculture faces, some farmers and ranchers are turning to agroforestry. Agroforestry combines agriculture and forestry practices. There are five basic agroforestry systems in use in BC:

- Alley cropping or intercropping – employs the cultivation of various berries, forages, vegetables and grains between rows of trees or shrubs spaced to allow near full sun between the rows.
- Silvo pasture – combines livestock grazing (cattle, sheep, goats, etc.) on forage crops or pastures within a managed tree crop.
- Forest farming – uses the shade in a forest to raise other plants, such as mushrooms, maple and birch syrup, native plants used for landscaping and floral greenery (eg. – salal, sword fern), medicinal and pharmacy products (eg. - ginseng, yew bark) wild berries and fruit.
- Shelter and timberbelts/windbreaks/buffers – conservation plantings designed for both shelter and opportunity for plant harvest and forest production. Trees and shrubs can be used to protect livestock and some crops, as well as reduce soil and water erosion.
- Integrated riparian forest buffers – managed forest and shrubs in areas bordering lakes, streams, rivers and wetlands. This approach enhances and protects aquatic and riparian resources as well as generates income.

Science and Technology: the Problem or the Solution

Since the first person used a stick to dig up a root, we've been applying science and technology to the problem of food. Science is the knowledge of general facts, laws and relationships that is obtained through systematic observation and experiment. Technology is this scientific knowledge applied to practical uses.

In the past, many people had the attitude that if it increases the yield, it must be good. We're now learning that there is price to pay for a technological quick fix. One area of concern is the over-use of chemical pest control and fertilizers.

The DDT Story

In 1948, the Swiss scientist Paul Muller was awarded the Nobel Prize in Medicine for the invention of a powerful pesticide called DDT. DDT was used during the war to stop the spread of insect-borne diseases. Its success was mainly based on the fact that it didn't break down – it stayed active and toxic (poisonous) for a long time.

For farmers, DDT wiped out troublesome insects and crop yields increased dramatically. For about 20 years, we believed we had the solution to world hunger.

Birds, such as eagles, osprey and peregrine falcons started dying off. It turned out that DDT used on crops was remaining toxic long after its original use was over. As larger birds fed on smaller birds that ate from fields or fish that live in the streams that flowed through fields, the DDT entered their bodies. As birds ate more and more contaminated food, the DDT became concentrated enough to start killing. And if it was building up in bird's food, humans were also getting a lot of DDT in their diet.

The miracle cure turned out to be a deadly problem.

DDT is now banned in North America and Europe. Today's pesticides and herbicides are designed to rapidly decompose in the soil – they should never build up in animals the way DDT did. They are also

less toxic to begin with and designed to work on a specific species. We assure we have identified a problem and fixed it. It may take 20 years for a new problem to show up.

We used to think that pesticide and herbicide technology, combined with seeds bred to be disease resistant and give higher yields, would solve the problem of world hunger. Well, it didn't. While obesity is a major problem in North America, people are starving to death in Latin America, Africa and Asia. In addition, many North Americans are undernourished.

What went wrong? It has become apparent that North American-style agribusiness only works if you have the money to keep buying the chemicals and the commercially developed seeds, and can afford to link in to the world wide transportation networks. The result is that wealthier areas of the world over produce food, while poorer nations continue to go hungry.

There are other ways to mitigate, or lessen, other environmental effects from agricultural practices. While farming and grazing does represent a large potential for carbon stores where carbon is taken out of the atmosphere (usually in the form of CO_2), recent agricultural practices have decreased this ability. Improved land management techniques, like crop rotation, can be used to restore degraded land and reduce soil tillage issues. This will also restore some of the carbon absorbing organic soils. Similarly, more efficient fertilizers can reduce N_2O and alternative feeds can reduce CH_4 from the stomach of cattle and sheep. (One technique that shows that adding cooking oil to the feed decreases CH_4 production.) However, there is only so much that Canada and British Columbia can do. It has been estimated that 70% of the agricultural emissions are coming from the developing countries of world like China, India, and South America.

As we move along in the twenty-first century, agriculture seems to be going in two directions as once:

- There is a return to mixed farming principles and natural methods of pest control and fertilization.
- There is an increasing use of sophisticated technologies such as computer-controlled greenhouses and biotechnology.

The goal is to mix these two to create sustainable agriculture.

Questions

1. What are some of the issues in agriculture yield that technology has helped with?
2. What are some of the problems that technology creates when dealing with agricultural issues?
3. What are some ideas that can help protect the environment and make agriculture more sustainable?
4. What are the 5 agroforestry systems in use in BC? Explain each.

Activity 4.2 – What’s New?

Overview/Purpose – to allow students to investigate the pros and cons of some of the new agricultural techniques that are used to increase yield on farms and ranches.

PLO’s connections

Sustainable Resources 11- Sustainable Agriculture

A1 analyse the environmental, social, and economic significance of agriculture at the local, provincial, and global levels

A2 outline components of agricultural systems and ways of enhancing agriculture production

A3 assess current practices related to sustainable management of agricultural resources in British Columbia

A4 investigate current practices related to the development of commercial agriculture products

A5 illustrate various roles of technology in agricultural practices

Home Economics: Foods and Nutrition 8 to 12

Grade 10

Social, Economic and Cultural Influences

D2 identify factors that affect food production and supply, especially in Canada today.

Grade 11

Social, Economic and Cultural Influences

D2 demonstrate an awareness of environmental and health issues related to the production and consumption of food.

Grade 12

Social, Economic and Cultural Influences

D2 analyse global and environmental health issues related to the production and consumption of food.

Social Studies

Grade 11 – Human Geography

- Assess environmental challenges facing Canada, including global warming ozone layer depletion and freshwater quality and supply

Lesson Objectives – by the end of the lesson, students will be able to discuss both the pros and cons of several new farming techniques and support their position with current research.

Materials and Resources

BLM – Activity 4.2 – What’s New? Student Sheet
Pencil or pen

Background Information

Student Misconceptions

Some students may think that everything is going well with agriculture. They may not be aware of the issues that the agriculture industry faces. The way the agriculture industry answers these challenges will shape the future they will see.

Teacher Notes

There are a number of ways that the agriculture industry will change to make it more sustainable. Many farmers live and work farms that were first settled by their parents and grandparents. They have a long term view of farming and want to make it sustainable so their children will have a future on the farm if they want.

The main focus of new agricultural technologies and techniques involve one of the following:

- **Tillage** is the practice of plowing soil as a farmer prepares for planting.
- **Pest control** includes the management of weeds, insects, and diseases.
- **Nutrient management** includes both the source of nutrient addition for plant crops and livestock production.
- **Water management** is used where rainfall is insufficient or variable, which occurs in most areas of the world.
- **Biotechnology** is the use of science to develop better seeds and animals to grow and raise.
- **Oil and Oil Products** are used in many stages of agriculture from the use of oil based pesticides, to the gas that runs the tractors in the fields and the trucks that bring food to market.
- **Biofuels** are a way to reduce the amount of oil necessary to make gasoline or diesel fuel by substituting a type of plant product.
- **Agroforestry** is intensive land-use management combining trees and/or shrubs with crops and/or livestock.

However, each of these has both a benefit and poses a challenge to either farming or the environment. For example, as corn is diverted from the food chain to the production of biofuels, that means there is less food being produced for world needs. This diversion has already had a worldwide effect on the price of basic food commodities.

Time – 60 minutes

Web Resources

Federation of BC Woodlot Associations – gives information on Agroforestry.
<http://www.woodlot.bc.ca/agroforestry/>

University of Missouri Center for Agroforestry – Gives access to both good general information in addition to specifics on agroforestry.
<http://www.centerforagroforestry.org/>

Google or Yahoo Search Words – you can use a Google or Yahoo search using “nutrient management”, “biotechnology”, “biofuels”, or “pesticides” to find more information on the topics.

Presentation Suggestions

1. Have students read the introduction to the issues that technology may change the face of agriculture. Make sure they understand what each involves. You can use a class discussion to supplement the information.
2. Assign groups of students to research each technology or technique. Make sure that all the topics are covered. You can add other topic of special interest to the list. It is often best to allow some student choice in topic selection as they may be more motivated to research something they are interested in.
3. After the research is completed, have the student groups present their information to the class.

Meeting Individual Needs

You may choose different ways for students to present their information, based on their learning styles and ability levels. These could include: video, essay, letter to the editor, etc.

Extension or Enrichment Suggestions

Invite guest speakers in to discuss one or more of the topics introduced in this activity. For example, a farmer could talk about the specialized grain they feed livestock or poultry, the way fertilizers are used or the way water is managed. A scientist could discuss recent developments in GMOs.

Assessment

This is a good representation of student understanding of these Prescribed Learning Outcomes and could be an integral part of the student portfolio. Use the rubric below to help guide it's assessment. If you choose to have students present their research to the class, you could include a peer evaluation of each presentation.

What's New?

Assessment Rubric

Aspect	Not Yet Within Expectations (1)	Meets Expectations (2) (Minimal Level)	Fully Meet Expectations (3)	Exceeds Expectations (4)
Snapshot	The student is unable to meet basic requirements of the task without close, ongoing assistance. Unable to provide a relevant extension.	The work satisfies most basic requirements, but it is flawed or incomplete. May produce a simple extension.	The work satisfies basic requirements of the task. If asked, the student can produce a relevant extension or further illustration.	The work is complete, accurate, efficient, and insightful. The student may volunteer an alternative procedure, an extension, or an application.
Outcome/ Objective				
Presentation	Presentation is unattractive and lacks colour. Few visuals are included.	Presentation is mostly attractive and contains some colour. Uses a few visuals.	Presentation is attractive and colourful. Suitable visuals are included.	Presentation is attractive and colourful. Suitable visuals are included. Presentation is original and creative
Content	Presentation includes few facts about the problem and technology. Has no closing review.	Presentation includes some facts about the problem and technology. Has a weak closure.	Presentation includes many facts about the problem and technology. Has a closing review that summarizes both benefits and challenges of the technology.	Presentation includes numerous facts about the product. Has a closing review that summarizes both benefits and challenges of the technology. Content includes facts that show further research.

Effectiveness	Presentation is ineffective in relating the information in a coherent manner.	Presentation is slightly effective in relating the information in a coherent manner.	Presentation is effective in relating the information in a coherent manner.	Presentation is very effective in relating the information in a coherent manner.
---------------	---	--	---	--

Suggested Answers to Questions on Student Sheets

Student answers will vary, depending on the issue they research.

Student Activity Sheet 4.2

Name: _____

Date: _____

What's New?

In 2007, about one third of the world's workers were employed in agriculture. In spite of this and the importance of food, agricultural production accounts for less than five percent of the gross world product (an aggregate of all gross domestic products). In order to keep the farms working at peak production, there are several practices that are important to understand.

Tillage is the practice of plowing soil as a farmer prepares for planting. At the same time, the soil can have nutrients added or pests managed. The amount of tillage varies and may improve productivity by warming the soil, incorporating fertilizers and controlling weeds. However, it also makes the soil more susceptible to erosion, triggers the decomposition of organic matter in the soil, releasing CO₂, and reduces the abundance and diversity of soil organisms.

Pest control includes the management of weeds, insects, and diseases. Chemical (pesticides), biological (bio-control), mechanical (tillage), and cultural practices are used. Cultural practices include crop rotation, culling, cover crops, intercropping, compost, and resistance. Integrated pest management uses all these methods to keep pest populations at low levels to ensure an economic profit. Pesticides are usually only recommended as a last resort.

Nutrient management includes both the source of nutrient addition for plant crops and livestock production. This also includes using the manure produced by livestock. Nutrients can be added to soil using chemical inorganic fertilizers, manure, and compost or mined minerals.

Water management is used where rainfall is insufficient or variable, which occurs in most areas of the world. Some farmers use irrigation to supplement rainfall. In other areas, farmers let the land lay fallow (unplanted) to conserve soil moisture to use for growing a crop in the following year. It's estimated that about 70% of the world's freshwater supply is used for agriculture.

Biotechnology is the use of science to develop better seeds and animals to grow and raise. These include the use of crop alteration and genetically modified organisms (GMOs).

Oil and Oil Products are used in many stages of agriculture from the use of oil based pesticides, to the gas that runs the tractors in the fields and the trucks that bring food to market. It's estimated that 20% of the energy use in North America is linked to the agriculture and its related industries.

Biofuels are a way to reduce the amount of oil necessary to make gasoline or diesel fuel by substituting a type of plant product. Corn, which would normally be used for food, can be processed into ethanol and mixed with gasoline to power our vehicles.

Agroforestry is a sustainable agriculture practice that involves, land stewardship, habitat for wildlife, and improved water quality while creating a diversified farm income. It is a management approach that integrates agriculture and forestry practices into land management systems which diversifies farm income and makes them more sustainable.

Questions

Take one of these issues and research it further. What are the good things about it? What are the challenges it poses? How will it help the agriculture industry? Is it a part of a sustainable future?

Activity 4.3 – Price Check on Aisle 2

Overview/Purpose - to critically analyze the total cost (financial, social, energy and environmental) of an object (both small and large).

PLO's connections

Sustainable Resources 11- Sustainable Agriculture

- A1 analyse the environmental, social, and economic significance of agriculture at the local, provincial, and global levels
- A2 outline components of agricultural systems and ways of enhancing agriculture production
- A3 assess current practices related to sustainable management of agricultural resources in British Columbia
- A4 investigate current practices related to the development of commercial agriculture products

Lesson Objectives – by the end of the lesson students should be aware of the hidden (or embodied) energy, environmental and social costs of several objects and list some of the ways and places that these happen.

Materials and Resources

BLM - Activity 4.3 – Price Check on Aisle 2 Student Sheet

Computers with Internet access for further research on enrichment question

Background Information

Student Misconceptions

It's easy to see the costs of the food we eat every day. The prices are recorded at the checkout counter. However, there is much more involved in that price. Every item we purchase and every service we accept has other costs to go along with the monetary costs. Students may not be aware of this. This activity will make students more aware of all the costs that go along with the food we eat.

Teacher Notes

The main objective of this activity is to allow students to realize that there is a "hidden" cost (in energy, environmental and social impact) to everything they purchase. The actual costs, including energy values, are of lesser importance. Hidden energy in a product is often referred to as embodied energy and refers to the amount of energy that is necessary to manufacture and supply to the user, a product, material or service. It includes the energy necessary for the product, material or service – from raw material extraction to transportation, manufacturing, assembly, installation, etc., until final disassembly, deconstruction and decomposition. This kind of accounting is also referred to as Life Cycle Assessment, Life Cycle Analysis or Life Cycle Costing and includes the ideas of Cradle-to-Grave (or Cradle-to-Cradle) Costs. No matter what you call it, this view includes more than the dollar price we pay for an item.

Time - 60 minutes to read the activity and start the questions; 1 more class period may be needed to complete the extension question.

Web Resources

Google or Yahoo Search Words – you can use a Google or Yahoo search using “cradle to grave assessment” to find more information on this topic.

Presentation Suggestions

1. Make copies of the Price Check on Aisle 2 play for each student. Before you hand it out read the title and ask students what they think the story is about.
2. Provide students with a copy of the Price Check on Aisle 2 play. The script can be presented to students in a number of ways:
 - assign a group of four students to practice and present the script as a Reader’s theatre presentation.
 - read through the script with students using a guided reading strategy.
 - have students read the script individually, in pairs, or in small groups.
3. Have students answer the questions at the end of the script and discuss the answers in class. Ask them what they think the title now means. How have their ideas changed?
4. Before moving on to question 5, have students try to figure out the real cost of an item, such as a chocolate cake or an sub sandwich. Students will not be able to calculate the exact energy amounts and each step in the process to get the product to a store but they should be able to describe where items, such as pesticides and energy, are necessary. One way to examine a product is to make a flow chart of the life of the item. This helps create a life cycle assessment. For example, draw a chocolate cake on the board, Backtrack one step to the where the cake came from (a cake mix at the store), then back another step to a warehouse, then back further until you get to the raw materials, such as wheat, eggs, milk, baking powder, etc. Try to list where energy would be needed (transportation, etc.) and other factors, such as environmental (chemical used to grow the wheat and control insects) and the social costs (manufacturing or transportation jobs, etc.). The flow chart will be good for visual learners (see Meeting Individual Needs section).
4. Have students work on extension question 5 and present their results to the class.

Meeting Individual Needs

1. If students have difficulty reading the text, use a Readers theatre or guided reading strategy.
2. Visual learners benefit from a flow diagram or other visual to show the costs involved in the agricultural product they choose.

Assessment

If students complete the extension activity and present their research to the class, you can use the rubric for assessing student performance found in the Appendix.

Suggested Answers to Questions on Student Sheets

1. What do you think the title of the play means? (Everything we build or use has a financial price as well as an environmental cost. We don't always consider the latter.)
2. What are the "hidden environmental costs" of a product or structure? (Student answers will vary. They could include resource extraction, energy for manufacturing and transportation, and clean up of waste products.)
3. How do these hidden costs effect climate change? How are these hidden costs figured into the idea of sustainability? (Student answers will vary. The use of energy in any of these steps produces CO₂ that increases global warming which affects the climate. The use of energy also creates a carbon footprint. All the embodied energy costs need to be considered in any discussion about energy sustainability.)
4. Could the product or structure be made using renewable energy to minimize or eliminate the environmental costs? (Student answers will vary. The use of renewable energy or recycled materials can minimize the environmental costs. These can be part of the carbon offsets used to minimize the environmental costs for a product, structure or service.)

Extension

5. What is the true cost of a can of salmon? Try to figure out all the resources that are needed to catch, process and can the salmon. You may not be able to give an exact value of the resources, but you should be able to list all the different steps and resources that are needed. (Students should be able to list the resources needed to catch the fish – boat purchase and operation, process the fish – people to operate the plant, to clean and cook the fish, and to can it, and transportation to get the cans to market. Related industries include mining and smelting the tin for the can, oil for canning the fish, trucking, and marketing and advertising. There will be an economic, environmental, and social cost to each resource in terms of money, environmental issues and jobs in the community.)

Enrichment

1. Have students make a comic strip of the play. They can draw pictures of the scenes and add voice bubbles when someone speaks.
2. Have a group of students present Price Check on Aisle 2 as a skit. They can present it to other classes or to the community.

Student Activity Sheet 4.3

Name: _____

Date: _____

Price Check on Aisle 2

Read the following script and answer the questions at the end of the activity.

Scene: Liz and Matt are walking into a grocery store. It looks like a normal grocery store – the name of the store “True Cost” is written on the front window. There is also a sign that says “Grand Opening”. A clerk, Amy, is scanning food items for a customer at the checkout counter, while another clerk, Burt, is bagging the items. The store manager, Jim, greets Liz and Matt at the door.

Jim: Welcome to True Cost. We’re the only store in town that shows you the true cost of the food we eat. No special mark ups. We never charge more than the true cost.

Matt: That sounds good. We’re only here to buy a bag of potato chips and some pop for after school. We’re students so we don’t have a lot of extra money.

Liz: I do most of the shopping for my family, so I know what these items should cost. We don’t want to pay a penny more.

Jim: That’s our motto - Never a penny more than the true cost. You’ll find what you want in Aisle 2 with all the other snack foods.

Matt: He sure is friendly. I think I’m going to like this store.

Liz and Matt walk to Aisle 2 and find the snack foods.

Liz: Here’s the six pack of pop. But there’s no price listed on it. What does it cost?

Matt: There’s a button here with a sign that says, “Scan item and push for price check.”

Liz: Well then, scan the pop and push the button.

Matt scans the pop cans and pushes the button. Burt immediately shows up.

Burt: May I help you?

Liz: That was quick. We want to know the cost of the pop.

Burt: What do you think it should cost?

Matt: Well, we bought some last week. It cost \$2.99.

There is an audible groan from Burt. An even louder groan comes from over the loudspeaker system in the store. Liz and Matt look around, slightly confused.

Burt: Sorry, Matt. I’m afraid that not the true cost at all. Show him Amy.

Amy appears from nowhere and stands in the middle of the Aisle.

Amy: A six-pack of pop. Well, let’s take a look. Resource extraction would be 2.1 megajoules of energy to manufacture the cans. That’s the same amount of energy a 100-watt lightbulb would use if it’s left on for 21 hours. Plus there’s energy in processing the pop, including the water, sugar, dye, phosphoric acid — another 3.7 megajoules. Transportation adds another 200 kilojoules. Don’t forget

the environmental costs during these steps . . . and climate change. And finally, there is an energy cost to wholesale and retail trade, and in your refrigerator, which makes a total cost of 11.2 megajoules of energy, a 2.3 ton carbon debt. . . plus \$2.99.

Liz: I get it. You're working out the value of things based on their true costs – economic, environmental and social. You eventually have to pay the environment for the entire process. They're showing us the hidden costs involved in everything we buy.

Matt: [to Liz] Well, nobody told me that!

Burt: And that doesn't include that fact that we have to get rid of the cans afterwards.

Matt: Well, you could recycle those!

Burt: Right, Matt! In fact, recycling could save up to 90% of the manufacturing energy. In the last ten years we've recycled enough metal to equal the weight of six million science teachers stacked one on top of another. [Matt tries to picture that.]

Burt: [to Liz] OK, Liz. How about the potato chips? What do you think the true cost of them is?

Liz: Well, the potato chips themselves would cost about \$3.50. But I know this brand of chip is manufactured overseas. The environmental costs would add 15 megajoules of energy for manufacturing, transportation, sales . . .there's also the carbon debt and climate change, an increasing carbon footprint . . .

Burt: [interrupts] Good try, Liz. But the true cost is more than double what you thought. You forgot to include the costs to clean up and dispose of the waste oil from the cooking process. And the new potato chip factory displaced a local bird nesting area while it supplied needed jobs for the area. These potato chips are a very expensive item. But you're starting to see the true cost of the food we eat.

Burt: So, is there anything else you need today?

Liz: I was thinking about getting some canned salmon. What's the true cost of that?

Burt: [to Liz and Matt] I think you know. You can figure that out. [to the audience/reader] And what about you? Can you figure out the true cost of a can of salmon?

Questions

1. What do you think the title of the play means?
2. What are the "hidden environmental costs" of a product or structure?
3. How do these hidden costs effect climate change? How are these hidden costs figured into the idea of sustainability?
4. Could a product or structure be made using renewable energy to minimize or eliminate the environmental costs? Explain your answer.

Extension

5. What is the true cost of a can of salmon? Try to figure out all the resources that are needed to catch, process and can the salmon. You may not be able to give an exact value of the resources, but you should be able to list all the different steps and resources that are needed.

Activity 4.4 – This is My Future - Presentations

Overview/Purpose – to allow students to investigate one career in the agriculture industry. This will include demonstrating knowledge of the factors that affect the availability of career opportunities.

PLO's connections

Sustainable Resources 11- Sustainable Agriculture

F1 research career and job opportunities in resource industries and related services

Lesson Objectives – by the end of the lesson students will have investigated one career in the agriculture industry while demonstrating knowledge of the factors that affect the availability on that career.

Materials and Resources

BLM – Activity 4.4 – This is My Future – Presentations Student Sheet

Computer with Internet access

Poster board

Felts or coloured pencils

Background Information

Student Misconceptions

Students will have explored several careers in the agriculture industry. However, they might not have an idea about the details that go into the career – e.g., training, wages, etc. This activity will open one career and allow this information to come forward.

Teacher Notes

In doing this activity, students explore one job or career opportunity in the agriculture industry. It may be available now or will be in the future. The careers students will research can be involved in the many aspects of food, nutrition and agriculture as it moves from field to fork, from plough to plate. All these careers can be involved our province's agricultural sustainability.

Time – allow 60 minutes to start the activity and part of the next few days to complete it. Another 60 minutes will be required for student presentation

Web Resources

Human Resources and Social Development Canada (HRSD)

This site links to National Occupational Classification (NOC) document that gives information on a number of jobs and careers. It gives the main duties for the job, employment requirements, including education, and additional information about the job.

<http://www23.hrdc-drhc.gc.ca>

WorkInfoNet

Makes useful labour market and career information accessible to British Columbians. See “Quicklinks” drop down menu on side for many more links.

<http://workinfonet.bc.ca/>

Workfutures BC

Looks at occupational outlooks in British Columbia.

<http://www.workfutures.bc.ca/>

Presentation Suggestions

1. Have students review the results of Activity 2.4 – Fields of Your Future. Have them look at the careers they investigated. Is there one that interests them more than the others?
2. Either have students select a partner for the activity or assign student pairs to complete the activity.
3. Go over the procedure before starting to make sure students understand both their task and the criteria by which it will be assessed.

Meeting Individual Needs

Make sure you pair weaker students with stronger students to ensure the activity will be completed. Students can also be paired to compliment learning styles. For example, you can match a visual student with a linguistic student so they can maximize each others talents and abilities and have a better presentation.

Extension or Enrichment Suggestions

Before you start this activity, invite people from the agriculture industry to speak to your class about their jobs and their view of the future of agriculture.

Assessment

Student presentations can be assessed using the rubric for Student Presentations found in the Appendix. The visual presentations can also be assessed by both the teacher and student peers, using a four point rating scale (outstanding, good, satisfactory, minimal) to describe how effectively the presentations met the criteria listed on the student sheets. The teacher can mark the action plan portion of the visual presentation.

Student Activity Sheet 4.4

Name: _____

Date: _____

This is my Future

In Activity 2.4, Fields for Your Future, you explored several careers in the agriculture industry. In this activity, you and a partner will further investigate one of those careers. You may also investigate another agricultural career with the permission of your teacher.

Procedure

Working with a partner, chose one specific job or career in the agriculture industry. Use the career exploration work you did in Activity 2.4 to help you choose the job or career. As an alternative, you could choose another job or career in the agriculture industry that is just emerging and the industry changes to meet the new needs of society. Confirm your job or career with your teacher.

Place the job or career in the middle of a piece of paper and make a web diagram to record the questions and issues related to the appeal of this job or career.

Categorize the questions into areas such as, working conditions, wages, qualifications, responsibilities, working with colleagues, opportunities for advancing, benefits, and school or training necessary to enter the job or career.

Research the find out the information needed to answer these questions. You can use the library, career brochures or the Internet to do your research. You can use the same web sites noted in Activity 2.4.

Create a visual presentation of your information (e.g., a poster, video, display, power point, photo essay, etc.). Confirm your presentation technique with your teacher.

Include an action plan outline which includes steps necessary to achieve this career option.

Prepare and present your information to the class.

Defining Criteria

Visual Presentation

Comprehensive – does the presentation address all the categories of the questions?

Accuracy – does the presentation include information that is current and accurate and credible?

Relevance – does the presentation focus on important aspects of the questions?

Clarity – can other students easily gather the important information from the presentation?

Action Plan

Focus – does the action plan contain the necessary steps to reach the career option?

Complete – if the action plan were followed, would a student reach their goal?

Accurate – is the action plan an accurate understanding of the current workplace?

Clarity – is the action plan clear and easy to understand.

Concept 5

There are many factors involved in a healthy lifestyle. Good nutrition and exercise are beneficial to healthy living and are part of a balanced life. The choices we make about the food we eat will affect our lives both today and in the future.

Facts:

- Good nutrition and exercise are part of a healthy lifestyle.
- The choices we make about the food we eat will affect how we live our lives.
- Nutritious food comes in many forms. It is important that we know how to identify a nutritious food.
- Eating Well with Canada's Food Guide can help create a nutritious meal.

Attitudes:

- We can all change our eating habits and eat more nutritious food.

Activity 5.1 – You Are What You Eat

Overview/Purpose – students will record what they eat for a 24 hour period, then compare it to the Canadian Food Guide.

PLO's connections

Health and Career Education

Grade 8

Health – Healthy Living

- Set personal goals for attaining and maintaining a healthy lifestyle
- Analyse influences on eating habits, including family, peers, and media

Grade 9

Health – Healthy Living

- Relate the characteristics of a healthy lifestyle to their ability to maximize personal potential.
- Analyse how healthy eating habits can support a healthy lifestyle.

Planning 10

- C1 analyse factors that influence health (e.g. physical activity, nutrition, stress management)
- C2 analyse health information for validity and personal relevance.

Home Economics: Foods and Nutrition 8 to 12

Grade 8

Nutrition and Healthy Eating

- C1 describe the importance of nutrition and other factors that contribute to health
- C2 use Eating Well with Canada's Food Guide to plan simple, nutritious dishes and snacks.
- C3 use product labels to identify and compare the nutritional value of a variety of food products.

Grade 9

Nutrition and Healthy Eating

- C2 use Eating Well with Canada's Food Guide to plan meals and snacks for a nutritionally balanced diet.
- C4 identify and compare the ingredients and nutritional value of various commercial products

Grade 10

Nutrition and Healthy Eating

C1 demonstrate an understanding of the following nutrients and their relationship to healthy living:

- a variety of protein choices
- simple and complex carbohydrates
- saturated, unsaturated and trans fats
- micronutrients, including vitamins and minerals

C2 create nutritious menus for a variety of dietary and budget considerations using Eating Well with Canada's Food Guide.

C5 evaluate commercial food products including:

- interpreting information on food labels
- analyzing food labels for nutritional labels
- developing and using criteria to compare similar food products

Grade 11

Nutrition and Healthy Eating

C2 create nutrition plans within a specified budget for a variety of dietary considerations that meet the recommendations from Eating Well with Canada's Food Guide.

C5 identify types of food additives and enrichments and their function in food products.

Grade 12

Nutrition and Healthy Eating

C1 apply principles from Eating Well with Canada's Food Guide and other reliable sources to analyse menus and make recommendations for particular dietary needs.

C5 critique the use of additives and enrichments, use of pesticides and nutrition and health statements about foods.

Physical Education

Grade 11 – Active Living

- design and implement plans for balance, healthy living, including:
 - nutrition
 - exercise
 - rest
 - work

Lesson Objectives – by the end of the lesson students will be able to assess their diet for a 24 hour period and decide if it meets the guidelines set out by the Canadian Food Guide.

Materials and Resources

BLM – Activity 5.1 – You Are What You Eat Student Sheet

Pencil or pen

Computer with Internet access or a copy of Eating Well with Canada's Food Guide

Background Information

Student Misconceptions

Student may not know what an serving size in for each of the food categories. The use of the Eating Well with Canada's Food Guide gives that information.

Teacher Notes

Diet consists of all the food a person regularly eats and drinks. Your diet can be affected by many things, such as the foods available where you live or family customs and religious beliefs. Your diet can also be affected by things like age, health and personal likes and dislikes. A diet should provide a person with their proper nutrition, foods from the 4 food groups and fibre, to support a healthy lifestyle.

Time – 10 minutes to hand out inventory sheets one day and 60 minutes the next day to complete the chart and answer the questions

Web Resources

Canada's Food Guide – Health Canada's site for information on Eating Well with Canada's Food Guide. It has a link for Educators and a separate Food Guide for First Nations, Inuit and Metis.
<http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/index-eng.php>

Presentation Suggestions

1. Ask students about their current diet. Do they think their diet is healthy or unhealthy? Ask for their ideas about what makes a healthy or unhealthy diet and listen to their responses.
2. Hand out the You Are What You Eat Student Sheets. Explain that they are going to keep track of all the food they eat for the next 24 hours. Students only need to complete the first two columns on the chart. They can fill in the other columns the next day.
3. When students return to class, check to make sure they have completed the assignment the day before. Then have students complete the remainder of the assignment.

Meeting Individual Needs

1. Have examples of serving sizes for the second day. Go over what a serving size actually looks like. This is one thing that confuses many students and the visual representation will help them begin to understand serving size and the amount of certain foods they eat.
2. When placing foods on the Eating Rainbow, have them both list the food and draw a picture of it. This will help the visual learner.

Extension or Enrichment Suggestions

Ask a nutritionist to speak to your class on eating a healthy diet.

Assessment

Since there are no correct answers for a student diet, it is important to look for completeness of answers and the ability to assess their own diet and make choices that will lead to a healthy lifestyle.

Suggested Answers to Questions on Student Sheets

Student answer will vary on the questions, depending on their diet.

Student Activity Sheet 5.1

Name: _____

Date: _____

You Are What You Eat

We don't often think about the food we eat. It's put on our plate and we put it in our mouths. But how nutritious is your diet? Does the food you eat meet the guidelines that are set out by Health Canada? In this activity you'll examine the food you eat in one day and then compare it to Health Canada's guidelines.

Materials

Worksheets

Pencil or pen

Computer with Internet access or a copy of Eating Well with Canada's Food Guide

Procedure

1. List all the food you eat in a 24-hour period. List each in the meal where you ate it. Make sure to list the amount you eat of each item.
2. When the list is complete add the information on the number of servings and food group each belongs to. You can use Health Canada's website to get this information (<http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/index-eng.php>). Several examples are given below:

Food	Amount	Number of Servings	Food Group
Bagel	1 slice (1/2 of a bagel)	1 serving	Grains Products
Peanut Butter	30 mL	1 serving	Meat and Alternatives
Apple	1 medium	1 serving	Vegetables and Fruit
Milk	250 mL	1 serving	Milk and Alternatives

You Are What You Eat Worksheet

Name: _____

Date: _____

Food	Amount	Number of Servings	Food Group
Breakfast			
Lunch			
Dinner			
Snacks			

You Are What You Eat Questions:

1. What is important for good health?
2. What effect do you think food has on how one feels, looks and behaves?
3. What are the characteristics of a healthy diet?
4. What are the characteristics of an unhealthy diet?
5. Draw a picture of someone participating in a healthy activity?
6. Compare your answers and picture with someone else in class. How are your responses the same and how are they different that theirs?

Extension

7. Place each food you eat on the Eating Rainbow in the appropriate category. Compare your diet with Canada's Food Guide. The Food Guide suggests secondary students (age 14 – 18) eat:

Food Group	Males	Females
Vegetables and Fruit	8	7
Grain Products	7	6
Milk and Alternatives	3 – 4	3 – 4
Meat and Alternatives	3	2

Does your daily diet demonstrate nutritious, healthy eating? Use the "Create My Food Guide" on the Health Canada website to input your foods and have them compare your diet to these standards. (<http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/index-eng.php>)

Name: _____

Date: _____

The Eating Rainbow

Place the foods you ate on the Eating Rainbow according to its food category. After you are done, compare the servings you have in each category with the recommended number of servings for your age and sex. Do you have a nutritious diet? Does it meet Health Canada's guidelines for your sex and age group?

Activity 5.2 – It’s All in the Fine Print

Overview/Purpose – to allow students to investigate the information found on food labels.

PLO’s connections

Home Economics: Foods and Nutrition 8 to 12

Grade 8

Nutrition and Healthy Eating

- C1 describe the importance of nutrition and other factors that contribute to health
- C2 use Eating Well with Canada’s Food Guide to plan simple, nutritious dishes and snacks.
- C3 use product labels to identify and compare the nutritional value of a variety of food products.

Grade 9

Nutrition and Healthy Eating

- C2 use Eating Well with Canada’s Food Guide to plan meals and snacks for a nutritionally balanced diet.
- C4 identify and compare the ingredients and nutritional value of various commercial products

Grade 10

Nutrition and Healthy Eating

- C1 demonstrate an understanding of the following nutrients and their relationship to healthy living:
 - a variety of protein choices
 - simple and complex carbohydrates
 - saturated, unsaturated and trans fats
 - micronutrients, including vitamins and minerals
- C2 create nutritious menus for a variety of dietary and budget considerations using Eating Well with Canada’s Food Guide.
- C5 evaluate commercial food products including:
 - interpreting information on food labels
 - analyzing food labels for nutritional labels
 - developing and using criteria to compare similar food products

Grade 11

Nutrition and Healthy Eating

- C2 create nutrition plans within a specified budget for a variety of dietary considerations that meet the recommendations from Eating Well with Canada’s Food Guide.
- C5 identify types of food additives and enrichments and their function in food products.

Grade 12 –

Nutrition and Healthy Eating

- C1 apply principles from Eating Well with Canada’s Food Guide and other reliable sources to analyse menus and make recommendations for particular dietary needs.
- C5 critique the use of additives and enrichments, use of pesticides and nutrition and health statements about foods.

Physical Education

Grade 11 – Active Living

- design and implement plans for balance, healthy living, including:
 - nutrition
 - exercise
 - rest
 - work

Lesson Objectives – by the end of the lesson students will be able to read the ingredient label found on common foods and interpret what they mean. They will begin to make informed decisions about the food they eat.

Materials and Resources

- BLM – Activity 5.2 – It’s All in the Fine Print Student Sheet
- Nutrition labels from a many common food products

Background Information

Student Misconceptions

The most common thing students are unaware of is that the ingredients are placed in the order of their amount. Also, companies will try to put two items under different names so they don’t seem so prevalent (e.g., sugar as fructose or glucose).

Teacher Notes

The nutrition facts label is a label required on most pre-packaged foods in North America, Europe and other countries. In Canada, a standardized “Nutrition Facts” label was introduced as part of regulations passed in 2003 and became mandatory in 2007. Since the Canadian label came 10 years after a similar label in the United States, it changed some of the previous data due to advanced food science techniques. Many of the Recommended Daily Intakes (used to calculate % Daily Value) differ slightly in Canada.

Time – 60 minutes

Web Resources

Health Canada

This website contains information on nutrition labeling. It has a link to an interactive nutrition label and quiz if more information is necessary.

<http://www.hc-sc.gc.ca/fn-an/label-etiquet/nutrition/index-eng.php>

Presentation Suggestions

1. Bring in a number of nutrition labels from various pre-packaged food items. (Or have students bring them in. You could give this as an assignment for the previous day.) Ask students why the information is important. (It gives nutrition information about the product.)
2. Ask students if they know what information is on the label. Ask if labels and their information are the same in every country.
3. Have students complete the reading and extension activity.
4. If you have time and Internet access, you can supplement the reading with Health Canada's website. Their interactive nutrition label is a useful way to learn about labeling in Canada.

Meeting Individual Needs

Because there is a lot of information in this reading, you may choose to do this as a class assignment using a guided reading strategy. Have stronger readers read a paragraph then discuss what was read so that everyone understands the concepts. This is especially true with the section on how to read the nutrition labels.

Extension or Enrichment Suggestions

Have students research whether the vitamins and minerals in a food product is there naturally or added to "enrich" the product. Does it make a difference?

Assessment

Use the Suggested Answers to Questions on the Student Sheets below to assess if students understand the information found on a nutrition label.

Suggested Answers to Questions on Student Sheets

1. What foods did Kate eat for her main course.
 - a. (whole wheat bread)
 - b. (margarine)
 - c. (mayonnaise style dressing)
 - d. (bologna)
 - e. (lettuce)
2. What do those food make when you put them together? (sandwich)
3. What did Kate drink? (orange drink)
4. What did Kate eat at the end of her lunch? (chocolate bar)
5. Look back at item (a) in Kate's main course. What ingredient is there the most of? (whole wheat flour)
6. Why are sugar, cocoa butter and lecithin listed together inside brackets in the list of ingredients of the item Kate ate at the end of her lunch? (they are the ingredients in chocolate)
7. What other forms of sugar does this item have? (sugar appears twice – molasses are also types of sugars)

Extension

Read the labels of three other foods and list their ingredients. What surprised you the most in the their list of ingredients? (Student answer will vary.)

Student Activity Sheet 5.2

Name: _____

Date: _____

It's All in the Fine Print

Few of us would sign a contract without reading it first. Most people want to have some idea what a moving is about before they go see it. But we all regularly put food into our mouths that are very much mystery items – unless you read the fine print. Listed below is an example of a nutrition label that could be found on a breakfast cereal. They list both the ingredients and the nutritional value of a specific sized serving.

Crunchy Rice Cereal

Nutrition Facts

Per 1 cup (29 g) – amounts in grams or % Daily Value

Amount	Cereal Only	Plus 125 mL Skim Milk
Calories	110	160
Protein	2.2 g	6.4 g
Fats 1.5 g	2%	2%
Saturated 0.3 g + Trans 0 g	1%	2%
Cholesterol 0 mg		
Sodium 200 mg	8%	10%
Carbohydrates	23 g	32 g
Sugars	6 g	
Fibre	0.3 g	0.3 g
Vitamin A	0%	8%
Vitamin D	0%	23%
Calcium	5%	25%

Amount	Cereal Only	Plus 125 mL Skim Milk
Iron	30%	30%
Niacin	6%	15%
Folate	8%	10%
Phosphorus	8%	20%
Magnesium	8%	15%
Zinc	4%	10%

INGREDIENTS: Rice, sugar, glucose-fructose, salt, malt flavouring, thiamin hydrochloride, pyroxide hydrochloride, folic acid, calcium phosphate, iron, BHT

The law requires manufactured foods to list ingredients. Here are some pointers next time you reach for that box of Super Cruncho cereal.

The Order is Important

The ingredients are listed according to the amount contained by the product. The most is listed first, the least last.

Ingredients within Ingredients

Some ingredients contain other ingredients. In this case, the ingredient will be followed by a list of the ingredients in brackets, for example: chocolate (sugar, cocoa butter, and lecithin).

Careful Wording

Food manufactures know that people are often concerned about food value or the amounts of sugar and fat in a product, so they word their ingredients as carefully as possible. For example, remember that enriched flour means white flour with additives – it doesn't mean whole-wheat flour.

Separating out different forms of the same ingredient can alter where they appear in the list. Fats may be: lard, coconut oil, hydrogenated oil, vegetable oil, hydrogenated vegetable oil, palm oil, palm kernel oil, or shortening. Sugar may be: dextrose, corn syrup, molasses, or fructose – just to name a few.

A list of ingredients for a white cake mix could be: flour, shortening, sugar, dextrose, corn syrup, baking soda, propylene glycol, artificial flour, xanthan gum. If all forms of sugar were added together, sugar would actually be the main ingredient and would have to be listed first.

Additives

Additives are the scientific sounding words in the list. They are chemicals that are added to help preserve the food, or alter the flavour, colour, or consistency. Because a little goes a long way with additives, they are usually toward the end of the list.

All additives must be tested and approved for human consumption. There is, however, some disagreement about whether a life-long pattern of consuming small amounts of additives every day might increase a person's chance of getting some forms of cancer.

In case you're interested, the following additives are considered controversial:

- The artificial sweeteners acesulfame K and saccharin
- Artificial colourings
- BHA and BHT, two preservatives often added to crackers, cereals, and vegetable oil
- Sodium nitrate, a preservative used to make processed meats such as bacon and hot dogs

On Saturday, Kate went on a hike. She decided to pack a lunch to take with her. Can you figure out what she took?

1. These were assembled into the main course:

- a. **INGREDIENTS:** whole wheat flour, water, unbleached wheat flour, yeast, vegetable oil shortening, salt, calcium propionate, sodium stearoyl-2-lactate, mono- and di- glycerides, caramel.
- b. **INGREDIENTS:** hydrogenated soya and Canola oils 75%, Canola oil 5%, not more than 16% water, whey powder 1.4%, sorbitan tristearate 0.4%, vegetable lecithin 0.2%, potassium orbate 0.1%, vegetable colour, artificial flavour, citric acid, vitamin A palmitate, Vitamin D.
- c. **INGREDIENTS:** Canola oil, water, sugar, white vinegar, egg yolk, modified corn starch, salt, starch, mustard flour, spices, calcium disodium EDTA.
- d. **INGREDIENTS:** pork, beef and/or mutton and or mechanically separated meats (chicken, turkey, pork), water, beef and/or pork by-products, salt, modified milk ingredients, modified corn starch, starch, spice, glucose, sugar, sodium erythorbate, sodium nitrate, smoke.
- e. **INGREDIENTS:** lettuce

2. She drank:

INGREDIENTS: water, liquid sugar, glucose-fructose, citric acid, natural flavour (contains citric acid), salt, sodium citrate, monosodium phosphate, potassium citrate, coconut oil triglycerides, sucrose acetate isobutyrate, colour, brominated vegetable oil.

3. And finished it off with:

INGREDIENTS: sugar, peanuts, glucose, modified palm and vegetable oils, chocolate (sugar, cocoa butter, lecithin), modified milk ingredients, fancy and blackstrap molasses, salt, cocoa butter, soya lecithin, mono- and di- glycerides, natural and artificial flavour.

Questions

1. What foods did Kate eat for her main course.
 - a.
 - b.
 - c.
 - d.
 - e.
2. What do those food make when you put them together?
3. What did Kate drink?
4. What did Kate eat at the end of her lunch?
5. Look back at item (a) in Kate's main course. What ingredient is there the most of?
6. Why are sugar, cocoa butter and lecithin listed together inside brackets in the list of ingredients of the item Kate ate at the end of her lunch?
7. What other forms of sugar does this item have?

Extension

1. Read the labels of three other foods and list their ingredients. What surprised you the most in the their list of ingredients?
2. Research a food additive with the approval of your teacher. What does it do for the food? What are its benefits? Is there a concern over its use? If so, what is it?

Activity 5.3 – Making it Fit

Overview/Purpose – to allow students to create a diet for a specific diet need.

PLO's connections

Home Economics: Foods and Nutrition 8 to 12

Grade 8

Nutrition and Healthy Eating

- C1 describe the importance of nutrition and other factors that contribute to health
- C2 use Eating Well with Canada's Food Guide to plan simple, nutritious dishes and snacks.

Grade 9

Nutrition and Healthy Eating

- C2 use Eating Well with Canada's Food Guide to plan meals and snacks for a nutritionally balanced diet.
- C4 identify and compare the ingredients and nutritional value of various commercial products

Grade 10

Nutrition and Healthy Eating

- C1 – demonstrate an understanding of the following nutrients and their relationship to healthy living:
 - a variety of protein choices
 - simple and complex carbohydrates
 - saturated, unsaturated and trans fats
 - micronutrients, including vitamins and minerals
- C2 – create nutritious menus for a variety of dietary and budget considerations using Eating Well with Canada's Food Guide.
- C5 - evaluate commercial food products including:
 - interpreting information on food labels
 - analyzing food labels for nutritional labels
 - developing and using criteria to compare similar food products

Grade 11

Nutrition and Healthy Eating

- C2 – create nutrition plans within a specified budget for a variety of dietary considerations that meet the recommendations from Eating Well with Canada's Food Guide.

Grade 12

Nutrition and Healthy Eating

- C1 – apply principles from Eating Well with Canada's Food Guide and other reliable sources to analyze menus and make recommendations for particular dietary needs.

Physical Education

Grade 11 – Active Living

- design and implement plans for balance, healthy living, including:
 - nutrition
 - exercise
 - rest
 - work

Lesson Objectives – by the end of the lesson students will be able to create a diet that fulfills a specific dietary consideration.

Materials and Resources

- BLM – Activity 5.3 – Making it Fit Student Sheet
- Computer with Internet access

Background Information

Student Misconceptions

Student may not recognize the importance of a their diet on their overall health. Diabetes, heart disease and obesity are hot topics today. Their prevention and treatment is in your hands. Foods with a lower glycemic index, which are higher in soluble fibre and lower in saturated fats have significant health benefits over other foods.

Teacher Notes

One way to create a healthy diet is to focus on one that has a low glycemic index (GI). Definition: Foods are ranked on a scale of 1 – 100 based on the rate of carbohydrate digestion, metabolism and their effects on blood glucose levels. Carbohydrates that break down rapidly during digestion and release glucose rapidly into the bloodstream have a high GI; carbohydrates that break down slowly and release glucose gradually into the bloodstream have a lower GI. Lower GI foods have been shown to lower the risk for developing both type 2 diabetes and coronary heart disease. Choose lower GI foods most often and higher GI foods less.

Low GI Foods (55 or less)	Medium GI Foods (56 – 69)	High GI Foods (70 or more)
Whole grain breads		White bread and buns
Barley		Bagels, croissants, pretzels
Pasta (still firm)		Short Grain or Minute Rice
Whole fruits	Long grain brown rice	Cornflakes
Whole vegetables	Whole wheat products	Gatorade
Legumes	Orange sweet potato	Potatoes –baked or fried
Popcorn	Table Sugar	Rice cakes
Nuts		Fruit bars
Juices (125 mL)		Soda crackers
Milk		Highly refined foods
Chicken, fish and lean meat		Most processed foods

Time – 60 minutes

Web Resources

BC Chicken Marketing Board – This web site includes more information on chicken as part of a healthy diet, food safety and tasty chicken recipes.

<http://www.bcchicken.ca/>

Canada’s Food Guide – Part of Health Canada’s web site, Canada’s Food Guide helps you select appropriate serving sizes and choose healthy, nutritious food and meals.

<http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/index-eng.php>

Google Search words and phrases – you can use a Google or Yahoo search using “low glycemic index” or any of the other diet types to find more information on these topics.

Presentation Suggestions

1. Tell students that they have learned a lot about food and nutrition. Now they have a chance to create set of meals for one day that focus on the needs of a specific individual or group or people. They can work either as individuals or small groups on this project.
2. Hand out the Making it Fit student sheet and have students read the criteria and expectations for their daily diet. Make sure that they understand the task.
3. Have students select their category of daily diet. You may select the category for them in order to get a wider range of diets. You can circulate among the students to help them as they create their daily diets.

4. If students are going to prepare one of the meals in their daily diet, they should submit a list of ingredients they will need prior to starting their food preparation. Review all food safety techniques before students start their food preparation.
5. One way to organize this activity is to pair two groups together. Each group will share their prepared meal with the other group and then have their meal assessed.

Meeting Individual Needs

Some students may need more help to create their diet. You can get them started with the following suggestions for their meals.

Simple Meal Plan <as an illustration>

Breakfast – $\frac{1}{3}$ starch, $\frac{1}{3}$ protein, $\frac{1}{3}$ fruit

Snack – fruit, protein (nuts)

Lunch – $\frac{1}{4}$ starch, $\frac{1}{4}$ protein, $\frac{1}{2}$ vegetables

Snack – fruit, protein (cheese)

Dinner – $\frac{1}{4}$ starch, $\frac{1}{4}$ protein, $\frac{1}{2}$ vegetables

Extension or Enrichment Suggestions

Have students prepare one of the meals they have suggested in this activity. They can have other students assess their meal.

Assessment

If you have students prepare one of the meals in their daily diet plan, there will be two parts of this assignment. The daily diet plan can be assessed on its ability to meet the needs of the individual or group of people they selected. The meal they prepare can be assessed on the student's ability to successfully make the meal they suggested. Part of this should be following proper food safety techniques.

Suggested Answers to Questions on Student Sheets

There are no right or wrong answers in this activity. Students should follow the criteria for their daily diet.

Student Activity Sheet 5.3

Name: _____

Date: _____

Making it Fit

You have just been given the job to create a number of special menus for a local restaurant. They have decided to have each item on the menu cater to a different set of dietary concerns. Choose one of them and create one day's meals that match the needs for your group. Each day's diet should include food that is both nutritious and at the end of the day, should meet the daily nutritional guidelines as set out by Health Canada.

The possible dietary groups are listed below:

- low carbohydrate/high protein
- vegetarian
- organic
- low cost
- diabetic
- low glycemic index
- locavore (100-mile diet)
- ethnic
- kid friendly

Criteria for Assessment

1. The daily diet contains suggestions for meals for breakfast, lunch, dinner and snacks.
2. The daily diet meets the daily nutritional guidelines as set out by Health Canada.
3. The daily diet meets the criteria for the group of people who would use it (eg. – no sugar in the diabetic diet).
4. The daily diet contains foods that are both tasty and nutritious.

Extension

Prepare one of the meals you suggested in your daily diet and serve it to one or two classmates. What is their assessment of your meal?

Make it Fit Worksheet

Student Name(s): _____

Diet Category: _____

Breakfast:

Lunch:

Snack:

Dinner:

Meal to Prepare: _____

Recipe Ingredients: List your ingredients in the order of use.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Recipe Directions:

Concept 6

We make personal choices about the food we eat and where the food comes from. The choices we make about agriculture will affect the challenges we will face and the future we will create.

Facts:

- We will make choices about agricultural sustainability.
- There will be consequences to our choices.

Attitudes:

- Personal choice guides the end result for society in terms of impact and/or choosing governmental decision makers.
- Individuals have the power to affect the outcome of society as a whole.
- Understanding our choices empowers individuals.

Activity 6.1 – Sustainable Agriculture – The Game

Overview/Purpose – to allow students to represent their knowledge about food, nutrition and sustainable agriculture through the creation of a game.

PLO's connections

Sustainable Resources 11- Sustainable Agriculture

A6 analyse challenges and opportunities faced by agriculture industries in British Columbia

Social Studies

Grade 11 – Human Geography

- Assess environmental challenges facing Canada, including global warming ozone layer depletion and freshwater quality and supply

Lesson Objectives – by the end of the lesson, students will represent their knowledge about food, nutrition, agriculture and sustainability through the creation of a game. This representation will allow students to bring all their knowledge into a final product.

Materials and Resources

BLM – Activity 6.1 – Sustainable Agriculture – The Game

Poster board

Felt Pens

Objects to make game pieces

Paper for game rules

Background Information

Student Misconceptions

Students may not be familiar with this format for representing their knowledge. You may need to show several different types of games to the students. For example, Trivia Pursuit, Snakes & Ladders, Sorry, etc. each have a different game format for students to choose from. Make sure you go over the criteria for the assignment and how the project will be graded.

Teacher Notes

There are many ways for students to represent their learning. One way is through the creation of a board game. There are many board games that students can create that are modeled by current, popular games, such as Trivial Pursuit, Snakes and Ladders, Monopoly, Careers, Jeopardy, etc.

Time – Allow students 2 – 3 class periods to work on their game.

Web Resources

You can find other board games to assess student learning by using the key words “board game assessment” in a search engine, such as Google.

Presentation Suggestions

1. Begin the class by handing out the student sheet and give an overview of the game project.
2. Show examples of different game boards. Discuss their features and how they are played. Have students look for the following:

The visual design of the board and game pieces.

The goal of the game, the number of players and how someone wins.

The questions or clues on the cards. How do they help the game?

Are a dice or spinner used to move players around the board?

3. Answer student questions and review the assessment criteria for the game. Make sure that students understand their task.
4. While this project can be done individually, it may also be done as a group project. If you use the group format, you can suggest that one student take a leadership role in each of the following area:

Rule Maker(s) – He/she must first work with the group to identify the goal of the game, how the game is played and how players move around the board. After the concept of the game has been agreed to, the other students in the group can begin their roles.

Artist(s) – Create the game board and game pieces.

Writer(s) – Creates and types the questions, instructions and rules sheet for the game using a word processing program.

Researcher(s) – Looks through class notes and readings for questions and answers for the game.

Meeting Individual Needs

A group format works well if you have students with different abilities. Ensure that each group has a mix of stronger and weaker students.

Extension or Enrichment Suggestions

Some groups can be encouraged to have more questions for their game.

Assessment

There are three parts to the assessment and evaluation of this project: peer evaluation, self-evaluation and teacher evaluation. Rubrics for each are included in the Student Sheet section.

1. Begin the assessment process by having students do the student self-evaluation.
2. Next have students circulate in the room and do peer evaluations as they play the games of other students. One way to do this is by having half of the students leave their games on their desks and move to the games created by the other half of the students.
3. Students then read the rules and play the game with several other students for a period of time selected by the teacher.
4. When time is up, students change games and play again, until they have played four games.
5. Students switch roles and the remaining games are played.
6. Finally, Game Boards are turned in to the teacher who completes their assessment. While the peer evaluation and self evaluation can be used as an aid, the final assessment always belongs to the teacher.

Student Activity Sheet 6.1

Name: _____

Date: _____

Sustainable Agriculture – the Game

Congratulations! You have been hired by the British Columbia Educational Gaming Association (BCE-GA) to design and create a board game about food, nutrition and sustainable agriculture. This activity will provide you with the challenge of designing and creating your own, original, creative game while investigating all the topics covered in class.

Purpose: Working individually or in a group, invent and construct a board game that includes all the topics covered in this class.

Criteria:

Your game should include the following.

1. Game Board – The game board should include the game title, is suitably decorated and is in color. The board should consist of an appropriate game surface and be sturdy enough to hold up to student play. It must be large enough for classroom display and for players to clearly read the playing directions printed on it. All spelling must be correct. Suggested size: at least 60 cm x 60 cm (although it doesn't have to be square).
2. Game Markers – The game should have playing pieces for up to six players. They should be invented and created on your own and should relate to the game.
3. Game Path – The game should have a path to follow. The path can be squares, rectangles, triangles or other shape that fits your game. The Game Markers will travel along the Game Path. The Game Path should have a start and finish and movement directions along the way on specific squares (e.g. ALR rules against your proposal, go back 3 spaces). You may include multiple paths or detours on your Game Path. Dice or a homemade spinner will be used to decide the number of spaces the Game Markers will move. The Game Path must have at least 20 spaces to move on.
4. Game Cards – Game Cards must be linked with the game's theme and must be answered before the person can advance to the next spin or roll (similar to Trivial Pursuit). You will need to create a minimum of 40 Game Cards covering information from all the concepts in this class. The questions must be accurate and follow the theme of the game. The Game Cards must be decorated and include both the question and the answer. No more than half of the questions can be true/false or multiple-choice type. You may decide to have random cards with random topics or you can have different coloured squares that correspond to different coloured cards on different topics.
5. Game Rules – You must have a specific set of rules that clearly explain The Game. The rules must be neatly typed, easy to understand and included in your Game Kit (see #6 below). The rules should tell how a player wins the game.

6. Game Kit – The Game Kit should be a box, envelope or other container that holds the Game Pieces, Game Cards, Game Rules and any other materials required to play the game.
7. Your name, class and block must be printed neatly on both the Game Board and Game Kit.

An assessment rubric is included on the next page.

Sustainable Agriculture – The Game

Final Project Assessment and Evaluation

Student Name: _____

Game Name: _____

Assessment Criteria (points)	Student Evaluation	Teacher Evaluation
1. Game Board (total 15 points) Original Title (2) Decorated and Colorful (5) Appropriate Size (2) Board is Sturdy (1) Correct Spelling (5)		
2. Game Markers (total 5 points) 6 markers provided (1) Markers are hand made (2) Marker shapes relate to the game (2)		
3. Game Path (total 10 points) Path contains at least 20 spaces to move on (2) Path is neatly drawn (3) Includes both a start and finish (2) Includes places to stop, jump ahead or go backwards with appropriate directions (3)		
4. Game Cards (total 40 points) Includes at least 40 Game Cards that are accurate and answers are provided (35) Are neatly printed, written or typed and are neatly cut (3) Are decorated appropriately (2)		
5. Game Rules (total 12 points) Game Rules are typed (2) Game Rules are understandable (10)		
6. Game Kit (total 8 points) Game Kit is included (3) Game Markers, Game Cards, Game Rules and other game materials can fit in the Game Kit (5)		
7. Overall Game Appeal (total 10 points) Board Game is creative and original (5) Board Game is complete and neat (5)		
Game Project Total (100 points)		

Teacher Comments:

Peer Evaluation for Sustainable Agriculture – The Game

Student Name: _____

Game Name: _____

Assessment Criteria (points)	Student 1	Student 2	Student 3	Student 4
1. Game Board (total 15 points) Original Title (2) Decorated and Colorful (5) Appropriate Size (2) Board is Sturdy (1) Correct Spelling (5)				
2. Game Markers (total 5 points) 6 markers provided (1) Markers are hand made (2) Marker shapes relate to the game (2)				
3. Game Path (total 10 points) Path contains at least 20 spaces to move on (2) Path is neatly drawn (3) Includes both a start and finish (2) Includes places to stop, jump ahead or go backwards with appropriate directions (3)				
4. Game Cards (total 40 points) Includes at least 40 Game Cards that are accurate and answers are provided (35) Are neatly printed, written or typed and are neatly cut (3) Are decorated appropriately (2)				
5. Game Rules (total 12 points) Game Rules are typed (2) Game Rules are understandable (10)				
6. Game Kit (total 8 points) Game Kit is included (3) Game Markers, Game Cards, Game Rules and other game materials can fit in the Game Kit (5)				
7. Overall Game Appeal (total 10 points) Board Game is creative and original (5) Board Game is complete and neat (5)				
Game Project Total (100 points)				

Student Comments:

Activity 6.2 – BC’s Best Diet

Overview/Purpose - To allow students to investigate the food and food products that are raised, grown or processed in British Columbia.

PLO’s connections

Sustainable Resources 11- Sustainable Agriculture

A6 analyse challenges and opportunities faced by agriculture industries in British Columbia

Social Studies

Grade 11 – Human Geography

- Assess environmental challenges facing Canada, including global warming ozone layer depletion and freshwater quality and supply

Lesson Objectives – by the end of the lesson students will be able to report on two food items or products that they normally eat, telling where they are grown or processed, the nutritional value and whether it is a sustainable agricultural product.

Materials and Resources

BLM – Activity 6.2 – BC’s Best

Poster board

Felt pens

Pencil or pen

Background Information

Student Misconceptions

Students may not know where the food they eat comes from. That information is not always included on produce or on cans of processed food. It may take a little research for students to discover where each food item comes from. When the average North American sits down to eat, each ingredient has traveled at least 1500 miles (2400 km) from the farm where it was raised or grown to be on a dinner plate.

Teacher Notes

Today's mounting social and environmental concerns demand responses that are broad, deep, and strategic. Given the concerns with globalization, it seems clear that one of the most powerful solutions involves a fundamental change in direction – towards localizing rather than globalizing economic activity. In fact, “going local” may be the single most effective thing we can do.

Since global food moves around the world, food miles have gone up astronomically in recent years, making food transportation a major contributor to fossil fuel use and its associated problems. In the US, for example, transporting food within its borders accounts for over 20% of all fuel consumption and results in at least 120 million tons of CO₂ emissions each year. Canada is similar to the US. Much of this transportation could be decreased if everyone used more food from their own region, especially those that are grown, raised or processed near local communities.

Time - 1 – 2 class periods

Web Resources

The 100 Mile Diet – Local Eating for Global Changes
This site gives information on the 100-mile diet.

<http://www.100milediet.org>

Presentation Suggestions

1. Ask students what food and food products that are grown, raised or processed in British Columbia. Some students may already know about salmon from the Pacific Ocean, fruit from the Okanagan Valley or berries from the Fraser Valley. Next ask about agricultural products grown or processed in their local community. Where are these local products sold?
2. Tell students that they are going to research a food or food product that is raised or grown in British Columbia. This activity can be done individually, in pairs or small groups. One option is to have a group put together a meal using only food and food products from BC.
3. When deciding what food and food products to study, have the class research a variety of agriculture, aquaculture and commercial fisheries industries. Some can be things we eat (food) and others can be things we use (wool from sheep). That way they can see the diversity of products that are available.
4. A map of Agriculture, Fish & Food in B.C. is available through the Agriculture in the Classroom Foundation. See the Resources List in the Appendix for more information.

Meeting Individual Needs

1. When selecting foods and food products for each student, make sure that each student is able to find information on their choices. Use foods that are easy to get information on for weaker students and give the more difficult foods to the stronger students.
2. Ask students who may have a different cultural background to share the foods that might be included in this activity if it was done in a school in their native country.

Extension or Enrichment Suggestions

Have students research a complete meal. Challenge them to create a 100-mile meal using only foods that are grown or raised within a radius of 100 miles (160 km) from your community.

Assessment

Look for completeness and accuracy in student presentation. Select criteria that you will use to assess the final products. This can include neatness, accuracy and use of visuals.

Student Activity Sheet 6.2

Name: _____

Date: _____

BC's Best Diet

British Columbia produces a lot of food for use in our own province as well as for export throughout Canada and the world. This food originally comes from the agriculture, aquaculture and commercial fisheries industries. Food is also processed and sold, often for export. In 2005, total consumer sales in these industries were valued at \$20.9 billion and supported 280,430 jobs.

At the same time, BC imports \$3.3 billion in farm and food products. This globalization of the food industry is based on an economic theory that every nation and region should specialize in one or two globally-traded commodities – those they can produce cheaply enough to compete with every other producer. The money received from exporting those commodities is then used to buy food for local consumption. According to this theory, every one will benefit. But recent events, including global warming, suggests that there is dark side to this theory. If nothing else, it takes energy to transport a food product half-way around the world to get to your dinner plate. This energy use has a hidden cost, a cost that must be paid to the environment.

In this activity you are going to research a food or food product that is raised or grown in British Columbia.

Procedure

1. Work with your teacher to choose at least two food or food products (in cans or boxes) that you normally eat and are raised or grown in B.C. One should be a fresh food item. Research how the foods are grown or raised. Why are they grown or raised in BC?
2. Use the Internet or a map of Agriculture, Fish and Food in B.C. to begin research where each food comes from. What is special about where it is raised or grown?
 - You may need to ask the grocery store personnel about where their fresh food comes from. A BC label on some foods will help.
 - Many food products list the food processing province or city on the can or box. You should also find out if the food processor uses local food or they if import it from another province or country.
 - Where else in the world is this food or food product raised besides BC?
3. Calculate the number of miles or kilometers that each food or food product traveled from farm to your community. You can do this with a map of B.C. that has a distance scale. How far would each travel if you used an imported food or food product?
4. Prepare a poster of your findings to represent your findings. You should include a map of B.C. showing the location where each food originated.
5. Be prepared to present your findings to the class.

Extension

Why do you think eating locally is a good idea? What are the benefits of eating the B.C. grown or raised food you studied? How does that help with agricultural sustainability?

Activity 6.3 – The Sustainability Times

Overview/Purpose - the purpose of this activity is to allow students to represent their knowledge and understanding of agriculture and sustainability in various ways using a newspaper format.

PLO's connections

Sustainable Resources 11- Sustainable Agriculture

A6 analyse challenges and opportunities faced by agriculture industries in British Columbia

Social Studies

Grade 11 – Human Geography

- Assess environmental challenges facing Canada, including global warming ozone layer depletion and freshwater quality and supply

Lesson Objectives – by the end of this lesson students will have represented their learning in a newspaper format.

Materials and Resources

BLM – Activity 6.3 – The Sustainability Times Student Sheet

sample newspaper

paper

pencil or pen

coloured pencils or felts

large poster paper if you choose to make it look like a newspaper at the end

Background Information

Student Misconceptions

While students will be familiar with what a newspaper is, they may not know about all the parts that are in one. They may know about the front page, the sports sections, comics, etc. They may not know about the editorial section and the difference between world news stories and local news stories.

Teacher Notes

A newspaper is a publication that contains news, information and advertising. General-interest newspapers are usually journals of current news, political events, business, culture and opinions (often in editorials or political cartoons). Many also include weather news and forecasts. Newspapers use pictures and photographs to illustrate their stories. They may also have comic strips, crosswords and horoscopes.

Time - 2 – 3 class periods

Web Resources

Canadian Newspaper Association

This website gives other examples of how to use the newspaper format as a final assignment to represent student learning.

<http://www.newspapersineducation.ca/index.html>

Presentation Suggestions

1. Ask students if they have ever looked at a newspaper. What is included in a newspaper? Write the word NEWSPAPER on the front board and start a mind map. Write the student responses around the word. After they have finished their answers, hand out a sample newspaper and add any new things that they discover about a newspaper. Use a large regional or national newspaper and pull out the separate sections. You can compare this to a local newspaper.
2. Tell students that as a class you are going to put together a newspaper on food, nutrition and sustainable agriculture. It is their chance to represent what they've learned in this unit. Each student or group of students will create a different part of the paper. Some will write news and information stories while others will create editorials or a business report. They can even create a weather report and forecast, comics, advertisements, or even a farmer's almanac section. Their section of the newspaper can include both words and pictures. Divide the class and let them get to work on their section.
3. After each group has done their part, put the pieces together on a larger piece of poster paper so that the finished product looks like a newspaper.

Meeting Individual Needs

Visual learners can benefit by illustrating the newspaper. You can use their visual skills as a way to allow them to represent what they have learned in this unit.

Extension or Enrichment Suggestions

If you have students with better leadership skills, assign them as leaders for each section of the newspaper. Make sure they understand that a leader gets things done by listening to others and using their input to create a better final product. This is an opportunity for these students to improve their leadership skills.

Assessment

1. The assessment of each section will depend on the criteria you establish before starting this activity. This should include:
 - Uses factual information learned during the class
 - Is able to communicate the information or point of view effectively
 - Text and/or graphics is appropriate for content
 - Worked well with group to complete their section

2. Students can give a self-assessment on this project by answering the following questions:
- What did you learn about writing a newspaper story? How was this format used to show what you had learned in this course?
 - What did you like about writing as a newspaper reporter? Were you able to get all the fact included that you wanted?
 - What surprised you the most about creating a classroom newspaper?
 - What was your group's biggest challenge?
 - What was your favorite story or part of the newspaper and why?

Student Activity Sheet 6.3

Name: _____

Date: _____

The Sustainability Times

A newspaper is a publication that contains news, information, and advertising. General-interest newspapers are usually journals of current news, political events, business, culture and opinions (often in editorials or political cartoons). Many also include weather news and forecasts. Newspapers use pictures and photographs to illustrate their stories. They may also have comic strips, crosswords and horoscopes.

You have been studying agriculture and sustainability. Now you have a chance to be creative in the way you represent what you've learned. Your teacher will divide you into groups and each group will be assigned a different section of the newspaper to create. Several groups may be asked to develop different news and information stories.

Every good news story involves the 5 W's – who, what, when, where and why. When you write your story, try to include information that addresses each one. Your story can either be a factual one, such as the story of a local farmers market, or one that blends fact and fiction, such as an interview with a fictitious farmer about his farming techniques. You can include stories about the activities you did during this module. Add pictures or drawings to help tell your story.

When you have all completed your sections, you'll put them together into one newspaper. Each one of you plays a very important part in the finished product. So, give it your best!

Assessment and Evaluation in Choosing Tomorrow's Menu

Assessment and evaluation can be an integral part of a teacher's curriculum provided we invest in educationally useful and valid measures of student learning. The methods and instruments of assessment and evaluation should be varied so that they focus on a broad range of skills, strategies and knowledge, reflecting the various dimensions of learning.

Thus, in addition to the Student Sheets provided with each activity, you may wish to incorporate other activities that may be useful in your assessment. These could include:

- Journals or Learning Logs
- Notebooks
- Self Evaluation Forms
- Presentations
- Portfolios

You may also wish to use a presentation as part of an authentic assessment. An example of a student presentation sheet is provided below. Rating scales are similar to checklists except that they also include a measure of the quality of the performance. The scale below could be used when observing and rating a student's performance in a presentation. Consideration should be given to the student's finished reports, as well as to the performance. This can be used for a variety of purposes that students represent their learning. The information collected can be used for diagnostic, reporting, or interview purposes.

Rating Scale for Assessing Student Presentations

Student Name:

Date:

	Approaching Expectations		Meets Expectations		Exceeds Expectations	
A. Demonstrates understanding of the problem or issue	1	2	3	4	5	
B. Introduction	1	2	3	4	5	
C. Materials are relevant to topic	1	2	3	4	5	
D. Materials have been researched in depth	1	2	3	4	5	
E. Materials are clear and concise	1	2	3	4	5	
F. Content is organized in a logical and easy to follow way	1	2	3	4	5	
G. Conclusion is derived from material presented	1	2	3	4	5	
H. Shows an openness to a variety of points of view	1	2	3	4	5	
I. Presentation voice is clear and audible	1	2	3	4	5	
J. Presentation shows confidence in stance and gestures	1	2	3	4	5	
K. Uses notes and aids effectively	1	2	3	4	5	

Appendix

Additional Activities

Extra Activity 1 - Soil Types

Purpose – to examine soil and begin to understand the similarities and differences that soil samples can have.

Curriculum Connections –

Suggested Time – 1 class period

Materials

- three samples of soil:
 - sandy soil
 - potting soil from a garden store
 - soil from a garden
- magnifying glass
- white paper

Background Information

Soil is the living layer on the earth's surface, which is essential for life to flourish. Soils nourish plants, which in turn provide food for many types of animals. Soils vary from place to place, but all have the same basic composition and are developed through similar processes.

Soil has two main components. One is the mineral or inorganic material that comes from the weathering and erosion of rocks. The other is organic material called humus, which comes from living matter, usually decaying plants. The amounts of each one of these components in the soil determines many factors, such as how much water it will hold, how well plants will grow in it, and what colour it is. These factors create a soil profile. Soil research has shown that soil profiles are influenced by five separate, yet interacting, factors: parent material, climate, topography, organisms, and time. Soil scientists call these the factors of soil formation. These factors give soil profiles their distinctive character. Soil properties are determined by the soil profile, soil characteristics and soil classification. Soil profiles are affected by additions and removals from the soil, transformations (weathering and decomposition) and vertical transfers. Soil characteristics include soil colour, texture, amount of organic (living) matter, structure, density, water retention and chemical properties, such as pH. Soil is generally classified into based on the amount of clay, sand and loam it contains.

Presentation Suggestions and Notes for the Teacher

1. Before the class starts the activity, ask them what they think soil is. Ask them if they think that all soils are the same and to give examples of plants and the soil that grows in each. For example, some students may have been to the desert and have seen cactus will grow in the rocky, sandy soil there. Others may have been to the coast and seen the ferns that grow in the rich loam soil that is found there. Tell the class that they are going to examine soil samples and then predict what plants might be able to grow in them. One option of collect their ideas is through the use of a web diagram with "soil" in the middle.

2. If you haven't already previously shown the Barnston Island video, use it as a lead in to a discussion on soil types and how they might affect the growth of plants. A video viewing student worksheet is in the Appendix.
3. After showing the Barnston Island video and class discussion, have students read the editorial below. Although the Barnston Island decision has been made, there will be other, similar challenges to other ALR land. An editorial on the final decision for Barnston Island is included.

Student Activity Sheet 1

Name: _____

Date: _____

Soil Types

Agricultural land is disappearing all over the world because of many factors such as soil erosion, the spread of cities, and pollution. The Canada Land Inventory Act monitors soil use throughout our country. In Canada, the provincial and federal governments are trying to maintain the land that is presently used for agriculture.

In British Columbia, only 5% of the total land is suitable for various kinds of agriculture. The remaining 95% of the total land in BC is mostly mountainous, rocky, or forested land. On the land suitable for agriculture, only a small part can sustain a wide variety of crops. Good farm land is very limited in British Columbia.

There are many different types of soil. Some are better for growing plants than others. In this activity, you will investigate the different types of soils.

Materials

three samples of soil:

- sandy soil
- potting soil from a garden store
- soil from a garden

magnifying glass

white paper

Procedure

1. Spread the soil onto separate pieces of the paper.
2. Examine the samples with the magnifying glass.
3. Record your observations on the sheet below. You can describe what you see, draw a picture of each soil sample, or do both.

Soil Data –

Soil Sample	Description	Drawing
Soil Sample 1:		
Soil Sample 2:		
Soil Sample 3:		

Investigation Questions

1. How are the soil samples the same? How are they different? Is the soil light or dark?
2. What size are the grains that make up each soil? Which sample has the smallest grain? Which has the largest?
3. In there any decaying plant material in any of the soil samples?
4. Which soil do you think will be better for growing plants? Why?
5. How are plants adapted to the type of soil and the climate they grow in? For example, would a cactus plant grow in the same soil as corn?

Extensions

Research the history of the Agricultural Land Reserve in British Columbia. What is it? Why do you think it was started? What does it do for the citizens on British Columbia? Is it still needed today?

Agri-Facts: Did you know that diabetic test strips contain an enzyme found in horseradish?

Extra Activity 2 - Plant Parts and Growing Seeds

Purpose – to allow students to examine the role soil plays in the growth of plants.

Suggested Time – 1 – 2 class periods to set it up and 10 days to grow the seeds

Materials

- Three soil samples from previous activity (sandy soil, potting soil, garden soil)
- Three Styrofoam cups
- Six green bean seeds
- Water

Background Information

While there are many different types of plants, they have many things in common. Most plants use the process of photosynthesis, combining the energy of the sun with carbon dioxide and water to form carbohydrates – energy rich chemical compounds that provide materials required to sustain both plant and animal life – and oxygen. But plants also need soil and the nutrients it contains in order to grow. Think of soil as a thin living skin that covers the land. It goes down into the ground just a short way. Even the most fertile topsoil is only a foot or so deep. Soil is more than rock particles. It includes all the living things and the materials they make or change.

As you move down into soil you pass distinct layers, or horizon. These layers form the soil profile. Plants grow and animals live in the top later of the soil. A thick cover of plants can keep the soil cool and keep it from drying out. Decomposers recycle dead plants and animals into humus, the part of the soil that comes from living organisms. Below the topsoil is the subsoil, a mix of mineral particles and some humus near the top. Subsoil is very low in organic matter compared to the topsoil. This is the layer where most of the soil's nutrients are found. Deep plant roots come here looking for water. Clays and minerals released up above often stick here as water drains down. The minerals are absorbed by the plants and provide the necessary chemicals the plants need for healthy growth. If the soil does not have the proper nutrients for the type of plants that are grown there, a farmer may add those nutrients.

There are three key factors that determine what will grow in a region:

- Climate – the overall pattern of weather in an area.
- Soil – the mixture of mineral particles (silt, sand and clay), organic matter (living and dead plants and animals), air (trapped between the particles), and micro-organisms such as bacteria and fungi.
- Topography – refers to the general layout of the land – whether it is on a steep mountainside or flat river valley.

These not only affect which crops can be harvested for human consumption, but also what feed is available for farm animals.

Presentation Suggestions and Notes for the Teacher

1. Review the results of the previous activity on soil types prior to starting the activity. Ask them to predict with soil will produce the best plants and explain their thoughts.
2. If you haven't already previously shown the Glen Valley Organic Co-op Farm video, use it as a springboard for discussion about the role of organic farming practices. How does organic farming differ from other forms of farming? How does it relate to sustainable agriculture? A video viewing student worksheet is in the Appendix.

Student Activity Sheet 2

Name: _____

Date: _____

Plant Parts and Growing Seeds

While there are many different types of plants, they have many things in common. Most plants use the process of photosynthesis, combining the energy of the sun with carbon dioxide and water to form carbohydrates – energy rich chemical compounds that provide materials required to sustain both plant and animal life – and oxygen.

Plants don't start their lives full grown. They begin their life as a seed. Seeds are like babies. They need proper care to help them grow healthy. In this activity, you will investigate the growth of seeds into plants.

Materials

- Three soil samples from previous activity (sandy soil, potting soil, garden soil)
- Three Styrofoam cups
- Six green bean seeds
- Water

Procedure

1. Fill each cup with a different soil sample.
2. Use your finger to make 2 holes in the soil, each about 1 cm deep, about 2 cm apart. Place one seed in each hole.
3. Fill the hole with extra soil and lightly pack the soil.
4. Water the soil thoroughly. Continue to water the seeds (and later the bean plants) regularly, about every other day.
5. Record observations of your seeds every day. Measure the height of your plant every day.

Data:

Plant Observation and Plant Heights

Day	Sandy soil plants	Potting soil plants	Garden soil plants
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Investigation Questions

1. Which seeds sprouted first?
2. Construct a line graph to show the growth of the bean plants for each soil sample. Put data from all three soil sample plants on the same graph using different coloured pencils.
3. What do you notice about the growth of bean seeds in different soils? Why do some agricultural crops grow better in different soils?
4. If you were a farmer and your soil didn't grow a specific crop, such as beans, very well, what could you do?

Extensions

Research what farmers can do to grow better crops.

Agri-Facts: Did you know that while only 1.6% of British Columbians lived on farms in 2001, primary agriculture contributed \$1.74 billion to the Gross Domestic Product in 2002?

Student Video Activity Sheet

Name: _____

Date: _____

Video Viewing Worksheet

Name of the video you watched: _____

List at least five (5) interesting things that you learned from the video.

Tell why you found each interesting.

Interesting things I learned from the video	Why I found these things interesting
1.	
2.	
3.	
4.	
5.	
6.	

What was the most important thing you thing that the video was trying to say?

Critical Thinking in the Classroom

Although there are many definitions and concepts about what critical thinking is, or isn't, recent developments by the BC Ministry of Education and The Critical Thinking Consortium suggests that critical thinking can be usefully understood as thinking in any situation provided the thinker intends to come to a reasoned judgment.

This definition of critical thinking is based on several assumptions about the nature of critical thinking. Three principles are particularly crucial:

- There is a contextual nature to thinking. A meaningful challenge always arises in a particular context and that context determines what qualifies as a sensible or reasonable response.
- There is an interrelationship between thinking and knowledge. Critical thinking requires the possession of relevant knowledge in both the background of the subject to be studied and in the principles and concepts that characterize quality thinking.
- There is an importance in the quality of thinking. In judging the quality of thinking, the key is not whether we agree with the conclusion but rather the quality of thinking that supports the reasoned judgment.

The ability think critically develops over a lifetime by acquiring and refining the range of "tools" necessary to respond to problems and issues. These tools include:

1. Possession of relevant background information: students cannot think critically about a topic if they know nothing about it
2. Understanding of appropriate standards of reasoning: students need to understand rational or logical arguments, deliberation, inquiry and justification.
3. Possession of key critical concepts: students need to understand key concepts so they have the same vocabulary to distinguish issues.
4. Fluency with regard to heuristics: there are certain strategies that are useful in guiding students through some thinking tasks.
5. Possession of essential habits of the mind: there are many habits that students should possess, including open-mindedness, an intellectual work ethic, respect for high-quality thinking and performance, fair-mindedness, independent-mindedness, and an inquiring attitude.

Constructivism in Education

Choosing Tomorrow's Menu is based on a learning model called "constructivism" or "concept change learning." Constructivism believes that the learner constructs knowledge and understanding through interacting with meaningful experiences.

Constructivism assumes that students always have previous ideas and that they learn by combining new information with earlier ideas, creating new knowledge and understanding. Often, new ideas challenge or conflict with original ones. This leads to questioning, which in turn leads to modification and reorganization of ideas into new understandings. This way of learning is adaptive. People make sense of the world for themselves. Constructivism suggests that the best way to teach is not simply to transmit knowledge to students but to help them expand or reconstruct their original beliefs with more sophisticated ones.

Choosing Tomorrow's Menu activities themselves are organized into five phases to help students acquire and use new ideas. The phases are:

1. Orientation – This phase helps students focus attention on the problem or idea to be introduced.
2. Elicitation – This phase allows students to identify their original thoughts and ideas. This is their starting place for learning.
3. Restructuring – This phase is where student activities are focused on new learning.
4. Application – This phase is where students use their new understanding to draw conclusions, make decisions, or summarize their understanding of the topic.
5. Review – In this phase, students recap their new ideas to see how they have added to their understanding.

To maximize learning, it is important to include all of these elements when teaching an educational unit. Although you don't need to undertake all the activities in this module, try to include ones that represent all phases of constructivism to maximize student learning and understanding.

In addition, Choosing Tomorrow's Menu holds to several other learning principles that form its educational philosophy:

- Learning requires the active participation of the learner
- People learn in a variety of ways and at different rates
- Learning is both an individual and a group process
- Active learning in hands-on and minds-on
- Integrated curriculum incorporates real-life learning situations

Resource List

Canada's Food Guide – Health Canada's site for information on Eating Well with Canada's Food Guide. It has a link for Educators and a separate Food Guide for First Nations, Inuit and Metis.
<http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/index-eng.php>

Sustainable Table – site offers ways to create sustainable diets. Included is the humorous animated short – The Meatrix Series – which looks at the problems associated with factory farms. Links with
<http://www.sustainabletable.org/schools/teachers/>

Eat Well Guide – site offers information on where to purchase local, fresh, sustainable food. Search is by Postal Code.
<http://www.eatwellguide.org/i.php?pd=Home>

Canadian Agriculture at a Glance Teacher's Kit – Part of the Statistics Canada site. It offers links for the 2001 Census of Agriculture data.
<http://www.statcan.ca/english/kits/agric04/intro.htm>

B.C. Ministry of Agriculture and Lands – This site contains information about agriculture in BC.
<http://www.al.gov.bc.ca>

Agriculture and Agri-Food Canada – This site has a variety to information on agriculture in Canada
<http://www.agr.gc.ca>

BC Agricultural Land Commission – This site connects to the Agricultural Land Commission, the primary steward of B.C.'s valuable agricultural land.
<http://www.alc.gov.bc.ca>

SmartGrowth BC – This site supports the creation of more livable communities.
<http://www.smarthgrowth.bc.ca>

InfoBasket – This site is a link to agri-food information in British Columbia
<http://www.inforbasket.gov.bc.ca>

BC Agriculture in the Classroom - More lessons on agriculture and sustainability are available, including lesson ideas for Home Economics: Foods and Nutrition 8 to 12.
<http://www.aitc.ca/>

10 Reasons to Buy Locally

(Adapted from Growing for Market, 2001)

1. Locally grown food tastes better. Food grown in your own community was probably picked within the past day or two. It's crisp, sweet and loaded with flavor.
2. Local produce is better for you. Fresh produce often loses nutrients quickly.
3. Local food preserves genetic diversity. Local farms grow a larger number of varieties of vegetables to create a longer harvest and best flavor.
4. Local food is GMO-free. Although biotech companies commercialize genetically modified fruits and vegetables, they are currently only licensing them to large factory-style farms.
5. Local food supports local farm families. Farmers currently get only about 10% of the retail food dollar. Local farmers who sell directly to consumers realize more income and keep their farms viable.
6. Local food builds communities. Buying directly from farmers gives you insight into the farm seasons, weather and farmer concerns.
7. Local food preserves open space. The green landscape that the ALR creates will only survive as long as farms are financially viable.
8. Local food keeps your taxes in check. Farms contribute more in taxes than they require in services.
9. Local food supports a clean environment and benefits wildlife. A well-managed family farm is one part of stewardship of the land where fertile soil and clean water are valued.
10. Local food is about the future. Supporting farmers today ensures there will be farms in your community tomorrow.

Name: _____

Date: _____

Choosing Tomorrow's Menu Word Search

There have been many words that you have encountered in your study of food, agriculture and sustainability. How many of the words can you find in the Word Search Puzzle below? Words can be spelled forwards or backwards, horizontally or vertically. You can find the words on this page and scattered through the pages of the Choosing Tomorrow's Menu module. Do you know what each word means?

S	U	S	U	S	T	A	I	N	A	B	L	E	X	K
N	K	J	V	E	F	L	O	O	D	S	N	F	A	R
O	N	O	B	E	T	R	T	L	C	O	O	P	D	A
I	O	N	C	D	E	E	S	G	N	I	M	R	A	F
T	D	N	A	S	R	A	L	I	Z	L	O	N	I	I
A	P	O	U	L	T	R	Y	C	H	I	C	K	R	S
Z	V	R	H	B	X	C	I	N	A	G	R	O	Y	H
I	M	H	U	D	S	O	N	S	B	A	Y	N	G	A
N	Y	H	I	J	T	D	S	O	N	N	Y	C	V	B
A	W	I	E	B	S	P	Y	O	U	N	R	M	R	I
B	A	R	N	S	T	O	N	I	S	L	A	N	D	T
R	G	S	E	S	U	O	H	N	E	E	R	G	B	A
U	M	F	I	R	S	T	N	A	T	I	O	N	S	T
S	O	X	Y	R	T	S	E	R	O	F	O	R	G	A

Hudson's Bay
Coop
Sand
Urbanization
Barnston Island
Poultry
GMO

First Nations
ALR
Fish
Organic
Seeds
Dairy
Agroforestry

Farming
Soil
Greenhouse
Sustainable
GVRD
Habitat

