BC Agriculture in the Classroom Foundation

Unit Plan:

Apples of British Columbia

Apples are the most valuable edible horticulture crop in BC with about 75% of all BC orchard land being planted with apple trees. BC produces about 27% of apples grown in Canada, ranging from 91,000 – 100,000 tones annually. About two-thirds of the apples grown are eaten as fresh fruit and the remainder are processed as fresh/frozen apple juice, sauce, pie filling, cider and vinegar, or dried into apple leather.

Use one or all five of the lessons that make up the **A**pples of **B**ritish **C**olumbia Unit to help students develop a deeper understanding of this all important tree fruit.

Suggested Grade/Subject Levels

Food Studies 9 – 12

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The following are the curricular competency and content connections for the courses this activity could work for:

Subject Area	Curricular Competency	Content
Food Studies 9	• Engage in a period of research and empathetic observation in order to understand design opportunities • Critically analyze and prioritize competing factors, including social, ethical and sustainability considerations, to meet community needs for preferred futures • Evaluate the personal, social, and environmental impacts, including unintended negative consequences, of the choices they make about technology use • Evaluate how the land, natural resources, and cultural influence the development and use of tools and technologies	• Components of food preparation, including use and adaptations of ingredients, techniques and equipment • Health, economic and environmental factors that influence availability and choice of food in personal, local and global contexts • Ethical issues related to food systems
Food Studies 10	• Engage in a period of research and empathetic observation in order to understand design opportunities • Critically analyze and prioritize competing factors, including social, ethical and sustainability considerations, to meet community needs for preferred futures • Use materials in ways that minimize waste • Evaluate personal, social, and environmental impacts and ethical considerations • Evaluate how the land, natural resources, and cultural influence the development and use of tools and technologies	• Food trends, including nutrition, marketing, and food systems • Simple and complex global food systems and how they affect food choices, including environmental, ethical, economical, and health impacts
Food Studies 11	• Conduct user-centered research to understand design opportunities and barriers • Critically analyze how competing social, ethical and sustainability considerations impact designed solution to meet global needs for preferred futures • Use project management processes when working individually or collaboratively to coordinate production • Analyze the role and impact of technologies in societal change and the personal, social, and environmental impacts, including unintended consequences, of their choices of technology use	• Components of recipe development and modification including ingredients, functions, proportions, temperatures, and preparation methods • Issues involved with food security
Food Studies 12	• Conduct user-centered research to understand design opportunities and barriers • Critically analyze how competing social, ethical and sustainability considerations impact designed solution to meet global needs for preferred futures • Use project management processes when working individually or collaboratively to coordinate production • Analyze the role and impact of technologies in societal change and the personal, social, and environmental impacts, including unintended consequences, of their choices of technology use	• Legislation, regulations, and agencies that influence food safety and food production • Nutrition and health claims and how they change • Development of a food philosophy by an individual or group

Teacher Background

This resource demonstrates how you can take one food produce and use it to explore place and reeducate people in the art of living well where they are.

Increasingly those concerned with food, whether it be food production or consumption, are realizing the essential connections between personal health, sustainable agriculture and the health of the planet. The advantages of choosing local products grown close to home include:

- Environmentally friendly as fewer resources are used for transportation
- Fresher and generally has more nutrients as they haven't lost them to early harvest and travel time
- Freshness generally means locally grown foods have more taste
- Purchasing local supports BC farmers and enables them to continue producing food
- Supporting local famers helps to ensure that land will preserved and available for food production in the future.

Apples are the most important tree fruit crop in Canada and have a long history in BC. Tree fruits were introduced to BC by the early settlers with seed they carried with them from Fort Vancouver as they explored the interior. By the 1850s there were planting of small orchards in the Fraser Valley. A gentleman by the name of Thomas G. Earl established the first orchard at Lytton. Cold winters forced Earl out of business, but other growers, including an Oblate missionary named Father Pandosy, had discovered the Okanagan Valley, an area boasting a warmer, although much drier, climate. Pandosy planted his first trees where the City of Kelowna now stands. Dry soil provided a barrier to production until growers rigged pumps and opened flumes to direct water from lakes and creeks into the Valley.

BC produces about 27% of apples growing in Canada. Today, about 98% of BC apples are produced in the Okanagan-Similkameen Valleys, with the remainder being produced in the Fraser Valley. The hot dry weather in the Okanagan is ideal for growing Red and Golden Delicious apples. High sunlight and temperature levels are idea for apple colouring and yield. The low rainfall reduces the impact of disease. Most orchards are on slopes near lakes which helps to moderate the temperature and reduces the risk of winter injury and spring frost.

There are over 100 varieties of apples grown in North America. The varieties grown for BC's commercial production are Red and Golden Delicious, Royal Gala, McIntosh, and Spartan. New varieties now being widely planted are Jonagold, Braeburn and Fuji.

The total quantity of apples harvest ranges between 91,000 tones to 100,000 tones each year. About two-thirds of the apples grown are eaten as fresh fruit, while processed apples are used for fresh and frozen apple juice, sauce, pie filling, cider and vinegar, or dried into apple leather.

Apples are about 85% water and about 12% natural sugar or fructose, making them an excellent source of instant energy.

Unit Overview

This unit consists of 5 lessons that can be used individually or in series as a unit. Student worksheets are provided at the end of the teacher guide.

Lessons in this unit are as follows:

1. Introduction to Agriculture in BC
2. Lab: Apple Pie Filling
3. An Apple a Day…
4. BC Apple Tasting
5. Lab: Apple Breakfast Bar

Student handouts include:

Worksheet 1: Local Food Supply
Lab: Apple Pie Filling
Extension Activity: Apple Research Assignment
Information Strips: Apple People Search
Activity: Apple People Search
Worksheet 2: Apple Facts from “Grow BC”
Flowchart: The Food System Behind the Label
Extension: Mass Production of Food Video
Activity: BC Apple Tasting
Activity: Apple Juice Tasting and Consumer Comparison
Lab: Apple Breakfast Bar

Lesson 1 – Introduction to Agriculture in BC

Objectives

This is an introductory activity that is aimed at introducing students to the diversity of foods products grown or raised in BC. Students will be more aware of local food production.

Materials

- Several copies of the poster: Agriculture Fish and Food in BC Map
- Several copies of the poster: What Does it take to Produce Food
  *** both posters are available to order for free on the BC Agriculture in the Classroom Foundation website http://www.aitc.ca/bc/resources/posters
- Student handout: **Local Food Supply**

Activities

1. Hand out one copy of the *Agriculture Fish and Food Map* poster to each group. Have students study the map and lead a discussion on the following questions:
   a. What foods are grown in the area where we live? Are there any foods produced here that you were unaware of? Are there foods produced here that are not mentioned on the map? What would account for that? What makes this are suitable for producing the foods shown on the map?
   b. What part of BC produces the majority of the food? What are the reasons for this? Where does the majority of the population in BC live? What problems can result?
   c. Could we be well nourished if we just at the food produced in BC? Explain
   d. Since our main topic for this week is Apples, where are apples produced in BC?
2. Hand out a copy of the *What Does it Take to Produce Food* poster. Have the students study the poster and lead a discussion using the following questions as starters:
   a. What kinds of knowledge and skills are required? How would they be obtained?
   b. A local farmer refers to plants and animals as energy converters? What does this mean?
   c. Why are air and water so important to the food supply?
   d. What ways are used to enrich the soil with nutrients?
   e. Give some examples of plants, animals, birds, and fish that are used for food in BC.
   f. What are the various names of people who produce food? (eg. Orchardist, vintners, cattle ranchers, poultry producers, dairy farmers, etc.)
3. Hand out the Worksheet: Local Food Supply and have students complete the question.

Possible Extensions

- Field trip to a local orchard, farmers market, or food production plant

Lesson 2 – Lab: Apple Pie Filling

Objectives

Students will begin to gain an appreciation of the importance of knowing where our food comes from. Students will gain experience working with local BC products.

Materials

- Student handout – **Lab: Apple Pie Filling**
- Demo and group sets of the necessary tools and the following ingredients:
  - 1 Kg local BC apples
  - 250ml of sugar
  - 10ml of Fruit Fresh
  - 30ml of minute tapioca
  - 10 ml cinnamon

Activities

1. Demonstration of the apple pie feeling and Earth as an Apple activity. While cutting and paring (peeling) the apple for the demonstration lesson do the following:
   a. Slice the apple into quarters and set three quarters aside

      Explanation: These three quarters represent the oceans of the world. The fourth quarter remaining represents the total land remaining.

   b. Slice the remaining quarter in half, providing two 1/8th pieces. Set aside one of the 1/8th pieces.

      Explanation: This piece represents the land that is too inhospitable for human use – the polar areas, desserts, swamps, high altitudes, steep mountainous areas. The remaining 1/8th piece represents the land where people LIVE… not necessarily where the food is grown.

   c. Slice the remaining 1/8th piece into four sections. You will now have four pieces, each representing 1/32nd of the earth. Set aside three of the four pieces.

      Explanation: These three pieces represent areas that are too rocky, too wet, too cold, too steep, areas with soil that is of limited quality for food production. The remaining 1/32nd represents the land currently used for agriculture production.

d. Peel this 1/32nd and hold up the peel.

   Explanation: This tiny bit of peel represents the surface – the very thin skin of the earth's crust upon which humankind depends. Usually less than five feet deep, it represents the fixed amount of land that is used for food production.

e. Lead a class discussion using the following questions:
   i. Why is it important to preserve this land?
   ii. What has been done in BC to preserve farmland?
   iii. What are the consequences of not preserving farmland?
   iv. What kind of action can you as an individual take to preserve farmland?
   v. What types of agriculture are there in our community?
   vi. Where can you buy locally produced foods?

2. Have students work with their cooking groups to make the apple pie filling.

Possible Extensions

- Apple Research Activity (see handout)

Lesson 3 – An Apple a Day…

Objectives

Students will become aware of apple related information (ex. Nutrition, cookery principles, consumer issues, and production). Students will be able to list the components of the food system and describe what is involved in each component for one food product.

Materials

- One set of apple information strips cut out
- Student handout: **Apple People Search**
- Apples for prizes (optional)
- Online access or class set of p.74 and 75 in the BC Agriculture in the Classroom **Grow BC** book http://www.aitc.ca/bc/uploads/growbc/GrowBC_2014_Plants.pdf
- Student handout: **Apple Facts From Grow BC**
- Several items (either the actual item or the wrapper/lable/package) that are made from apples: apple juice, apple pie filling, dried apple slices, apple leather, apple sauce. One item could be a fresh apple
- Student handout: **The Food System Behind the Label**

Activities

1. As students enter the class, hand each one of them an individual apple information strip and an Apple People Search handout.
2. Direct students to find the answers the questions in the Apple People Search by talking to each other, recording the answer in the corresponding box and having the person who provided the information sign in the space provided. You can decide whether students must complete every box, or whether to divide the class into 5 groups and assign them a column:
    - Column A: covers nutrition related information
    - Column P: covers food preparation and cookery information
    - Column P: covers consumer information
    - Column L: covers production facts
    - Column E: covers apple trivia
3. You can choose to provide apple prize(s) for the person, group, column that finishes first.
4. Have students use the “apple pages” from Grow BC to complete the Apple Facts from Grow BC handout.
5. Introduce The Food System Behind the Label activity by having students think of words that include “system” (ex. School system, digestive system, sound system, ecosystem, etc.). Discuss what makes something a system.
    a. The definition of a system could be put on the board: *an interdependent group of components forming a unified whole.*

6. Ask students what are the interdependent components of the food system. After students brainstorm you could put the following flowchart on the board:

Natural and Human Resources →→→ (work with) **inputs** →→→(to) **produce food** →→→

(which is) **transformed**→→→(for) **distribution**→→→(made) **accessible**→→→ consumed

→→(leaving) **outputs**→→→(that may become) **natural resources** (to start the cycle again

7. Have students work in small groups. Give each group one of the products containing apples. Give each person/group a Behind the Label student handout and have the students answer the questions for their particular product, either on a separate piece of paper or a poster.
8. Have students report back to the class and then have the class discuss the following questions:
    a. The food system was very complex, what would happen if one part of the system didn't function, or if there was a breakdown in one part? Ex. The inputs (no wate0, the food production part (crop wiped out by disease), the distribution part (cost of fuel goes up), farmer can't make enough from the crop, etc.
    b. There are outputs throughout the system, did you include these in your output section?
    c. Can any of the outputs become natural resources that can be returned to the system?
    d. What kinds of careers are involved in each component of the system?
    e. Did you realize that eating an apple connects you to so many people?

Apple Facts from Grow BC Answer Key:

1. Apples
2. Pome core
3. 98% Okanagan-Similkameen valley Fraser Valley Kootenay
4. 27
5. Two-thirds eaten
6. Energy pectin digestive
7. Fresh processed
8. Pasteurized
9. High-density planting, growing varieties that are more popular in international markets
10. See "who's involved in producing apples?" p75.

Possible Extensions

- Video: Mass Production of Food (see accompanying extension handout)
- Field trip or guest speaker from the food system

Lesson 4 – BC Apple Tasting

Objectives

Students will be able to identify and name apples grown in BC. Students will be able to evaluate apples based on taste, texture, and price.

Materials

- Several varietals of apples grown in BC. One or two apples of each variety depending on the method of sampling used. When you purchase them make sure you record the price.
- Student handout: **BC Apple Tasting Handout**
- Several examples of apple juice – tetra pack, frozen, bottled, made in BC, imported, organic, etc. When you purchase them make sure you record the price.
- Glasses or Dixie cups for student sampling
- Student Handout: **Apple Juice Taste Test and Consumer Comparison**

Activities

1. If there is only one apple of each variety, then gather the students so that they can see each apple in turn, discussing the color and shape and sharing the price so that they can fill those columns in the chart. Drawing the shape rather than describing it often works well. Once an apple has been discussed, cut the apple in half so that the students can determine the interior color for their chart (try to get them to be specific, ex. White with a green tinge, creamy, or yellowish). Lastly cut the apple into small pieces so that each student can sample and describe the taste and texture.
2. If you have more than on of each apple, then students can be assigned the task of setting up a station with one whole apple and one apple cut into pieces for sampling. Students can then rotate from station to station filling in the BC Apple Tasting handout.
3. Discuss the common uses of the various apples
    - Golden Delicious is an excellent all around cooking apple
    - Jonathan holds its shape well so is good for open faced tarts and pies
    - McIntosh tends to break down when cooked so it's best suited for double-crust pies, cobblers, and crisps
    - Spartan is well suited to sauce, pies and baking as well as eating fresh
    - Fuji is suited for making apple sauce or eating raw
    - Galas are great for salads or eating fresh
    - Red Delicious is best for eating fresh
4. As students answer the questions on the back side of the BC Apple Tasting handout, set up stations for each of the different apple juices.
5. Go over directions for sampling with the students. Set up parameters on how much is appropriate for a sample to ensure that each student gets a sample. Remind students of the type of information they are looking for in each column of the handout.

6. Students rotate from station to station filling in the Apple Juice Taste Test and Consumer Comparison table.
7. Lead a class discussion on the following:
    - Which of the juices were pasteurized? Why is that important?
    - How much juice is required to make a serving according to Canada's Guide to Healthy Eating? (100ml-125ml) Why is this such a small amount?
    - Were any of the samples organic? What does this mean?
    - What other information was on the label?
    - Which juices were produced in BC?

Possible Extensions

- Apple Research assignment if they haven't already done it in lesson 1
- Have students investigate which apples are available in their community
- Students could determine the miles travelled if one purchased a Granny Smith grown in New Zealand. (an apple grown in New Zealand travels approximately 12,000km more to reach us than an apple grown locally, resulting in 50x the harmful CO_2 emissions)
- Bring in someone who has a juice extractor to demonstrate the process
- Field trip to a local production facility where "value is added" to locally produced food

Lesson 5 – Lab: Apple Breakfast Bar

Objectives

Students will gain experience preparing a food that has apples as an ingredient.

Materials

- Student handout – **Lab: Apple Breakfast Bar**
- Demo and group sets of the necessary tools and the following ingredients:
    - 125ml of flour
    - 2ml salt
    - 2ml baking soda
    - 80ml brown sugar
    - 250ml rolled oats
    - 155ml butter
    - 1 L apples, peeled, cored and sliced
    - French Vanilla yogurt for topping

Activities

1. Demo how to assemble the Apple Breakfast Bar
2. Have students prepare the Apple Breakfast Bar in their cooking groups.
3. During the 40 minute bake time, students can present their Apple Research findings if you chose to do that particular extension project.

Possible Extensions

- Have students choose another BC commodity to research

Worksheet: Local Food Supply

Name: _____ Date: _____

In your group, discuss the following and then individually record the answers:

1. Name the farms that are growing or producing food in this area:

2. List as many foods as possible that grow or are produced here (hint: you can include your own garden):

3. Make a list of local food production that is seasonal and that which occurs year round:

Seasonal	Year Round

4. What local foods are available right now?

5. Are there any food processing plants in our community? Describe.

6. Have you ever worked harvesting, processing, or selling fresh locally grown/produced food? Describe.

7. List the places that sell locally grown food products:

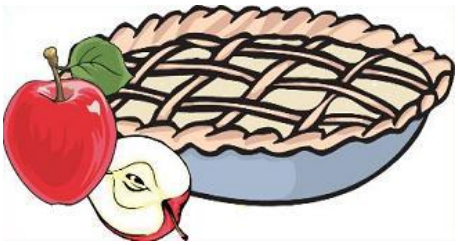
8. Are there any places where you can buy direct form the farmer or producer? List. What is the advantage of buying directly from the farmer or producer?

9. Are there any farmers or producers who do “value added” processing in order to sell their products? Describe.

10. Are there any famers or producers who have other commercial ventures on their property in order to bring in additional income? Describe (Hint: different forms of agritourism would count).

11. List all the advantages of buying locally.

Lab: Apple Pie Filling (freezer)



Yield: 4 Individual sized pies

Microwave: High for a total of 5 minutes

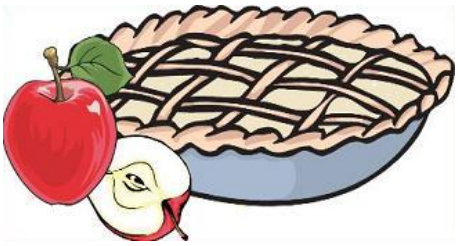
1 Kg of Apples

200ml sugar + 10ml Fruit Fresh

30ml minute tapioca + 50 ml sugar + 10ml cinnamon

1. Peel and core apples. Slice into 12 or cut into apple donuts.
2. Combine apple slices with 200ml of sugar and Fresh Fruit in a large casserole dish. Let stand for 5 minutes.
3. Cook apples on high for 3 minutes.
4. Stir in tapioca mixture. Cook 2 minutes, or until apples are clear.
5. Chill quickly by placing the casserole dish in a cold water bath – stir often.
6. Seal in freezer containers or labelled freezer bags.

Lab: Apple Pie Filling (freezer)



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6. Seal in freezer containers or labelled freezer bags.

Extension – Apple Research Assignment

There are many varieties of apples, each with their own history, taste, and uses. Your task is to research one apple variety and prepare a report/presentation that includes information on:

- The origin of this particular variety
- Where it is commonly grown
- A description – color, shape, texture, taste
- Common uses – eating, cooking, juicing, etc
- Other interesting facts about this variety

Choose from:

Ambrosia
Braeborn
Cortland
Crispin (Mutsu)
Duchess
Elkamine
Elstar
Empire
Fuji
Golden Delicious
Granny Smith
Gravenstein
Hyslop
Jonagold
Jonathan
Liberty
Lodi
McIntosh
Milton
Newtown
Northern Spy
Red Delicious
Red Rome/Red Beauty
Royal Gala
Shamrock
Silken
Sinta
Spartan
Sumac
Sunrise
Tydeman
Yellow Transparent
York
Wealthy
Winesap

Apple People Search – Information Strips

Cut the following info strips out before the beginning of class and give one to each student as they enter the class.

Apples are about 12% natural sugar or fructose. Fructose is a water-soluble sugar found in all ripe fruit. Because of the solubility of fructose, the body does not have to convert it into sugar before use, therefore, making apples an instant source of energy.

Apples are a delicious source of dietary fiber and pectin that helps aid digestion and promotes weight loss and can lower bad LDL cholesterol and help raise good HDL cholesterol.

Most apples are picked by hand

The science of apple growing is called pomology.

25 percent of an apple's volume is air. That is why they float.

A medium apple contains about 80 calories.

Apples ripen six to ten times faster at room temperature than if they were refrigerated.

BC is pioneering Sterile Insect Release (SIR) technology for one of the worlds' worst apple and pear pests – the codling moth

Apples come in all shades of reds, greens, and yellows.

It takes about one kilogram of apples to make one large pie.

There are over 7500 varieties of apples grown throughout the world.

Apples crunch when eaten because they are composed of tiny cells filled with water. When you bite into an apple, those cells explode with a loud crunch because apple cell walls are strong.

Appearance, color, maturity, size, shape, and quality are the determining factors for Canada Extra Fancy (the top grade for fresh eating), Canada Fancy, and Canada Commercial (ideal for cooking) grades. Grading ensures that the apples have met federal government standards.

Ethylene gas is produced as apples mature. Ethylene can speed up the ripening of pears, bananas, peaches and plums. Add an apple to a bag of these fruits if they are still on the green side to hasten ripening.

Some apples may be sprayed with a thin coating of edible wax to improve their appearance and increase their shelf life.

Canadian apples are now exported to more than 20 countries with the major importers being the United States and the United Kingdom

Johnny Appleseed was a real person. His real name was John Chapman and he was born on September 26th, 1774 in Leominster, Massachusetts.

Apples are the most valuable edible horticulture crop in BC. About 75% of all BC orchard land is planted in apples. BC produces about 27% of the apples grown in Canada.

The Spartan apple was developed at the Research Station in Summerland, BC, while the new variety Ambrosia originated in Cawston, BC.

Apples contain naturally occurring antioxidants called flavonoids, which may reduce the risk of heart disease and inhibit the development of certain cancers, particularly lung and colon cancers.

In recipes calling for white wine, you can substitute apple juice.

Coat apples slices with ascorbic acid or lemon juice to prevent browning.

Applesauce can be used as a substitute for butter in a recipe. Replace half of the butter with applesauce to reduce fat and add great flavor and nutrients.

The average North American eats between 5 and 6 kilograms of fresh apples per year, which is only about two large apples per month.

Apple People Search

Name: _____

Find the person who can share the following information with you. Put the answer on the space provided and have the person sign on the line to verify you got the information from them.

A	P	P	L	E
Naturally occurring antioxidants in apples may reduce the risk of heart diseases and cancer are called _____ _____ (Name of person providing info)	What can be used as a substitute for butter in a recipe to reduce the fat and add flavor and nutrients? _____ _____ (Name of person providing info)	How many kilograms of fresh apples does the average North American eat? _____ _____ (Name of person providing info)	What countries are the main importers of Canadian apples? _____ _____ (Name of person providing info)	How many varieties of apples are there grown throughout the world? _____ _____ (Name of person providing info)
Explain why apples are a good source of instant energy. _____ _____ (Name of person providing info)	In recipes you can substitute apples juice for: _____ _____ (Name of person providing info)	Name the 3 grades of apples. _____ _____ _____ _____ (Name of person providing info)	The science of apple growing is called: _____ _____ (Name of person providing info)	Why do apples float? _____ _____ (Name of person providing info)
Apples contain _____ that helps aid digestion and promotes weight loss _____ (Name of person providing info)	What is used to prevent apples slices from browning? _____ _____ (Name of person providing info)	Explain why it is important to store apples in a cool place. _____ _____ (Name of person providing info)	What is SIR and what is it used for? _____ _____ _____ _____ (Name of person providing info)	Why do apples crunch? _____ _____ (Name of person providing info)
How many calories in a medium apple? _____ _____ (Name of person providing info)	To make a large apple pie, buy _____ Kg of apples. _____ (Name of person providing info)	Name three main shades of apples: _____ _____ _____ _____ (Name of person providing info)	How are apples harvested? _____ _____ (Name of person providing info)	Who was Johnny Appleseed? _____ _____ (Name of person providing info)
The main mineral and vitamin found in apples are: _____ _____ (Name of person providing info)	The gas released by maturing apples that hastens the ripening of other fruit is: _____ _____ (Name of person providing info)	What is used to improve the appearance of apples and increase their shelf life? _____ _____ (Name of person providing info)	BC accounts for what percentage of the Canadian apple crop? _____ _____ (Name of person providing info)	Two apples developed in BC are: _____ _____ _____ (Name of person providing info)

Worksheet: Apple Facts from Grow BC

Name: _____ Date: _____

Use p. 74-75 of Grow BC to answer the following:

1. The most valuable horticulture crop in BC is _____.
2. An apple is a _____fruit, as is a pear. The seeds are protected in the _____.
3. _____% of BC apples are grown in the _____. The rest are grown in the _____ and _____ areas.
4. BC produces _____ % of the apples frown in Canada.
5. ____-_____ (fraction) of the apples grown are _____ as fresh fruit.
6. Apples are a source of instant _____. They are a source of _____, a soluble fiber which helps clean the _____ system.
7. Two-thirds of the apple crop is sold _____. One-third of the crop is _____. Apple juice is the most popular form of _____apples.
8. To kill harmful bacteria, the juice is _____.
9. Two things that fruit growers have done to modernize their orchards and make them more competitive are: _____ _____
10. List 4 careers that are involved in producing apples?

_____
_____
_____
_____

The Food System Behind the Label

Examine the food product you have been given closely, and answer the following questions on a separate piece of paper or poster. Make your answers as detailed as possible.

INPUTS

What inputs were necessary in order to produce this food item? (energy, lab or, fields, soil, water, machinery, equipment, etc.)

FOOD PRODUCTION

How was the food grown, raised, harvested? Where might it have been grown and raised? What is required to do this?

FOOD TRANSFORMATION

Is your food processed? How was this done? Were additional ingredients required? Is your food packaged? What kind of material is used? What is involved in the packaging?

DISTRIBUTION

How might the food have been transported from where it is grown to where it was transformed to where it was purchased? What kinds of resources were required to do this?

FOOD ACCESS

Where are you most likely to purchase this product? Can most people afford this product?

CONSUMPTION

Can this food be consumed as is, or does it need more processing or preparation? What kinds of resources are involved?

OUTPUTS

What is left once this food is consumed (ex. Packaging, peels, seeds, waste)? How are these remainders disposed of?

Extension: Mass Production of Food Video

Name: _____ Date: _____

What do you already know about the mass production of food?

What do you wonder about the mass production of food?

As you view the video, pay particular attention to the section where they show the mass production of prepackaged apples and answer the following:

1. Apples are washed to remove: _____
2. Which sorting is done by machine? C_____
3. What does ergonomic hand packing mean? _____
   _____
4. Why is water a good way to move the fruit? _____
   _____
5. Why is grading of apples done? _____
   How is it done? _____
6. How are the prepackaged apples preserved (kept fresh)? _____
   _____

What did you learn about the mass production of food?

BC Apple Tasting

Name: _____ Date: _____

Compare each of the apples provided according to their exterior color, shape, and flesh color. Then sample a small piece of each and describe the flavor and texture.

Variety	Cost per Kg	Exterior Color	Shape	Flesh Color	Flavor and Texture

Taste Test Follow up:

1. Which of these apples have you tasted before?

2. What apple did you like the best?

Did You Know?

- Canadians eat more bananas than apples. We do not grow bananas.
- The Okanagan region of the province produces more than 96% of the tree-fruit crops grown in the province!
- British Columbia apples are exported to more than 30 countries

Find out:

What are heritage apples are and how they relate to biodiversity:

Apple Juice Taste Test and Consumer Comparison

Name: _____ Date: _____

Take a small portion of each of the apple juices available and fill in the following chart.

Brand Name	Where is it produced?	Type of packaging	List of ingredients	How is it prepared?	What is the price per ml?	Describe the taste and color

Taste Test Follow up Questions:

1. Which brand of apple juice did you prefer for taste? _____
   Explain why: _____
   _____

2. Which brand of apple juice did you prefer for color? _____
   Explain why: _____
   _____

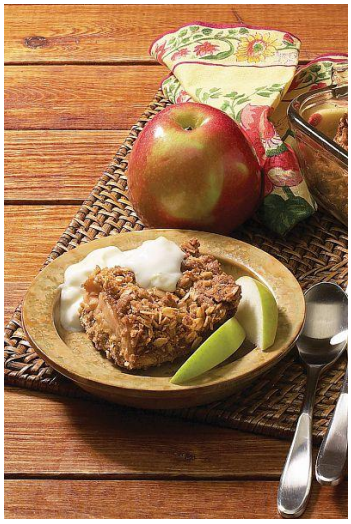
3. From an environmental point of view, which brand do you think is best? (consider the way it was produced, the amount of packaging, whether the packaging can be recycled, the amount of energy used in production, transportation, and storage, etc).
   _____
   Explain why: _____
   _____
   _____

4. Which brand is the best buy considering price? _____

5. What are the advantages of drinking locally (BC) produced apple juice rather than orange juice or apple juice from other places? _____
   _____
   _____

Lab: Apple Breakfast Bar

Source: www.bctree.com/recipes/apple



Servings: 6 Prep time: 15 min Total Time: 55 min

125ml flour
2ml salt
2ml baking soda
80ml brown sugar
250ml rolled oats
125ml butter
30ml butter
1 L apples, peeled, cored and sliced
French Vanilla yogurt for topping

1. Preheat oven to 350°F. Grease a small square cake pan.
2. In a mixing bowl, combine the first 6 ingredients. Cut in butter with a pastry cutter.
3. Spread half of the crumb mixture into the bottom of a greased small square pan.
4. Cover with apples and top with remaining crumbs.
5. Dot with the remaining 30ml of butter.
6. Bake 40 minutes.
7. Cut into squares and serve with the yogurt.

Lab: Apple Breakfast Bar

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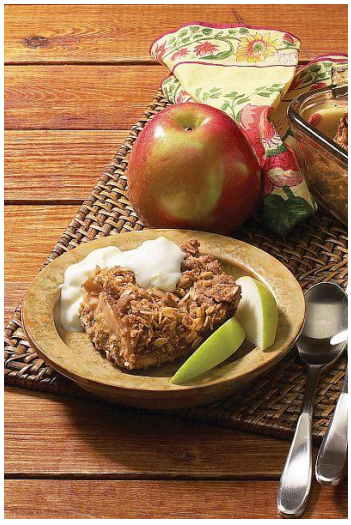

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