

BC At The Table: GRAINS



Teacher Discussion Guide

About BC At The Table

BC At The Table is intended to show how food is produced, processed, distributed and accessed in BC and inspire students to buy BC foods and support local farmers. It consists of four video segments that can be watched separately in shorter classroom sessions or together in one longer session. The videos highlight the main steps in the food system that four foods go through to make it to our plates:

- Produce (with a focus on greenhouse tomatoes and vegetables)
- Grains (with a focus on wheat)
- Dairy (with a focus on milk and cheese)
- Salmon (both wild and farmed)

The foods featured were selected because of the major role they play in BC's economy. They are also foundational foods for a healthy diet, as presented in [Canada's food guide](#) (2019).

The videos address some of the issues related to each food and give a glimpse of the career opportunities in the agrifood industry. In 2020, we added short video updates, available at bcdairy.ca/bcatthetable.

A teacher discussion guide is provided for each commodity to facilitate a general discussion about the food after watching the video. While watching the videos, students can use the food system worksheet provided at the end of this discussion guide to list the steps involved in the production, processing, distribution, access to and consumption of the food introduced in the video. The discussion guide also includes background information, key resources to support student inquiry, and general food system questions and activities for further student learning.

These videos can be used as a starting point for further [inquiry-based learning](#) on related issues of interest to students. Teachers wanting to use inquiry processes in the classroom may want to consult the website "[Points of Inquiry BC](#)".

BC At The Table links to many curriculum areas:

- Applied Design, Skills & Technologies 7, 8, 9
- Culinary Arts 10, 11, 12
- Food Studies 10, 11, 12
- Career Education 7, 8, 9; Career Life Connections 10-12
- Physical & Health Education 7, 8, 9, 10
- Science 7, 8, 9; Environmental Science 11, 12
- Social Studies 7, 8, 9; Human Geography 11

Learn more about cross-curricular connections [here](#).

Did you know?

- The Peace River is the largest agricultural area in BC.
- Up to 90% of the grain crops grown in BC are grown in the Peace River region.
- In 2019, BC farmers harvested 111,200 tonnes of wheat, 72,000 tons of canola, 57,100 tonnes of oats, and 63,000 tonnes of barley on nearly 235,000 acres. After a significant lower grain harvest (and higher canola harvest) in 2017, harvests in 2019 were similar to 2015 levels (Stats Canada, [Table 32-10-0359-01](#)).
- In 2019, 71,800 acres of wheat were harvested in BC represents less than 0.5% of the wheat growing area in Canada.
- One acre of wheat can produce enough wheat flour for more than 2,100 loaves of bread.
- Raw wheat and wheat flour are not major exports from BC. In 2016, \$38.3 million in wheat flour was exported from BC, primarily to the United States. In contrast, BC exported \$293 million in baked goods and cereals in the same year.

Questions for discussion and inquiry

1. What are the steps wheat goes through from when it is planted as a seed to when it is used as an ingredient in many food products?
2. What are some of the methods used by grain growers to maintain soil quality? (*crop rotation*)
3. What are some of the challenges faced by grain growers? (*weather, grain transportation, marketing, export markets, Peace Region producers nearing retirement, pressure to use the land for extracting oil and gas*) How can they be overcome? (*diversification, off farm income*)
4. What is the economic contribution of the grain industry to BC? (*sustains other industries by providing animal feed, generates millions in farm cash receipts...*)
5. What are the job opportunities created by the grain industry? (*grain producers, grain distributors, seed cleaners, flour millers, bakers, processors...*)
6. How has technology changed the grain industry?
7. Pat McCarthy from *A Bread Affair* mentions the 100-mile bread they make at the bakery. What does it mean? Is it easy or possible to follow a 100-mile diet?
8. What are the types of food and non-food products made from wheat? (*wheat flakes, flour, pasta, cereal, animal feed, but also: wood used in kitchen cabinets, paper, hair conditioners, biodegradable golf tees, adhesives on postage stamps, water-soluble inks, medical swabs, charcoal, biodegradable plastic, eating utensils, and much more!*)

Grain Food System – Examples of inputs and outputs

Food System Component	Inputs	Outputs
<p>Production</p> <p>Grains are grown mostly in the Peace River region and harvested in the fall.</p>	<ul style="list-style-type: none"> • seed breeding • seeds (wheat, oat, barley) • labour • equipment (tractors, combines, conveyors, grain drying machines) • technology • soil/water/nutrients/fertilizers • storage facilities (grain bin) 	<ul style="list-style-type: none"> • wheat plants/grains • greenhouse gases • oxygen
<p>Processing</p> <p>Harvested grains are sorted and cleaned before being shipped to various BC, Canadian and international locations.</p>	<ul style="list-style-type: none"> • labour (for sorting, grading and milling) • fortification of white flour • railway cars/trucks/ships • businesses (bakeries, food processing facilities) • packaging materials 	<ul style="list-style-type: none"> • wheat grains • wheat-based food products (flour, bread, crackers, tortilla) • greenhouse gases • animal feed for other industries (such as dairy, pork, etc...)
<p>Distribution</p> <p>Wheat products are sent to markets for sale to consumers and businesses.</p>	<ul style="list-style-type: none"> • labour • bakeries • grocery stores • restaurants 	<ul style="list-style-type: none"> • wheat-based products • greenhouse gases • waste
<p>Access</p> <p>Wheat-based products can be purchased from grocery stores, through CSA programs and other businesses like bakeries and restaurants.</p>	<ul style="list-style-type: none"> • labour • energy • food science knowledge • water 	<ul style="list-style-type: none"> • greenhouse gases • baked products • dishes using wheat • food waste
<p>Consumption</p> <p>Wheat and wheat products can be consumed in a variety of ways.</p>	<ul style="list-style-type: none"> • labour • energy • cooking skills • time 	<ul style="list-style-type: none"> • foods in the whole grains category of Canada's food guide • greenhouse gases • garbage

Teacher Backgrounder

What is the difference between whole grain and whole wheat products?

Whole grains contain all three parts of the seed: the bran, the endosperm and the germ. In Canada, when wheat is milled, parts of the seed are separated and then recombined to make whole wheat flour. Up to 5% of the seed can be removed to prevent whole wheat flour from becoming rancid and prolong its shelf life. Because whole wheat flour may have much of the germ removed, 100% whole wheat bread may not be whole grain. However, it remains a nutritious choice that provides dietary fibre.

To find out if a product is made from whole grains, check the label and the ingredient list. If it contains whole grains, it will have the word “whole grain” followed by the name of the grain as one of the first ingredients.

Hot Issues

Oil and Gas:

Oil and gas activities in the Peace River region put pressure on the land base used for growing crops. Concerns about these activities relate to competing land use, and the impact that oil and gas may have on the water supply, irrigation systems, drainage management and transportation corridors.

What are hybrid seeds?

Conventional breeding in the plant world occurs when two parent plants are cross-pollinated. The resulting seed has some genes from each parent plant. When the cross-pollination is done in an intentional way, to breed for a particular trait, hybrid seeds are produced. When these seeds are planted, the resulting hybrid plant will not produce hybrid seeds again—you would have to go back and cross-pollinate the original parent plants to get the hybrid seed. Open-pollinated plants, on the other hand are capable of producing offspring plants just like the parent plant, generation after generation.

GMO Seeds

According to Health Canada, genetically modified refers to any organism, such as a plant, animal or bacterium whose “genetic material has been altered through any method, including conventional breeding.” Genetically engineered (GE), on the other hand, refers to genetic modification “using techniques that permit the direct transfer or removal of genes in that organism.” In common speech, people often use the term GMO when they mean GE.

GE crops would not occur in nature. The GE corn known as Bt corn has the natural pesticide Bt engineered into its makeup, meaning that it can express the protein found in *Bacillus thuringiensis*, a protein that is poisonous to insect pests.

Pros and Cons of using GE crops

- Pros: higher crop yields, reduced need for pesticides and herbicides, may be drought-tolerant depending on features engineered, more nutritious, etc.
- Cons: higher seed cost, can't save seeds, may potentially introduce an allergen protein, may harm beneficial insects.

Is the wheat grown in Canada from genetically engineered (GE) seeds?

While Canada has [approved](#) many GE crops, only four are currently grown in Canada: corn, canola, soy and sugar beet. Wheat grown in Canada is not from GE seeds.

Benefits of eating grain products

Whole grain products are a good source of carbohydrates, fibre, B vitamins (e.g., thiamin, riboflavin, niacin and folate), iron, zinc, and magnesium.

With the release of [Canada's food guide](#) in 2019, Canadians continue to be encouraged to eat [whole grain foods](#). A diet rich in whole grains may help reduce the risk of cardiovascular disease and type 2 diabetes.

Examples of whole grains grown in BC include wheat, oats, pot barley and rye. Other whole grains include amaranth, brown rice, buckwheat, bulgur (wheat), semolina (wheat), millet, quinoa, spelt, triticale and wild rice.

At this time, [Canada's food guide](#) (2019) does not recommend specific amounts of foods for different ages.

Cooking with grains

Check these websites for recipe ideas:

Rogers Foods: rogersfoods.com/recipes

Anita's Organic Mill: anitasorganic.com/recipes

We Heart Local: weheartlocalbc.ca/explore-recipes

Links

1. Grain and Oilseed Production: Peace River Snapshot
pics.uvic.ca/sites/default/files/uploads/publications/Grain-Peace,%20Crawford.pdf
2. Grow BC: Grains
esrica-embassy.maps.arcgis.com/apps/MapJournal/index.html?appid=05cf85ab19eb4433b04331c4784fcacc
3. Cedar Isle Farm - a grain CSA (Community Supported Agriculture)
cedarislefarm.ca
4. As reported in the Tyee, "*Wheat Kings*"
thetyee.ca/Life/2009/09/18/WheatKings
5. Island Grains—a reference and resource for small scale grain growers on the West Coast
islandgrains.com

General Questions

1. What is the average age of farmers in BC? What percent of the population in BC are farmers? *(use Resource B and C, below)*
2. What is the cost of eating in BC? *According to Food Costing in BC 2017 (Resource D), the provincial average cost of a nutritious food basket for a family of four was \$1,019 per month.*
3. What measures need to be taken to improve food security? *(Resources D and E)*
To increase community food security: municipal planning, community gardens, food distribution hubs, agricultural land reserve, supporting farmers.
To decrease household food insecurity: income-based solutions to ensure all households have consistent and sufficient income to be able to pay for basic needs, including food.
4. What is being done in Canada to reduce hunger? Are food banks or programs like [Quest Food Exchange](#) the solution? What else can be done to address the issue at its root? *(Resources E and G)*
5. Have you heard of the term “food justice”? What does it mean? How can it be achieved? *Food Justice: seeks to ensure that the benefits and risks of where, what and how food is grown, produced, transported, distributed, accessed and eaten are shared fairly. (Resources E and F)*
6. There is an increase in the local food movement. What does local mean to you? *Definitions vary based on distance (100 km diet) and jurisdiction (Buy BC, 100% Canadian).*
7. People from BC may travel across the border to shop in the US for some of their groceries. What is the effect on BC’s economy and jobs if you were to mostly shop in the US?
8. How can you determine if a website, article or video is a credible source of information about food and the local food system? *Consider authorship, accuracy, currency, scope (location; relevance), and purpose (educational; entertainment). (Resource H and I)*

Additional Resources

- A. Grow BC bcaitc.ca/grow-bc-commodities
- B. Statistics Canada.
[Table 32-10-0442-01 Farm operators classified by number of operators per farm and age](#)
- C. BC Ministry of Agriculture. Fast Stats 2018
www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/agriculture-and-seafood/statistics/industry-and-sector-profiles/fast-stats/fast_stats_2018.pdf
- D. Food Costing in BC 2017, Oct 2018
bccdc.ca/pop-public-health/Documents/food-costing-BC-2017.pdf
- E. Food Secure Canada foodsecurecanada.org
- F. Food Share (Toronto) foodshare.net/about/food-justice
- G. Feed Opportunity feedopportunity.com/en
- H. HealthLink BC healthlinkbc.ca/healthy-eating/reliable-information
- I. University of British Columbia guides.library.ubc.ca/EvaluatingSources/Guidelines

Extension Activities and Questions for Further Inquiry

- We often think about the impact that food production exerts on the environment. But as consumers, we can also play a role by minimizing the food waste we generate. [United Nations reports](#) show that one quarter to one third of all food was lost or wasted. In North America, this occurs mostly at two stages of the food system: harvest (15% lost) and consumption (30% wasted).
 - How much food waste is generated in your school? Your home?
 - What can you do to reduce the waste? Explore [Love Food Hate Waste](#), and the [Food Matters Action Kit](#) for ideas and choose one or two activities to try individually at home, as a class, or as a school.
 - What are the consequences of food waste in general? Are there additional consequences when food waste ends up in the landfill? (*wastes the resources used to produce the food, cost of food increases, hungry people can't access food that could be eaten/donated/redistributed; methane, use up space in landfills*)
 - What's involved in recovering and redistributing food that might end up as waste? What laws govern the donation of food?
 - How are food scraps handled in the waste stream in your community?
- In some countries there is a culture of gleaning. People are legally allowed to gather the food that remains in the field after it has been commercially harvested. Learn more about historical and modern day gleaners. Explore how gleaners have been represented in the arts.
- Ask students to find out what foods are produced in their area. Use the interactive [Grow BC](#) website or [We ♥ Local BC \(weheartlocalbc.ca\)](#).
- Have students interview a farmer, or plan a balanced lunch ([one that includes all food categories](#)) using BC foods.
- Explore the taste of BC foods. For example, BC produces many varieties of pears, apples and potatoes. How many have you tried?
- How often do you use BC foods? Think about your meals, snacks and recipes. What are the pros and cons of choosing more local foods? What about choosing only or mostly local foods?
- Survey the foods served at your cafeteria and ask about where they come from. How many are BC foods? How many are imported?
- Choose one food trend and research how this trend can influence the supply and demand of a related agricultural product. Examples of current food trends include deciding to go on a gluten-free diet, eating only organic foods, or adopting a vegetarian or a 100-mile diet.
- Choose one of the foods highlighted in BC At The Table and identify the range of consumer products made from it. Select one specific product and prepare a presentation on how it is made. Make sure to include the food system components involved in the process.
- How can climate change affect different crops produced in BC? Explore a specific crop or specific impact.
- What are genetically modified organisms (GMOs)? What are genetically engineered (GE) foods? What are the advantages and disadvantages of using GE seeds?

Food System Student Worksheet—Inputs and Outputs

Food System Component	Inputs	Outputs
Production		
Processing		
Distribution		
Access		
Consumption		

Notes: