



# BC At The Table: DAIRY



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 provide a glimpse of the career opportunities in the agrifood industry. In 2020, we added short video updates, available at [bcdairy.ca/bcatthetable](http://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 foods 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?**

- There were about 470 dairy farms in BC in 2020.
- 98% of Canadian dairy farms are family-owned and operated.
- 76% of all the milk produced in BC comes from the Lower Mainland.
- The average dairy farm in BC has 135 milking cows.
- Milk is the top agrifood commodity in BC in terms of total farm income, generating over 40% of the province's total livestock farm income and 19% of the province's total farm income (BC Fast Stats 2018).

**Glossary**

**Heifer:** a young female cow that no longer drinks milk and has not ever had a calf: approximately 6 to 24 months old. Prior to weaning off milk, they are called heifer calves.

**Dry cow:** a cow that is not currently producing milk because she has completed a lactation period. Rest from milking typically occurs after 9-10 months of milking, although individual cows vary.

### Questions for discussion

1. What are the steps involved in bringing milk from the dairy farm to our homes? *(Use the food system worksheet on page 4 for guidance.)*
2. Why do cows need to be tracked? *(cow health and biosecurity, milk quality and quantity)*
3. Why do dairy cows have ear tags? *(A cow's ear tag is her identification. Just like each of us has a birth certificate with an individual number, a cow's ear tag has the same. It helps keep all of her information together. The ear tag is also equipped with a radio frequency identification tag, which traces her back to her farm of origin.)*
4. What is CQM? *(CQM stands for Canadian Quality Milk, an on-farm food safety program that helps producers prevent and reduce food safety risks on their farms.)* CQM has evolved to become the Food Safety and Milk Quality modules of the national proAction initiative. Learn more at <https://www.dairyfarmers.ca/proaction>
5. What is the meaning of a family farm to Richard van Laar?
6. What are the dairy industry's contributions to BC's economy?
7. What are some of the challenges faced by the dairy industry? *(See page 5)*
8. What are the job opportunities created by the dairy industry? *(veterinarians, on-farm staff, lab staff (to test milk and feed), animal nutritionists, truck drivers)*
9. What are dairy farmers (& the dairy industry) doing to improve and maintain environmental sustainability? *(create national on-farm environmental standards, monitor and conserve water use, use manure from their own cows to grow their own crops, etc...)*
10. How has technology changed dairy farming? *(helps monitor cow's health, feeding and milking, improves environment management and sustainability, etc...)*
11. What steps are taken to ensure safe milk and dairy products are available to the consumer? *(following the CQM program—now the proAction initiative, rigorously testing milk at the farm and processing plant, zero tolerance for antibiotics in milk)*
12. What are some of the steps taken by dairy farmers to ensure cows are healthy and comfortable? *(free access to feed and clean water, open barn, comfortable bedding, rotating scrub brushes, robotic milking, use of footband to monitor cow health, support ongoing research to improve knowledge of animal care best practices)*

## Milk Food System—Examples of inputs and outputs

Food System Component	Inputs	Outputs
<p><b>Production</b> Milk is produced by dairy cows living on family owned and operated farms. The average dairy farm in BC has 135 milking cows.</p>	<ul style="list-style-type: none"> <li>• sunlight, nutrients (used by plants for photosynthesis)</li> <li>• manure (to fertilize soil used to grow crops)</li> <li>• land to grow crops and for barns</li> <li>• feed</li> <li>• water (for cows and farm operations)</li> <li>• barn</li> <li>• equipment/ technology (for planting and harvesting crops, milking, cooling and storing milk, cleaning barns, monitoring cow health)</li> <li>• labour</li> <li>• energy</li> <li>• Canadian Quality Milk program—now part of proAction initiative</li> <li>• dairy cows</li> </ul>	<ul style="list-style-type: none"> <li>• raw (unpasteurized) milk</li> <li>• manure</li> <li>• greenhouse gases</li> <li>• energy</li> <li>• markets (machinery sales, seed/fertilizer sales, veterinarians, processors, government inspectors, etc.)</li> </ul>
<p><b>Processing</b> Milk is picked up from the farm in a certified refrigerated stainless steel tanker every other day for delivery to a processing plant where it is pasteurized and packaged for distribution (within 24 hours) or used as an ingredient in other dairy products (such as yogurt and cheese).</p>	<ul style="list-style-type: none"> <li>• qualified milk tanker driver</li> <li>• licensed dairy processing plant</li> <li>• grading and quality testing (to ensure it is fresh, cold and free of antibiotics)</li> <li>• energy</li> <li>• pasteurization</li> <li>• vitamin A and D fortification</li> <li>• recyclable containers</li> <li>• labour (food scientist, machine operators, cheesemakers, etc...)</li> </ul>	<ul style="list-style-type: none"> <li>• pasteurized milk</li> <li>• cheese</li> <li>• yogurt</li> <li>• other dairy products</li> <li>• waste</li> <li>• greenhouse gases</li> </ul>
<p><b>Distribution</b> Dairy products are delivered by dairy processors to grocery stores and food service businesses.</p>	<ul style="list-style-type: none"> <li>• regular testing of packaged dairy products by the Canadian Food Inspection Agency</li> <li>• refrigerated trucks</li> <li>• refrigerators/freezers</li> <li>• labour</li> <li>• energy</li> </ul>	<ul style="list-style-type: none"> <li>• markets (restaurant, grocery store, caterer, etc...)</li> <li>• greenhouse gases</li> <li>• waste</li> </ul>
<p><b>Access</b> Milk and other dairy products can be bought from stores and restaurants.</p>	<ul style="list-style-type: none"> <li>• refrigerators/ freezers</li> <li>• labour</li> <li>• businesses</li> <li>• energy</li> </ul>	<ul style="list-style-type: none"> <li>• milk/ dairy products can be used as is or as an ingredient in other dishes</li> <li>• greenhouse gases</li> <li>• waste</li> </ul>
<p><b>Consumption</b> Milk can be used in various ways: as a beverage or as an ingredient in other dishes.</p>	<ul style="list-style-type: none"> <li>• refrigerators/ freezers</li> <li>• cooking skills</li> <li>• water</li> <li>• energy</li> <li>• time</li> </ul>	<ul style="list-style-type: none"> <li>• food from the Protein Foods category</li> <li>• recyclable containers</li> <li>• garbage</li> </ul>



## Teacher Backgrounder

The Canadian Quality Milk program has evolved to become the Food Safety and Milk Quality modules of the national proAction initiative. BC's dairy farmers participate in this national program, which assures the same high food safety standards are in practice across the country. Before pick up, milk is tested for antibiotics. Milk is also tested for bacteria and somatic cell count.

### Challenges for dairy farmers

- To run self-sustaining successful **small businesses**
- A **competitive global market**, with more international access to Canadian markets due to various trade agreements (CETA, CUSMA, TPP)
- **Biosecurity threats**, such as livestock diseases entering the herd
- **Educating consumers** about the safety and quality of Canadian milk, and the animal welfare and environmental standards of Canadian dairy farming (proAction)
- Increasing **cost and competition for land**, due to urbanization and regulatory changes
- **Climate change**: changes in precipitation patterns will affect crops grown for dairy feed, farmers are adopting new practices to reduce their environmental impact

## Hot Issues

### Environmental impact of dairy farms

Dairy farmers live and work on their farms every day, so it is important for them to protect the land, water, and air for their families, surrounding communities, and future generations. As such, they choose farming practices that minimize the impact of their operations on the environment such as using water on the farm up to four times before it

ends up on their fields and growing about 60-70% of their feed on the farm.

In addition, dairy farmers have invested in various technologies to reuse the manure produced by cows as a soil fertilizer for their crops and to sell to other businesses. Some are even converting manure into energy using anaerobic digesters.

Dairy Farmers of Canada has been monitoring the improvements in the environmental impact of dairy farming, using a [life cycle analysis](#). Between 2011 and 2016, Canadian dairy farmer's carbon footprint, water consumption, and land use associated with milk production (per 1L milk) decreased by 7%, 6%, and 11%, respectively. Canada now has one of the lowest carbon footprints (per litre of milk produced) in the world.

All farms in BC must follow the Agriculture Environmental Management [code of practice](#) (2019), which is designed to protect water and air. Farmers can also access supports to improve resource use and environmental stewardship through the Environmental Farm Plan [program](#).

### Difference between organic and conventional milk

Conventional and organic dairy farmers abide by very high Canadian standards for milk production.

- Both types of milk are produced without the use of artificial growth hormones (such as rBST).
- Both are free of antibiotics.
- Both are equally safe and nutritious.
- Both undergo the same process at the dairy plant (standardization, fortification, and pasteurization) before being packaged.

The main difference between organic and conventional dairy farming is in the type of feed used. Cows raised to produce organic milk are fed certified organic feed.

Cows on organic-certified farms must also have access to outdoor pasture during the grazing season (when temperatures and weather are appropriate) and must be able to get 30% of their nutrition from this outdoor foraging. When land is available, conventional milk producers also let cows out to pasture, but this is not required. Outdoor access is not common in the Lower Mainland due to the high cost of land and wet conditions (which affect hoof health).

Organic dairy farmers have higher production costs in order to follow the standards that are required to receive and maintain the “certified-organic” label, which explains the difference in price between organic and conventional milk. The type of milk consumers choose is a matter of personal preference.

#### Antibiotics and growth hormones

It is illegal to use artificial growth hormones (such as rBST) to increase a cow’s milk production in Canada (unlike in parts of the US).

When a cow is sick and needs to be treated with antibiotics, she is removed from the milking herd and the dairy farmer must follow strict protocols. The farmer continues to milk her, but all her milk is discarded for a mandatory withdrawal period (specific to each medication) to ensure the medication is cleared from her system. Organic dairy farmers may use antibiotics to treat sick cows just as conventional dairy farmers. However, organic standards extend the withdrawal period to respect the spirit of this type of production.

Every delivery of milk is tested at the processing plant before being unloaded to ensure it is free of antibiotics. On the rare occasion that the load of milk contains antibiotic residues, it is rejected and properly discarded so it does not enter the food

chain. Because milk samples are collected at each farm, the farmer who supplied the contaminated milk is easily identified and subject to heavy fines.

#### Animal care

Dairy farmers go to great lengths to ensure their cows are treated properly. They work in collaboration with animal nutritionists to feed their cows a well-balanced diet. They also work with veterinarians to ensure cows stay healthy. Cows live in comfortable barns with lots of space to move around and free access to food and clean water all day. Many barns are equipped with rotating bristle brushes that cows can use whenever they need a good scratch. Dairy farmers also support ongoing research activities in animal welfare science.

#### Raw milk/ Pasteurization

Milk is a minimally processed food. It is fortified with vitamins A and D (which is required by law) and pasteurized. Pasteurization is important for food safety and is one of the most beneficial measures to protect the health of consumers. Pasteurization is the simple process of gently heating milk to 72° C for 16 seconds to destroy harmful bacteria that may be in it, then rapidly cooling and refrigerating it. It doesn’t alter milk’s nutritional value; any losses are insignificant. Pasteurization also extends milk’s shelf life by inactivating spoilage enzymes.

Some consumer groups have been asking for the legalization of raw (unpasteurized) milk in Canada.

However, [research](#) does not support any of the benefits attributed to drinking raw milk. Because there are no known benefits and there are serious risks (illness resulting from exposure to harmful bacteria), raw milk is not allowed to be sold in Canada. Pasteurized milk remains the safest choice for consumers.

### Supply management

In Canada, the dairy industry is one of several agricultural sectors operating under a system of supply management, where the milk supply is managed to accurately meet the demand, year in and year out. Each farmer fills a part of the demand (quota) without producing more than what is needed in the Canadian market. By balancing milk production from all Canadian farms with domestic consumption of milk products, Canada's supply management system avoids surplus production and wasting of unused milk.

Over the years, Canada's supply management model has provided a stable structure from which dairy farmers can meet the challenges of changing domestic markets and international trade rules. Stability allows farmers to plan milk production and facility upgrades; they get paid a fair price for their milk without government subsidies. It also allows processors to set prices that won't fluctuate dramatically.

Some economists and politicians have been questioning supply management and blaming it for higher prices of Canadian milk, compared to other markets. For example, US dairy farmers get large subsidies from the government and as a result, have a lower production cost than Canadian farmers.

Furthermore, removing supply management does not guarantee a lower cost for the consumer. In countries where the dairy industry was deregulated (such as in New Zealand, the UK and Australia), prices of milk and dairy products have gone up with inflation, not down.

### Benefits of consuming dairy products

Milk is a good source of many essential nutrients, including 3 of 4 micronutrients of concern for Canadians—calcium, potassium and vitamin D.

Milk, yogurt and cheese continue to be recommended as healthy [protein foods](#) in [Canada's food guide](#) (2019). Plain white milk is also a [healthy beverage option](#) besides water.

### Cooking with dairy products

Try recipes from:

- [Dairy Goodness](#)
- [We Heart Local](#)
- Health Canada (such as [overnight oats](#), [egg and veggie scramble](#), [broccoli and cheese muffins](#), and [more](#))

### Links

1. UBC Dairy Education and Research Centre [dairycentre.landfood.ubc.ca](http://dairycentre.landfood.ubc.ca)
2. proAction Initiative [dairyfarmers.ca/proaction](http://dairyfarmers.ca/proaction)
3. Canadian National Farm Animal Care Code of Practice for dairy cattle [nfacc.ca/codes-of-practice/dairy-cattle](http://nfacc.ca/codes-of-practice/dairy-cattle)
4. Dairy Farmers of Canada [dairyfarmersofcanada.ca/en/dairy-in-canada](http://dairyfarmersofcanada.ca/en/dairy-in-canada)



## 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). (Resources H and I)*

## Additional Resources

- A. Grow BC [bcaitc.ca/grow-bc-commodities](http://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](http://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](http://bccdc.ca/pop-public-health/Documents/food-costing-BC-2017.pdf)
- E. Food Secure Canada [foodsecurecanada.org](http://foodsecurecanada.org)
- F. Food Share (Toronto) [foodshare.net/about/food-justice](http://foodshare.net/about/food-justice)
- G. Feed Opportunity [feedopportunity.com/en](http://feedopportunity.com/en)
- H. HealthLink BC [healthlinkbc.ca/healthy-eating/reliable-information](http://healthlinkbc.ca/healthy-eating/reliable-information)
- I. University of British Columbia [guides.library.ubc.ca](http://guides.library.ubc.ca)

## Extension activities

- 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 site ([www.weheartlocalbc.ca](http://www.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?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		
<p><b>Notes:</b></p>		