

# BC At The Table: PRODUCE



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](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 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?

- Greenhouse vegetables were BC's third most valuable agrifood commodity in 2017, after dairy and chicken. BC producers rank second in Canada for sales of all greenhouse vegetables.
- Greenhouse tomatoes are among BC's top 10 crop commodities in terms of farm cash receipts—a way of measuring farmer income. They accounted for 7% of crop farm cash receipts in 2016.
- BC greenhouse tomatoes rank among the top 10 agriculture exports from BC, with a value of \$61.5 million in 2016.
- The United States continued to be BC's largest export market for greenhouse vegetables in 2015, accounting for over 99% of all export sales.
- Nearly 100% of BC greenhouse growers use biological pest control (Integrated Pest Management), thereby reducing their reliance on pesticides.
- BC greenhouses produce 10 to 20 times the amount of vegetables on the same area of field, when compared to traditional farming methods.

### Questions for discussion and inquiry

1. What are the components in a particular location that affect what farmers choose to grow? (*soil, water, climate, nutrients, energy, micro-organisms*)
2. What are some of the practices used in greenhouses to minimize their impact on the environment? (*use of natural gas and green fuels such as wood chips in boilers to produce heat, reuse and recycling of water and nutrient water, capture and use of CO<sub>2</sub> from natural gas boilers exhaust to enrich the greenhouse atmosphere and enhance production, use of energy curtains and heat storage tanks to reduce energy consumption, computerized control of the indoor climate*)
3. Why are the workers in the greenhouse wearing gloves? (*Employees can wear gloves to keep their hands cleaner if they prefer to but this is not required. In fact, many prefer to work with bare hands to have a better “feel” for the plant.*)
4. What is the smoke coming out of the greenhouse? Is it steam? Or does it contain particulate matter? (*The white smoke above the greenhouse is the hot boiler exhaust that condenses upon contact with outdoor cold air. It is only visible in the winter. The boiler exhaust, rich in CO<sub>2</sub>, is pumped back into the greenhouse to enrich the atmosphere for the plants.*)
5. What are some advantages of growing vegetables in a greenhouse? (*efficient use of agricultural land, extended season, controlled climate, better pest control, ability to grow crops that are difficult to grow in gardens or not normally commercially viable in the area such as tomatoes, eggplant and peppers*)
6. How do insects help in the greenhouse? (*pollination, biological pest control*)

**Greenhouse Tomatoes Food System—Examples of inputs and outputs**

Food System Component	Inputs	Outputs
<p><b>Production</b> Seedlings are planted in October and set into the greenhouse in early December to grow throughout the winter months.</p>	<ul style="list-style-type: none"> <li>• seeds</li> <li>• bags of sawdust, coconut fiber or rockwool to grow the plants</li> <li>• heat</li> <li>• labour</li> <li>• water/ nutrients/ carbon dioxide for photosynthesis</li> <li>• technology (computer systems)</li> <li>• science</li> <li>• greenhouses</li> <li>• highly efficient boilers (natural gas or wood waste)</li> <li>• water</li> <li>• insects for pest management (ladybugs, wasps and mites)</li> <li>• bumblebees for pollination</li> <li>• food safety guidelines</li> </ul>	<ul style="list-style-type: none"> <li>• tomato plants</li> <li>• CO<sub>2</sub> (reused inside the greenhouse)</li> <li>• oxygen</li> </ul>
<p><b>Processing</b> Tomatoes are handpicked when vine-ripe and then packaged.</p>	<ul style="list-style-type: none"> <li>• labour (for packing, grading and quality control)</li> <li>• packaging boxes</li> <li>• food safety guidelines</li> </ul>	<ul style="list-style-type: none"> <li>• tomatoes</li> </ul>
<p><b>Distribution</b> Tomatoes are delivered to various customers locally and internationally.</p>	<ul style="list-style-type: none"> <li>• labour (truck drivers, store employees)</li> <li>• energy</li> <li>• businesses (wholesalers, retailers, food service establishments)</li> </ul>	<ul style="list-style-type: none"> <li>• greenhouse gases</li> <li>• tomatoes in various locations</li> </ul>
<p><b>Access</b> Customers can purchase BC greenhouse tomatoes from a variety of businesses.</p>	<ul style="list-style-type: none"> <li>• labour</li> <li>• grocery store</li> <li>• restaurant</li> <li>• energy</li> <li>• food skills</li> </ul>	<ul style="list-style-type: none"> <li>• variety of foods prepared with tomatoes</li> </ul>
<p><b>Consumption</b> Consumers can enjoy delicious dishes prepared with tomato.</p>	<ul style="list-style-type: none"> <li>• food skills</li> <li>• labour</li> <li>• energy</li> <li>• water</li> </ul>	<ul style="list-style-type: none"> <li>• foods in the vegetables and fruit category of Canada’s food guide</li> <li>• dishes made with tomatoes</li> <li>• greenhouse gases</li> <li>• waste</li> </ul>

## Teacher Backgrounder

### How are greenhouses set up?

Greenhouses are recyclable structures made of aluminum, steel and single pane glass to allow plants to get the most light. They also have vents to cool the greenhouse on hot days. Inside the greenhouse, growers place a white plastic or white woven material over the growing medium. This plastic makes cleaning easy and prevents transfer of pests or diseases into the next crop. It also provides a barrier between the plants and pathogens in the soil, controls weeds and reflects light back up into the crop to help increase photosynthesis.

Computers monitor every aspect of the indoor growing environment such as light, temperature, humidity, ventilation, water, nutrients, heat and carbon dioxide.

Plants are typically grown in a soilless bag made of porous sawdust, rockwool or coconut fiber. A drip irrigation system delivers water and nutrients to the plants' roots. Unused water is collected and adjusted for nutrients before being reused again. Heating pipes run along the base of the plants to keep them warm on cold days. These pipes, which contain hot water, also function as a railing for the hydraulic carts used for picking and working at the top of the crops. On hot summer days, fabric shades (or whitewash applied to the greenhouse glass) create shade and protect the plants and fruit from burning.

### Hot Issues

#### Are greenhouses bad for the environment?

While greenhouse growers depend on energy to control the indoor environment of their greenhouses, they follow many practices to minimize the impact of their operations on the environment.

### Examples of these practices include:

- They use high efficiency boiler systems to heat their greenhouses. Most use natural gas and some even use wood chips as their fuel source.
- They capture CO<sub>2</sub> released from the natural gas boiler exhaust to enrich the greenhouse atmosphere and enhance photosynthesis.
- They invest in heat saving technology. They use energy curtains and store unused heat in large water tanks. The hot water from the tanks runs through heating pipes during cooler night temperatures.
- They are leaders in Integrated Pest Management and use predatory insects and mites to battle bad bugs that damage their crops and vegetables.
- They use no herbicides.
- They produce 10 to 20 times the amount of vegetables on the same area of field used in conventional farming.
- They collect rainwater and use it in their irrigation systems.
- They use a computer-controlled drip irrigation system that feeds the water and nutrients directly to the plants' roots. They recycle unused water and adjust it for nutrients before feeding it to plants.

### Benefits of Eating Vegetables and Fruit

Vegetables and fruit provide important nutrients such as carbohydrate, vitamins A and C, potassium, magnesium and some B vitamins such as folate. They also provide fibre.

With the release of [Canada's food guide](#) in 2019, Canadians continue to be encouraged to eat [plenty of vegetables and fruit](#). Recommendations include choosing fresh, frozen or canned vegetables and fruit to add a variety of colours, textures and flavours to your food.

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

### Cooking with Tomatoes

Tomatoes are versatile and can be consumed in a variety of ways. Check the following websites for recipe ideas:

We Heart Local: [weheartlocalbc.ca/explore-recipes](http://weheartlocalbc.ca/explore-recipes)

Howeling's Signature Recipes: [houwelings.com/files-2/recipes.php](http://houwelings.com/files-2/recipes.php)

Windset Farms Recipes: [windsetfarms.com/recipes](http://windsetfarms.com/recipes)

Village Farms Recipes: [villagefarms.com/recipes](http://villagefarms.com/recipes)

SunSelect Produce Recipes: [sunselect.ca/category/recipes](http://sunselect.ca/category/recipes)

### Links

1. Interactive Grow BC [bcaitc.ca/grow-bc-commodities](http://bcaitc.ca/grow-bc-commodities)

Check out entries for:

- Greenhouse vegetables
- Vegetable families, such as alliums, cucurbits, cole crops, herbs, legumes, roots and leafy vegetables.
- Individual vegetables

2. BC Greenhouse Growers Association [bcgreenhouse.ca](http://bcgreenhouse.ca)

### Acknowledgement

We would like to thank Linda Delli Santi, Executive Director at BC Greenhouse Growers' Association, for reviewing the Produce video and teacher discussion guide and providing us with background information for this resource.

## 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](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/EvaluatingSources/Guidelines](http://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 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?

**Food System Student Worksheet—Inputs and Outputs**

Food System Component	Inputs	Outputs
Production		
Processing		
Distribution		
Access		
Consumption		

**Notes:**