

FEEDING CANADA

Exploring Our Food System

— A VIDEO SERIES —

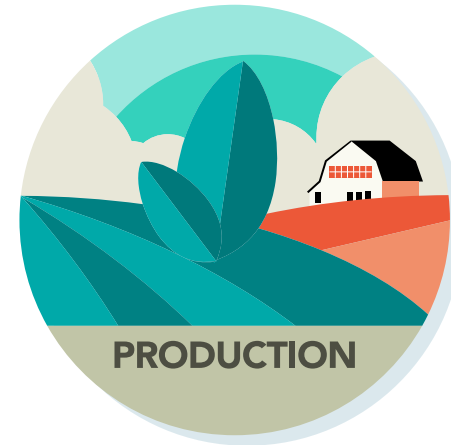


SUSTAINABLE FARMING



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We would like to offer a special thanks to the advisory group, curriculum consultants, teacher consultants, and students that worked with the team of Registered Dietitians in Ontario when these videos were first created.

We would also like to acknowledge the excellent contributions of the team of creative designers, videographers, film crew, and editors who helped create a dynamic video series.

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INTRODUCTION

Rationale for the Development of the Food System Education Project

Several programs of study in Nova Scotia's grades 7–12 curricula include learning outcomes that link to food systems, including Science, Health, and Social Studies. These outcomes include exploration of food production, food safety, food security, sustainable farming practices, preservation of farmland, local foods, factors influencing personal food purchases, and overall environmental responsibility. Current curricula and interest in food systems from both students and teachers present an opportunity to provide accurate, evidence-based representation of farming practices in Canada. The Curriculum Connections on page 15 highlights specific learning outcomes associated with each video.

Goal of Feeding Canada Video Series

The goal of this series is to provide a well-researched, engaging, and balanced exploration of the Canadian food system.

Purpose of Teacher Discussion Guide

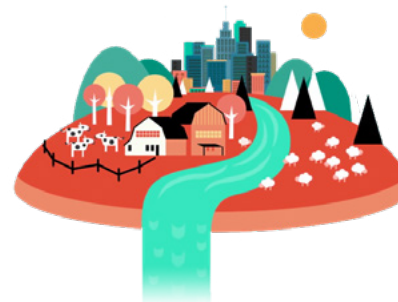
This discussion guide provides you with thought-provoking questions and answers to help facilitate a robust discussion around each topic in the video series. Specific learning objectives are addressed for each video. Questions will help students think critically about the issues that will be discussed during the video, help enhance the discussion after viewing, and help to meet all learning objectives for each video.

This guide provides additional in-depth information on each topic along with credible references for further exploration. Extension ideas have also been included to enrich the student learning experience.

FEEDING CANADA

Exploring Our Food System

— A VIDEO SERIES —



Using the Feeding Canada Videos

The Feeding Canada series comprises six short videos that range from 2 to 10 minutes in length. Each video explores issues relevant to the food cycle that may broadly or specifically affect farmers, the food industry, the public, and/or the environment. For a comprehensive examination of the issues relevant to Canada's food system, we recommend that all videos be viewed throughout the semester.

Required Materials

- Internet access
- Access to video link
- Computer, screen, and projector
- Chart paper and markers



FEEDING CANADA VIDEO SERIES

Video 1: Sustainable Farming

- Introduces the concept of a food cycle
- Defines and discusses sustainable farming practices and provides examples of how Canadian farmers use sustainable farming practices

Video 2: Farm Animal Care

- Introduces the concept of animal welfare and the regulations and best practices used to ensure animal well-being

Video 3: Food Safety

- Discusses the extensive regulations and safety measures in place at various stages of the Canadian food system to maintain food safety and human health

Video 4: Antibiotics and Growth Hormones

- Identifies regulations and safeguards in place in Canada to protect human and animal health
- Examines the use and regulation of antibiotics and hormones in food production

Video 5: Biotechnology

- Introduces the concept of biotechnology and its impact on food production

Video 6: Wasted Food and Food Recovery

- Explores the impact of wasted food and examines Canadian-based initiatives at various stages of the food cycle that are helping to reduce and manage food waste



USING CREDIBLE INFORMATION IN DISCUSSIONS AND ACTIVITIES

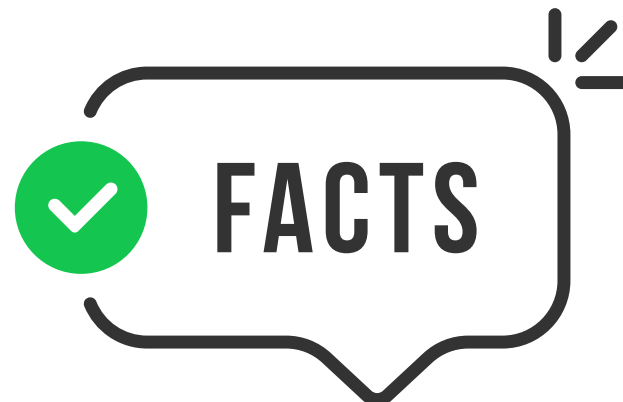
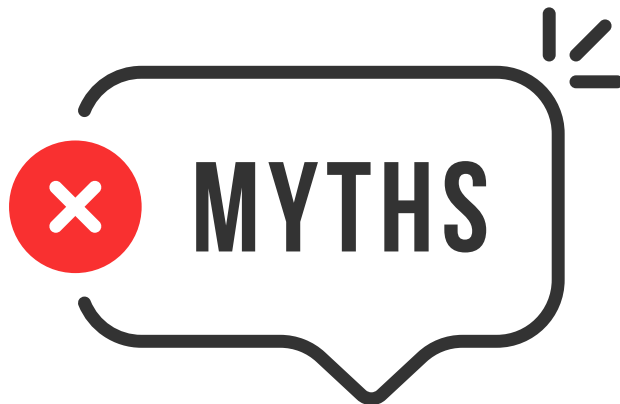
While agriculture has been prominent in Canada for more than a century, over time, our connection and relationship with food has changed. The decrease of firsthand knowledge and experience related to farming and food production increases the importance of using credible sources of information to learn about agriculture and food systems.

Food documentaries and farming exposés may be popular; however, they are often controversial and fraught with misinformation. Additionally, they commonly

- discuss international farming practices, which may not apply to the Canadian context;
- provide anecdotal rather than evidence-based arguments; and
- show content that is gratuitous in nature using rare examples that misrepresent what is common practice.

If students cite these types of sources, we suggest directing them to evidence-based resources that are current and Canadian-focused and that emphasize the perspectives of those working in the agricultural sector, including farmers, veterinarians, and researchers. Examples of these types of resources are found in the Additional Resources and Extended Learning sections of this guide.

We recognize that you or your students may have questions beyond the scope of what we have provided. Fortunately, there are many people and groups in the Maritimes that would be happy to help find answers to your questions. Reach out to people working in the agricultural sector in your community (e.g., farmers, veterinarians, agronomists), approach organizations with in-depth knowledge such as [Agriculture for Life](#) or use reputable websites such as [Agriculture and Agri-Food Canada](#). You can also connect with our team of Registered Dietitians at info@nutrition@dfc-plc.ca with the subject line “Feeding Canada Video”.





FOOD CYCLE INTRODUCTION

Each video in the series begins with an introduction to the food cycle. This message is reiterated throughout the series because it is important for students to have a strong understanding of the food cycle and how each component shapes the food system. Each video highlights specific issues relevant to key stages of the food cycle.



The Food Cycle

The agricultural food cycle is the journey food travels to reach the consumer. This cycle moves from the farm to food processing, distribution, access and consumption by consumers, to food waste, and back again to production. Each step of the food cycle is vital to the cycle's success and cannot work without the other steps. The food cycle includes local, household, and individual food systems and functions as part of the larger national and global food system, which has a significant impact on our health, the economy, and the environment.

Production: Farming practices that cultivate raw ingredients.

Processing: Preparation of food products from raw ingredients (e.g., the picking and packaging of fruit).

Distribution: Transportation – how food products reach the market system and the end user – the consumer.

Access: Market and retail accessibility connected to consumers through purchasing.

Consumption: Intake of food by consumers, whether at home or away from home.

Waste management: Treatment of waste from its creation to its disposal and/or recycling.



SUSTAINABLE FARMING



SUSTAINABLE FARMING

Estimated Time: 30 minutes for video viewing and pre- and post-video discussion

Learning Objectives

Students will

- Identify and describe the six components of the food cycle
- Explain at least three practices or new technologies farmers use to help protect the environment and produce safe, healthy food
- Demonstrate understanding of an Environmental Farm Plan by describing how it is used to enhance sustainable farming practices

Background

Throughout the food cycle, both farmers and consumers are concerned about many issues relating to the **production** and **processing** of adequate amounts of food in a sustainable way, while ensuring both animals and the land are cared for responsibly.

The Issues

- Producing enough food to feed Canada's population
- Ensuring consumers have accurate information about where and how their food is produced and the importance of sustainable farming practices

Why Should We Care?

Without a Canadian food supply, the foods Canadians eat would need to be imported, which means consumers would have to rely on other countries for food.

Ultimately, preserving farmland is essential for supporting the economy, creating and maintaining jobs, creating sustainable communities, supporting the environment, and providing local foods. This is why sustainable farming practices are important within the food system. Many farmers in Canada are working hard to include sustainable farming practices on their farms and are taking the initiative to lessen their environmental impact.

Sustainable food system: A food system that does not compromise the environmental, economic, health, or social well-being of present and future generations.¹



Sustainable farm practices: Best practices in farming that support an integrated system where nutrients, crops, farm animals, and other ecosystem components work together.²

Greenhouse gasses: Particular gasses in the earth's atmosphere that absorb heat and radiate some of it back to the earth's surface, keeping it warm and habitable. However, when concentrations get too high, these gasses can cause surface temperatures to be higher than they would normally be. The most important gasses that contribute to this effect are water vapour (largest impact), carbon dioxide, methane, and nitrous oxide.³

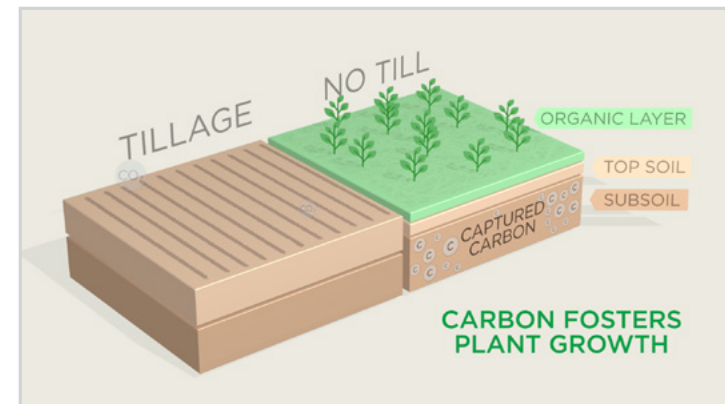
It is estimated that approximately 10% of greenhouse gas emissions in Canada come from agricultural practices.⁴ However, many research initiatives have explored how farms can reduce their impact, which has resulted in farmers taking steps to proactively reduce their emissions. For example, from 1990 to 2016, the carbon footprint of a litre of Canadian milk decreased by 23%.⁵ This change is a result of more high-tech and efficient farming practices such as working with animal nutritionists to improve dairy cattle diets and adjusting manure management practices (e.g., covering liquid manure with straw).⁵

Farming Best Practices

Canadian farmers and farming organizations have developed best practices and on-farm assurance programs to help produce enough safe, healthy food while protecting the land. These include best practices for waste management, soil care, and pest management, which will be covered in the first video of the Feeding Canada series.



Video 1 – Screen Sample A



Video 1 – Screen Sample B



Video 1 – Screen Sample C



DISCUSSION QUESTIONS

Pre-video

Q1: What comes to mind when you hear the terms *food system* or *food cycle*?

A1: Encourage students to think about each of the six areas of the food cycle: production, processing, distribution, access, consumption, and waste management. Remind students that their local or regional food cycle is just one part of the larger food system.

Q2: What areas of the food cycle do you feel most influence your food choices?

A2: There is no right or wrong answer here. The goal is to get students thinking about their own role in the food cycle and how their understanding of that role could change as they progress through the video series.

Post-video

Q3: What is sustainable farming?

A3: Sustainable farming is a range of practices that protect the land and water as much as possible so that farmers can continue to produce enough safe food for present and future generations. Highlight the point from the video that farmers aim to “not just use the land, but to improve it” so that farmland has the potential to be used forever, producing food for many future generations.

Q4: What is an anaerobic digester?

A4: An **anaerobic digester** is a mechanical system that aids in reducing food waste by operating like a mechanical stomach. Anaerobic digesters are fed with organic material (waste) from animals such as cows, as well as food waste (often from nearby farms or food

companies). Micro-organisms (bacteria) break down this waste in an oxygen-free (anaerobic) environment to produce renewable energy from methane gas.⁶ This is also referred to as a biogas system. This technology is innovative and proven to reduce environmental impacts.⁶ Alberta, Ontario, and Quebec have the most anaerobic digesters in Canada.⁷ Farmers who use anaerobic digesters recognize that waste is a valuable resource and an important part of the food cycle.

Q5: The three best practices farmers use to care for their soil are no-till, crop rotation, and cover crops. What are the environmental benefits of no-till practices?

A5: Minimal or no-till practices are good for the environment because plant materials from the previous year's crops are left on the soil, which increases nutrients and water in the soil.^{8,9} Since less time is required, less labour and fuel are used.^{8,9} Ultimately, fewer greenhouse gasses are emitted into the atmosphere.⁹ The earthworms (part of the microbiome that is better preserved with no-till farming) are especially important to cropping programs.¹⁰

No-till practices are relatively new in the farming industry, whereas tillage is the more traditional practice.⁹ Due to the many proven benefits of no-till practices, however, more than half of the farmland in Canada is now managed with no-till farming.⁸ While there are many benefits to no-till practices, there are still constraints that prevent some farms from adopting this practice. These constraints are often region- and climate-specific. For example, excess soil moisture can create plugged seed runs and overpacking of the soil.⁹ This is often not a concern in semi-arid conditions, but in regions of high humidity the excess moisture does not work well with no-till practices.⁹ Additionally, some field crops (e.g., potatoes, low growing beans) require significant tillage and soil disturbance during the harvesting period.⁹ Although not all soils, climates, or crops may be suitable for no-till practices, reductions in tillage are a benefit to sustainability.^{8,9}

**Q6: What is the purpose of beneficial insects?**

A6: Beneficial insects are part of an integrated pest management system.¹¹ They create a biological control system that better protects crops, soil, and the environment.¹¹ For example, some types of wasps* parasitize aphids that are harmful to crops, reducing the need for chemical controls such as pesticides.¹² Note that pesticide use by farmers is closely regulated by the Pest Management Regulatory Agency.¹³

* Not all wasps are parasitic as they are a diverse species; however, both Chalcid wasps (Chalcididae) and Braconid wasps (Braconidae) are parasitic to aphids.¹²

Q7: What is an Environmental Farm Plan (EFP)? Why is it important?

A7: EFPs help farmers assess their own sustainability efforts.¹⁴ After identifying potential environmental hazards, farmers can create action plans to address any issues and improve their sustainability practices.¹⁴ Ultimately, EFPs aim to create improvements for the environment for a more sustainable future.¹⁴ In some industries, such as dairy, farmers have been quick to use EFPs; 40% of all Canadian farmers have an EFP and over 80% of dairy farmers have EFPs in place.¹⁵

Q8: What are on-farm assurance programs? Can you name one?

A8: Farming organizations have created on-farm assurance programs to demonstrate their commitment to providing safe and healthy food in a sustainable and responsible way.¹⁶ Examples of on-farm assurance programs include the following:

proAction® (Dairy Farmers of Canada) – Canadian dairy farmers have collectively and proactively established an initiative that covers six key modules: milk quality, food safety, animal care, traceability, biosecurity, and environment. The program is mandatory on all dairy farms in Canada and is based on the principle of continuous improvement.
(www.dairyfarmers.ca/proaction)

Start Clean–Stay Clean® (Egg Farmers of Canada) – This program ensures that Canadian eggs are produced according to some of the highest standards for safety and quality in the world. There are five key parts: on-farm inspections, critical requirements, record keeping, continuous improvement, and farmer commitment.
(www.eggfarmers.ca)

Verified Beef Production Plus (Canadian Cattlemen's Association) – This program has expanded to meet growing consumer demands for transparent, accountable, and sustainable beef production. It includes training and auditing for animal care, biosecurity, and environmental stewardship, along with on-farm food safety practices.
(www.verifiedbeefproductionplus.ca)



ACTIVITIES

My Food Cycle

Have students summarize their learning by creating a visual representation of the food cycle as they currently understand it, including what is involved at each stage. Encourage students to add to their visual representation as they progress through the video series. Options may include creating a sketch or drawing, or making a mind map or chart.

Free Writing and Reflection

After viewing the video series (or as many of the videos as deemed appropriate for a specific course), have students complete the following reflection activity:

Give students 5–10 minutes to free write about their key learnings from the video series as well as any lingering questions. The aim is for them to recognize their learning and any changes in their knowledge or perceptions. Then encourage students to share highlights from either their visual representation or free writing with the class.

Farm of the Future Mini-Conference

Students will learn and share about practices or new technologies farmers use to help protect the environment that were not covered in the video. Divide students into groups of about four and allow them to choose from a list of topics (e.g., solar panels, wind turbines, renewable fuels, water recycling programs, buffer zones). After students research the topic and its benefits, have each group present their findings at a mock “Farm of the Future” mini-conference.

Option 1: Assign specific group roles

- Group leader: keeps group on task, ensures everyone participates, helps others
- Research specialist: leads efforts to find appropriate information
- Presenter: creates visual aids and is the main presenter
- Author: prepares the project summary and bibliography

Option 2: Have students complete the activity individually and present their findings in a slide deck, infographic, video, or one-page report.

Additional Resources

- [Environmental Farm Plans snapAG](#)
- [Conservation Tillage snapAG](#)
- [Crop Rotation snapAG](#)
- [Soil snapAG](#)



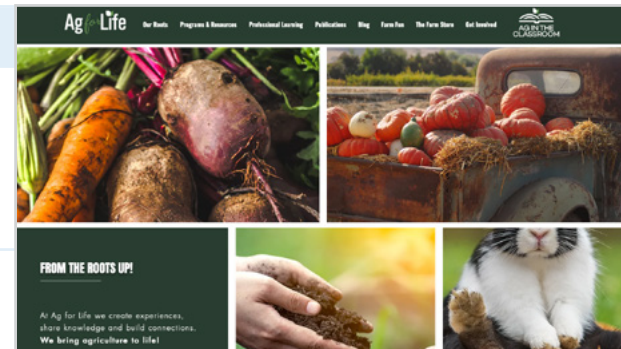
EXTENDED LEARNING

If you would like to continue exploring food systems in Canada, check out the following.

Ag for Life

Website address: www.agricultureforlife.ca

A variety of programs designed to empower audiences to think both critically and creatively and to give students a real awareness of agriculture and food production.



The Real Dirt on Farming

Website address: www.realdirtontfarming.ca

A digital magazine about food and farming in Canada that covers topics such as food safety, the environment, and the humane treatment of farm animals.





REFERENCES

1. Food Security Alberta. 2013. S.E.L.R.S. Lens. https://foodsecurecanada.org/sites/foodsecurecanada.org/files/selrs_lens_march_2013_copy_with_locale_0.pdf. Accessed March 12, 2021.
2. Dakers, S. Sustainable agriculture: future dimensions. Government of Canada: science and technology division. 1992. <http://publications.gc.ca/Collection-R/LoPBdP/BP/bp290-e.htm>. Accessed March 12, 2021.
3. Environment and Climate Change Canada. 2015. Greenhouse effect. <https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-effect.html>. Accessed March 12, 2021.
4. Agriculture and Agri-Food Canada. 2020. Greenhouse gases and agriculture. <https://agriculture.canada.ca/en/agriculture-and-environment/climate-change-and-air-quality/greenhouse-gases-and-agriculture>. Accessed March 12, 2021.
5. Dairy Farmers of Canada. 2019. How we're reducing emissions. <https://dairyfarmersofcanada.ca/en/who-we-are/our-commitments/sustainability/emissions>. Accessed March 12, 2021.
6. Canadian Biogas Association. N.D. About biogas. https://biogasassociation.ca/about_biogas. Accessed March 12, 2021.
7. Canadian Biogas Association. 2018. Current status and future potential of biogas production from Canada's agriculture and agri-food sector. https://biogasassociation.ca/index.php/resources/canadian_agricultural_biogas_study. Accessed March 12, 2021.
8. Statistics Canada. 2018. Snapshot of Canadian agriculture: Chapter 5. <https://www150.statcan.gc.ca/n1/pub/95-640-x/2011001/p1/p1-05-eng.htm>. Accessed March 12, 2021.
9. Agriculture and Agri-Food Canada. 2014. Flexibility of no till and reduced till systems ensures success in the long term. <https://agriculture.canada.ca/en/agriculture-and-environment/soil-and-land/soil-management/flexibility-no-till-and-reduced-till-systems-ensures-success-long-term>. Accessed March 12, 2021.
10. Ontario Ministry of Agriculture, Food and Rural Affairs. 2021. Be a better farmer: understand the living soil part 4 – those wonderful worms. <http://www.omafr.gov.on.ca/english/crops/facts/livingsoil4.htm>. Accessed March 12, 2021.
11. Government of British Columbia. N.D. Integrated pest management. <https://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/animals-and-crops/plant-health/integrated-pest-management>. Accessed March 12, 2021.
12. Government of British Columbia. 2016. Beneficial insects: predators, parasitoids, and pollinators. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/agriculture-and-seafood/animal-and-crops/plant-health/beneficial_insects.pdf. Accessed March 12, 2021.
13. Health Canada. 2009. Pest Management Regulatory Agency. <https://www.canada.ca/en/health-canada/corporate/about-health-canada/branches-agencies/pest-management-regulatory-agency.html>. Accessed March 12, 2021.
14. Alberta Environmental Farm Plan. 2021. Producers. <https://www.albertaefp.com/resources/producers/>. Accessed March 12, 2021.
15. Statistics Canada. 2019. Farm management survey, 2017. <https://www150.statcan.gc.ca/n1/daily-quotidien/190426/dq190426b-eng.htm>. Accessed March 12, 2021.
16. Government of Alberta. 2021. On-farm food safety programs. <https://www.alberta.ca/on-farm-food-safety-programs.aspx>. Accessed March 12, 2021.



CURRICULUM CONNECTIONS

Grade 10

Practical Applied Arts

FoodTech10 2.2 Critically analyze the impacts of evolving technologies on themselves, societies, and the environment

Science

Predict and analyze the impact of external factors on the sustainability of an ecosystem, using a variety of formats (212-4, 214-3, 331-6)

Grade 11

Practical Applied Arts

Ag / Agrifood11 AG-01 Investigate and explain abiotic and biotic factors that influence agriculture.

Ag / Agrifood11 AG-14 Compare the risks and benefits to society and the environment of production while maintaining health, preventing pests and diseases, and supply and demand.

Ag / Agrifood11 AG-24 Identify questions to investigate that include economy, environment, culture, and social aspects.

Science

Chem11 118-2 Analyze from a variety of perspectives the risks and benefits to society and the environment of applying organic chemistry knowledge or introducing a particular technology.



GLOSSARY

Anaerobic digester: A system fed with organic material (waste) from farm animals such as cows, as well as food waste, which is broken down by micro-organisms (bacteria) in an oxygen-free (anaerobic) environment to produce renewable energy from methane gas.

Access: Market and retail accessibility connected to consumers through purchasing.

Consumption: Intake of food by consumers, whether at home or away from home.

Cover crops: An array of different plants used to feed the soil, allowing farmers to increase the yield of their primary crop while using less fertilizer, which is better for the environment.

Crop rotation: Growing different crops, one after the other, on the same soil to keep the soil healthy and reduce pests and disease.

Distribution: Transportation – how the food products reach the market system and the end user – the consumer.

Greenhouse gasses: Particular gasses in the earth's atmosphere that act like the glass of a greenhouse, preventing heat from escaping. These gasses absorb heat and radiate some of it back to the earth's surface, causing surface temperatures to be higher than they would otherwise be. The most important gasses that contribute to this effect are water vapour (largest impact), carbon dioxide, methane, and nitrous oxide.

No-till: Growing crops with minimal soil disturbance.

Production: Farming practices that cultivate raw ingredients.


Processing: Preparation of food products from raw ingredients (e.g., the picking and packaging of fruit).

Sustainable food system: A food system that does not compromise the environmental, economic, health, or social well-being of present and future generations.

Sustainable farm practices: Best practices in farming that support an integrated system where nutrients, crops, farm animals, and other ecosystem components fit together.

Tillage: Plowing or working up the soil, usually done to control weeds.

Waste management: Treatment of waste from its creation to its disposal and/or recycling.



Tell us how you used this resource with your class and let us know if you have any suggestions for improving it by emailing infnutrition@dfc-plc.ca.

We appreciate your feedback!

TeachNutrition.caTM

By Dairy Farmers of Canada's Registered Dietitians