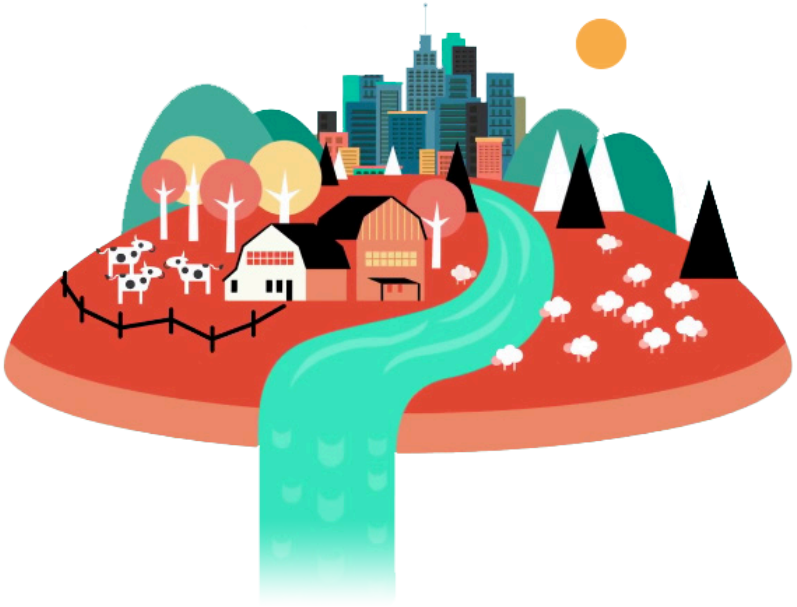
FEEDING CANADA

Exploring Our Food System

– A VIDEO SERIES –



WASTED FOOD AND FOOD RECOVERY

TeachNutrition.ca™
By Dairy Farmers of Canada's Registered Dietitians

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

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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.

A SPECIAL THANK YOU TO OUR TOPIC SPECIALIST INTERVIEWEES

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INTRODUCTION

Rationale for the Development of the Food System Education Project

Several programs of study in Alberta's grades 7–12 curricula include learning outcomes that link to food systems, including Science, Biology, and Career and Technology 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 chart on page 17 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.

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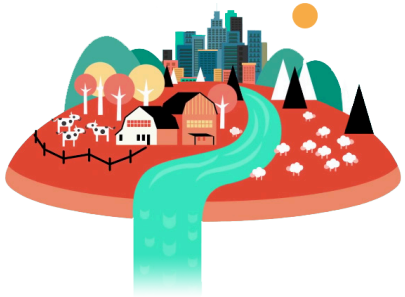


Using the Feeding Canada Videos

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

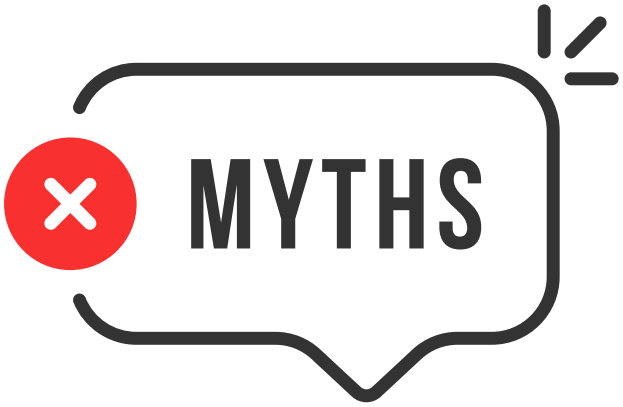
While agriculture has been prominent in Canada for more than a century, over time, our connection and relationship with food has changed. The decrease of firsthand knowledge and experience related to farming and food production increases the importance of using credible sources of information to learn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

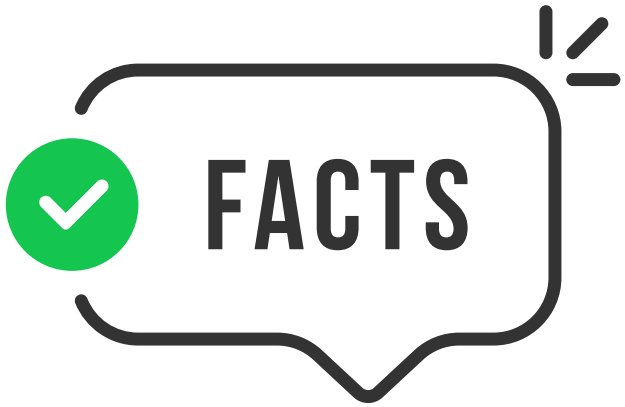
Food documentaries and farming exposés may be popular; however, they are often controversial and fraught with misinformation. Additionally, they commonly

- 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 Alberta 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 Alberta Milk, or use reputable websites such as Agriculture and Agri-Food Canada. You can also connect with our team of Registered Dietitians at albertanutrition@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.

WASTED FOOD AND FOOD RECOVERY

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

Learning Objectives

Students will

- Describe the impact of food waste on the economy, environment, and social sphere
- Identify at least three ways to reduce food waste

Background

Food Loss and Waste

At each stage of the food cycle, food loss and waste occur. In Canada, an estimated 20% (11 million tonnes) of all food produced becomes avoidable food loss or waste each year.[1] **Food loss** refers to foods lost during production, harvest, transport, storage, processing, packaging, and distribution.[1] For example, 13% of vegetables and fruits grown in Canada are never harvested or are discarded.[1] **Food waste** refers to foods that are disposed of at the retail, food service, or household level.[1] For example, about 30% of waste from Canadian households is food waste, with vegetables, fruits, breads, and cereals the most likely to be thrown away.[1] Canada has committed to reducing food loss and waste.[1] Each area of the food cycle contributes to food loss and waste, so many steps – from farm to home – can be taken to make a significant positive impact.

Why Should We Care?

Reducing food loss and waste saves money; helps ensure energy, water, and land resources for food are not misused; improves the efficiency of the agri-food sector; and reduces greenhouse gas emissions.[1] The environmental costs come at both ends of the food cycle. **Greenhouse gas** emissions occur as a result of production and transportation of food, and then more greenhouse gasses are created when it is disposed of, especially if it ends up in a landfill.[1] Reducing food waste is critical to easing the burden on resources and enabling food production to meet demands around the world.

Challenges and Current Actions to Address Food Loss and Waste in the Food Cycle

Production

Seasonal fluctuations in supply and demand, culling to meet quality and cosmetic standards for produce, insufficient employees to harvest produce, inadequate storage, and order cancellation are a few of the reasons food is lost during production.[1] Current actions to reduce food loss include initiatives to increase field **gleaning** and the harvest and sale of "imperfect" produce, tax credits to encourage food donations, and research and innovation on recycling or using agricultural waste.[1] Gleaning is the act of collecting crops left behind in farmers' fields after commercial harvesting has taken place, or from fields where it is not economically profitable to harvest.

Processing

Equipment malfunctions that cause products not to be up to quality specifications, inaccuracy of supply and demand forecasting, rejection due to poor quality, and production line changes are a few of the reasons food is lost during packaging, processing, and manufacturing.[1] Current actions to reduce food loss include optimization studies and waste assessments, toolkits for food processors, innovative technology such as pulsed light to extend shelf life, and research on the use of industry byproducts.[1]

Distribution

Inadequate temperature and humidity controls, spillage during transfers, mishandling and compression, and delivery delays are a few of the reasons food is lost during transport and storage.[1] Current actions to reduce food loss include forums for agricultural stakeholders to share best practices, inventory management by distributers and retailers, and research on new technologies to preserve fresh produce.[1]

Access

Rejection of produce that does not meet visual quality standards, goods damaged upon receipt, poor inventory management, lack of protocols for food rescue, and withdrawal of products approaching label dates are a few of the reasons food is wasted at the retail level.[1] Current actions to reduce food waste include training staff to improve produce display and handling, conducting daily waste audits to inform future purchasing, and discounting and donating foods before they reach their label dates.[1]

Consumption

Food prepared but not served, surplus ingredients, improper storage, and disposal of food returned to the kitchen are a few of the reasons food is wasted at restaurants and other food services.[1] Current actions to reduce food waste include staff training, food waste tracking, and certification programs.[1]

Over-purchasing, lack of meal planning, improper storage, limited understanding of shelf-life, and eating preferences (e.g., unwillingness to eat leftovers) are a few of the reasons food is wasted at the household level.[1] Actions to reduce food waste can include increasing awareness of the issue, increasing food literacy and cooking skills, and learning about "best before" and "expiry" dates.[1]

Waste Management

The Hierarchy of Solutions to Address Food Loss and Waste on page 11 offers guidance applicable to various parts of the food cycle.[1]

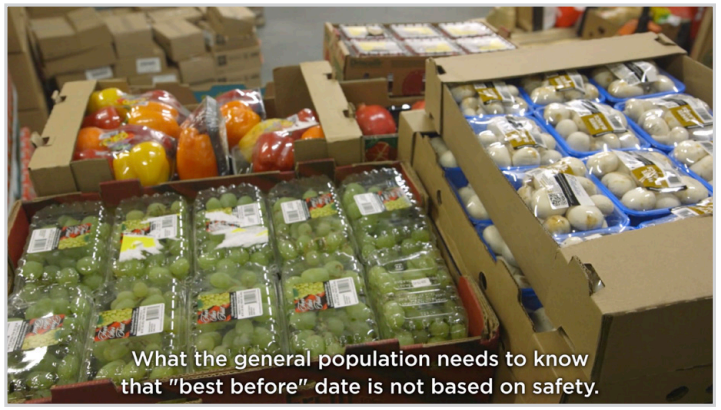
Tangible ways Canadians are managing and reducing food loss and waste include the following:

- Many farmers are consciously applying best practices to reduce food waste and improve how they manage waste. **Anaerobic digesters** are large closed-system units fed with organic material (waste) from animals such as cows, as well as with food waste. The waste is broken down by micro-organisms (bacteria) in an oxygen-free (anaerobic) environment to produce renewable energy in the form of methane gas. (See Video 1: *Sustainable Farming* for details.)[5]

- Households are composting food waste or participating in Green Bin programs; planning meals and using leftovers; and improving their food literacy – for example, by growing food, learning to store food properly, and learning to cook.
- Organizations such as Second Harvest Food Rescue ask restaurants and grocery stores to donate surplus fresh food instead of throwing it out.[2] The food is then delivered to charities and non-profit organizations for distribution to consumers. As noted by Environment and Climate Change Canada, "Recovery of surplus food to feed people is not proposed as a solution to food insecurity, but instead recognizes that the highest value of food is maintained when it is consumed by people."[1] **Household food insecurity** is defined as "the inability to acquire or consume an adequate diet quality or sufficient quantity of food in socially acceptable ways, or the uncertainty that one will be able to do so. Household food insecurity is often linked with the household's financial ability to access adequate food."[3]

This video will discuss the role of imports and exports in the Canadian food system, while also covering food waste along the continuum of the food cycle.

Video 6 – Screen Sample A



Video 6 – Screen Sample A

Video 6 – Screen Sample B

HIERARCHY OF SOLUTIONS TO ADDRESS FOOD LOSS AND WASTE

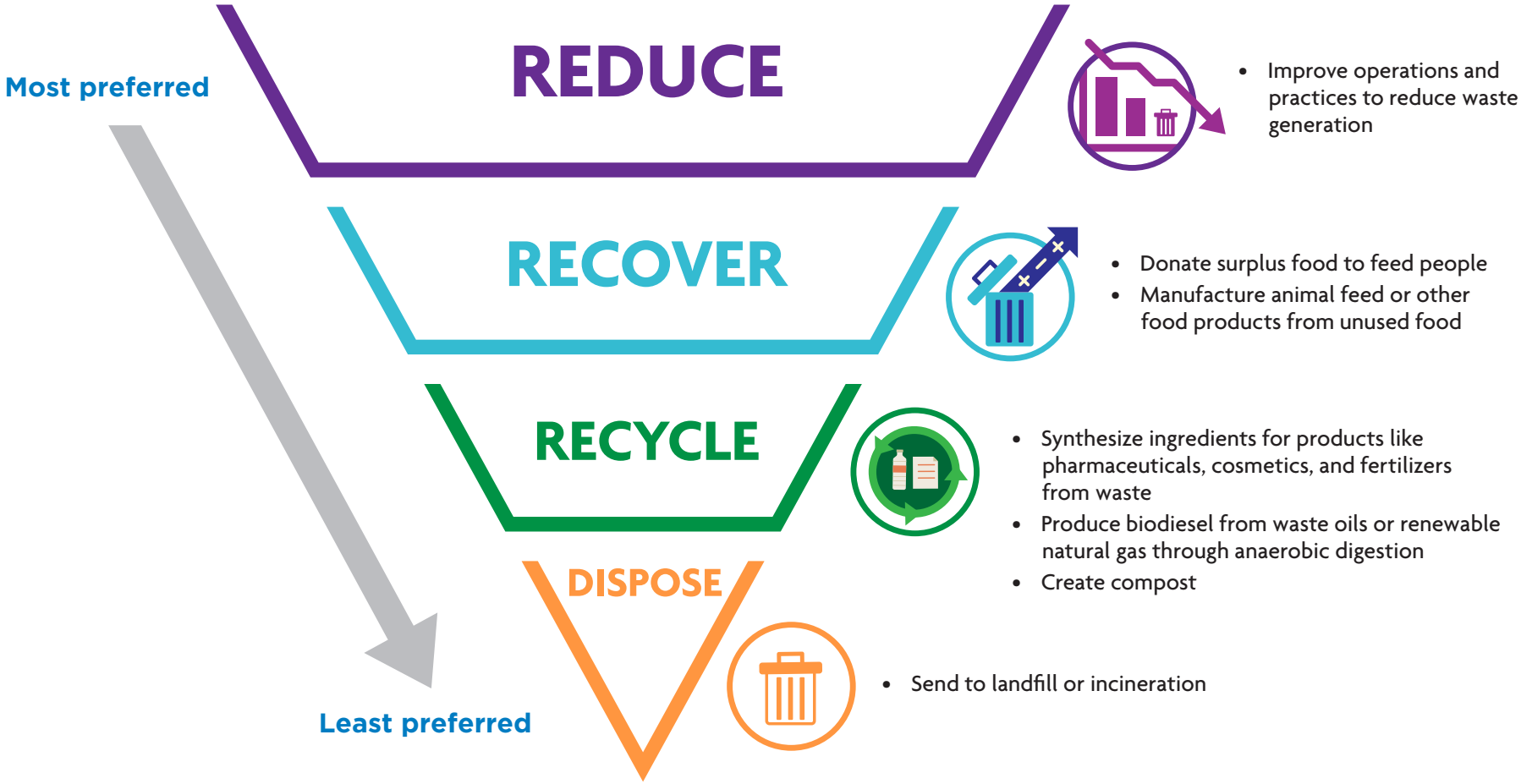


Figure adapted from:
Environment and Climate Change Canada. 2019. Taking stock: reducing food loss and waste in Canada. https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/food-loss-waste/taking-stock.html. Accessed March 18, 2021.

DISCUSSION QUESTIONS

Pre-video

Q1: What comes to mind when you think about food loss and waste?

A1: There is no one correct answer here. Students will likely think of food loss and waste from an individual or household consumer standpoint.

If students do not immediately bring up other parts of the food cycle, it may be helpful to prompt them to discuss additional areas that have an impact on food loss and waste and define the key terms. In Canada, an estimated 20% (11 million tonnes) of all food produced becomes avoidable food loss or waste each year.[1]

Food loss refers to foods that are not used during production, harvest, transport, storage, processing, packaging, and distribution.[1] For example, 13% of vegetables and fruits grown in Canada are never harvested or are discarded.[1]

Food waste refers to foods that are disposed of at the retail, food service, or household level.[1] For example, about 30% of waste from Canadian households is food waste, with vegetables, fruits, breads, and cereals the most likely to be thrown away.[1]

Post-video

Q2: What are some of the negative consequences of food loss and waste? Explain why it is important to reduce food loss and waste.

A2: Food loss and waste have economic, environmental, and social consequences. Reducing food loss and waste saves money; helps ensure energy, water, and land resources for food are not misused; improves the efficiency of the agri-food sector; and reduces greenhouse gas emissions.[1] The environmental costs come at both ends of the food cycle. Greenhouse gas emissions occur as a result of production and transportation of food, and then more greenhouse gasses are emitted when disposing of it, especially if it ends up in a landfill.[1] Reducing food waste is critical to easing the burden on resources and enabling food production to meet demands around the world.

Q3: The video discusses a food surplus recovery initiative to reduce food waste. How do you think this initiative helps improve the environmental, economic, and social problems associated with food loss and waste? Can you think of any other initiatives to reduce food loss and waste?

A3: Second Harvest Food Rescue asks restaurants and grocery stores to donate surplus fresh food instead of throwing it out. The food is then delivered to charities and non-profit organizations for distribution to consumers. Recovering surplus food diverts food waste from landfills, which can reduce greenhouse gas emissions and makes food accessible to those who can use it.

Please note, "Recovery of surplus food to feed people is not proposed as a solution to food insecurity, but instead recognizes that the highest value of food is maintained when it is consumed by people."[1] Household food insecurity is defined as "the inability to acquire or consume an adequate diet quality or sufficient quantity of food in socially acceptable ways, or the uncertainty that one will be able to do so. Household food insecurity is often linked with the household's financial ability to access adequate food."[3]

Other ways to reduce food loss and waste include the sale of "imperfect" produce, discounting food before it reaches its label date, waste assessment studies, technology to extend shelf life, and improving temperature and humidity controls for storage and transport. See "**Challenges and Current Actions to Address Food Loss and Waste in the Food Cycle**" on page 9 for more ideas.

Q4: In addition to the examples in the video, what are some ways that you can help to reduce food waste as a consumer?

A4: The video highlights a number of ways that consumers can affect the food cycle and reduce food waste, such as using leftovers, avoiding over-purchasing, improving food skills, and getting involved in initiatives in the community. Consumers and students can also do the following:

- Make a grocery list (and stick to it).
- Avoid grocery shopping when overly tired or hungry.
- Follow safe food storage practices.
- Learn to repurpose food scraps (e.g., citrus rinds) and other leftovers.
- Start with small portions and go for seconds if still hungry (extra food already on the plate rather than in the serving dish is more likely to be discarded).
- Leave the skins on apples, cucumbers, and potatoes and the crust on bread.
- Learn to preserve excess foods.
- Use a Green Bin or composter.

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.

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.

Note to Future Self

Students will observe food waste in their surroundings and reflect on if and how they wish to address what they noticed. Ask students to observe, record, and reflect on the food they see wasted in one day (e.g., at home, school, restaurants, grocery stores). Then, have them write their future self a letter or poem. Their note could include what they discovered, ideas on how to reduce food waste at a personal or systems level, or how they want to shape the food system their future self will experience.

If students need support and idea starters, refer to the Hierarchy of Solutions to Address Food Loss and Waste in the video.

Option 1: Have students create a six-to-eight word headline that summarizes their Note to Future Self and share it with the class. Review the responses and note any themes that stand out. Facilitate a discussion about alignment and divergence in responses.

Option 2: Use the Note to Future Self as the basis for a write-pair-share activity. Students write, then talk in pairs or trios about their ideas, then share highlights with the class.

Additional Resources

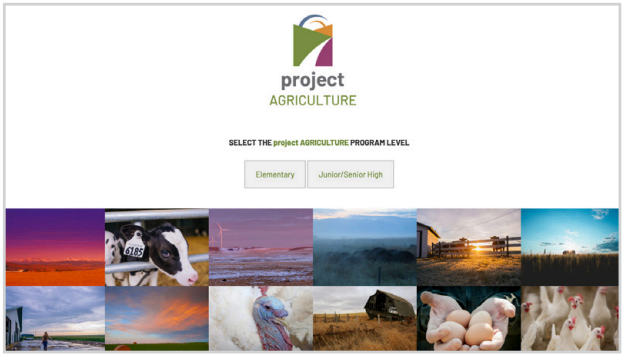
- Food Waste snapAg
- Food Security snapAg
- Food Loss and Waste Lab

EXTENDED LEARNING

If you would like to continue exploring food systems in Canada and Alberta, check out the following. Each includes free teacher and student resources for junior high and high school with links to the Alberta curriculum.

project AGRICULTURE

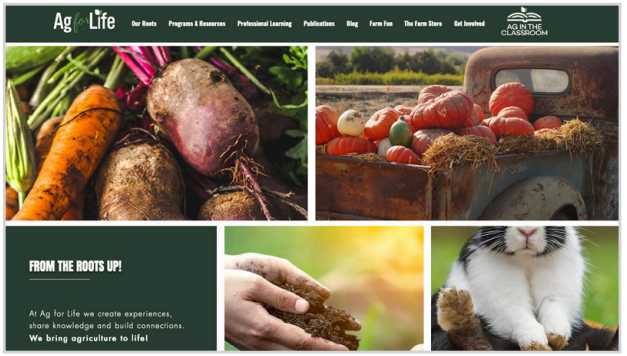
https://www.projectagriculture.ca
A project-based learning resource that provides opportunities for students to explore the impact and importance of agriculture in Alberta and Canada.



https://www.projectagriculture.ca

Ag for Life

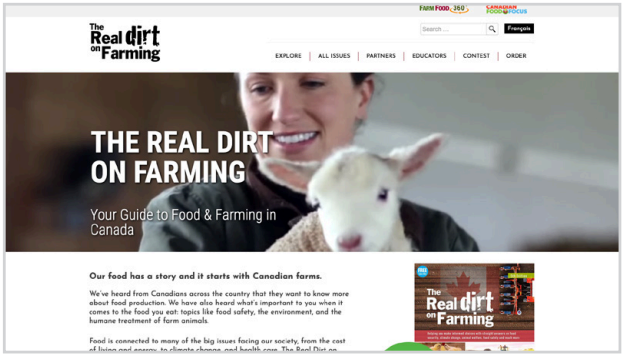
https://www.agricultureforlife.ca
A variety of programs designed to empower audiences to think both critically and creatively and to give students a real awareness of agriculture and food production.



https://www.agricultureforlife.ca

The Real Dirt on Farming

https://www.realdirtonfarming.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.



https://www.realdirtonfarming.ca

REFERENCES

1. Environment and Climate Change Canada. 2019. Taking stock: reducing food loss and waste in Canada. https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/food-loss-waste/taking-stock.html. Accessed March 18, 2021.
2. Second Harvest Food Rescue. N.D. Food rescue and delivery. https://secondharvest.ca/what-we-do/food-rescue-delivery/. Accessed March 18, 2021.
3. Health Canada. 2020. Household food insecurity in Canada: overview. https://www.canada.ca/en/health-canada/services/food-nutrition/food-nutrition-surveillance/health-nutrition-surveys/canadian-community-health-survey-cchs/household-food-insecurity-canada-overview.html. Accessed March 18, 2021.

CURRICULUM CONNECTIONS

	Video 1	Video 2	Video 3	Video 4	Video 5	Video 6
Grade 7 Science						
Unit A 1	x					
Unit A 2	x					
Unit A 3	x					
Unit B 1	x					
Unit B 3	x					
Unit B 4	x	x			x	
Grade 8 Science						
Unit B 3				x		
Unit B 4				x		
Grade 9 Science						
Unit A		x				
Unit A 3					x	
Unit A 4	x				x	
Unit C 1				x		
Unit C 2	x					
Grade 10 Science						
SCI14 Unit A	x					
SCI14 Unit C 4				x		
SCI14 Unit D 1	x					
SCI14 Unit D 2	x					

	Video 1	Video 2	Video 3	Video 4	Video 5	Video 6
Grade 11 Science						
SCI20-A2.2	x					
SCI20-A3.2	x					
SCI20-D1.1	x					
SCI20-D3.5	x					
SCI24 Unit C					x	
SCI24 Unit C 5				x		
BIO20-A2.1sts	x					
CHEM20-D2.2	x					
Grade 12 Science						
SCI30-A3.1s					x	
SCI30-A3.1sts					x	
SCI30-A3.2sts					x	
SCI30-B2.5	x					
SCI30-D1.5	x					
BIO30-A2.2				x		
BIO30-B2.1				x		
BIO30-D1.1				x		
Grade 9 Social Studies						
9.2.5						x
Grade 10 Social Studies						
SS10-1 3.7						x
Grade 11 Social Studies						
SS20-1 3.3						x

	Video 1	Video 2	Video 3	Video 4	Video 5	Video 6
Grade 10 Health						
CALM P6			x			
CALM R6						x
Grade 11 Health						
CALM R6						x
Grade 12 Health						
CALM R6			x			x
Grades 7–9 CTF						
All Foods Courses			x			
Grade 10–12 CTS						
All Foods Courses			x			
FOD1010						
1.1			x			
1.2			x			
1.3			x			
FOD2150						
1.1			x			
1.5			x			
2.1			x			
2.2			x			
3.2			x			
3.3			x			
FOD3900						
2.2						x
3.1			x			
4.1			x			
5.1			x			

GLOSSARY

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

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 in the form of methane gas.

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

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

Food loss: Food that becomes unavailable for consumption during production, harvest, transport, storage, processing, packaging, or distribution.

Food waste: Foods that are disposed of at the retail, food service, or household level.

Gleaning: The act of collecting leftover crops from farmers' fields after commercial harvesting has taken place or from fields where it is not economically profitable to harvest.

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.

Household food insecurity: The inability to acquire or consume an adequate diet quality or sufficient quantity of food in socially acceptable ways, or the uncertainty that one will be able to do so. Household food insecurity is often linked with the household's financial ability to access adequate food.

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

Production: Farming practices that cultivate raw ingredients.

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

NOTES

NOTES

NOTES

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

We appreciate your feedback!

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By Dairy Farmers of Canada's Registered Dietitians