

FEEDING CANADA

Exploring Our Food System

— A VIDEO SERIES —



ANTIBIOTICS AND GROWTH HORMONES

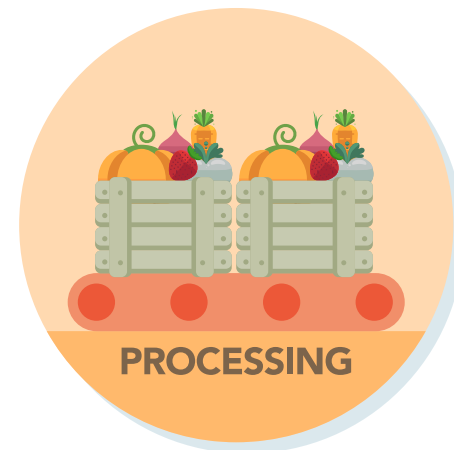
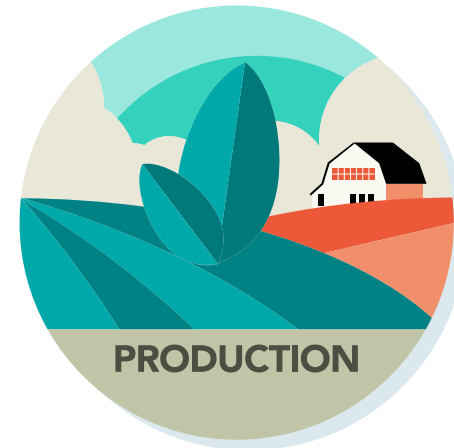
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By Dairy Farmers of Canada's Registered Dietitians



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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 16 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

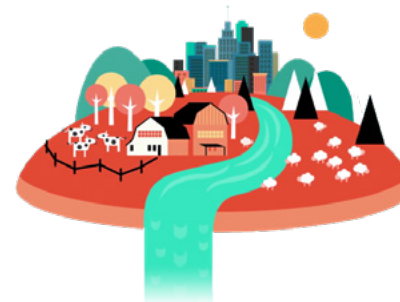
This discussion guide provides you with thought-provoking questions and answers to help facilitate a robust discussion around each topic in the video series. Specific learning objectives are addressed for each video. Questions will help students think critically about the issues that will be discussed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

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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

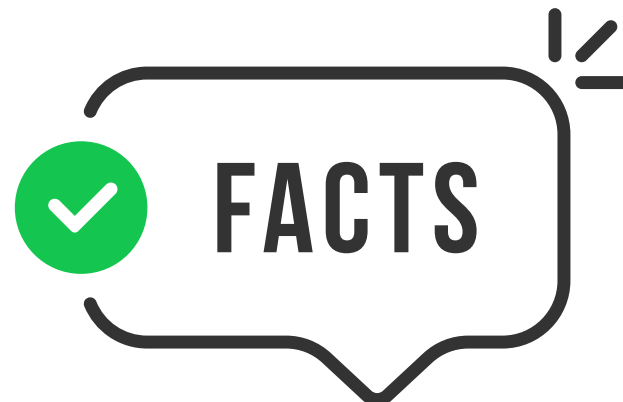
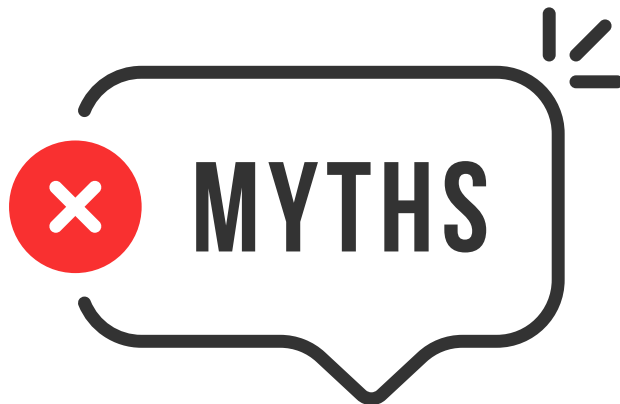
While agriculture has been prominent in Canada for more than a century, over time, our connection and relationship with food has changed. The decrease of firsthand knowledge and experience related to farming and food production increases the importance of using credible sources of information to learn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

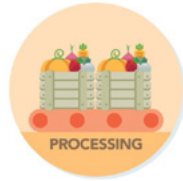
Access: Market and retail accessibility connected to consumers through purchasing.

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.



ANTIBIOTICS AND GROWTH HORMONES



ANTIBIOTICS AND GROWTH HORMONES

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

Learning Objectives

Students will

- Describe why and how antibiotics are used in farm animals
- Identify how antibiotic residues in food are monitored and regulated
- Explain why labels such as “hormone-free” and “antibiotic-free” are misleading
- Explain how growth hormones are used and regulated in Canada

Background

Part 1: Use of Antibiotics in Farm Animal Care

Farmers want to keep their animals healthy and have a responsibility to ensure their animals are well cared for. They do so by feeding them well and following codes of practice for animal welfare (as discussed in Video 2, *Farm Animal Care*). However, even under the best conditions, animals, like people, sometimes get sick and may need to be treated. Farmers use antibiotics in individual animals to treat infections and prevent or control diseases from spreading to other animals.¹

When antibiotics are needed to improve an animal's health, safety measures are enforced to make sure they are used properly and to ensure that drug residues do not end up in the food supply.² Health Canada strictly regulates the use of antibiotics and the Canadian Food Inspection Agency (CFIA) monitors the proper use of antibiotics in food production.² Strict withdrawal periods are enforced to ensure drug residues are not present in the food from these animals.² A withdrawal period is the time after treatment is stopped but before the treated animal or food from the animal goes to market.^{2,3}

For example, in the dairy industry, cows treated with antibiotics must be clearly identified and/or separated from the herd, and the milk of a treated cow must be properly discarded during the treatment period.⁴ Proper treatment records must also be kept. Additionally, a specific mandatory withdrawal period after antibiotic treatment is complete must be observed to allow the medication to clear the cow's system before its milk is used.⁴ A sample of every load of raw milk that is picked up is tested.⁴ The load of milk is dumped if antibiotic residue is found, and the farmer who produced the load is severely penalized.⁴



Similarly, chickens, turkeys, pigs, and beef cattle that have been given antibiotics for illness must go through a withdrawal period to eliminate any antibiotic residue in the meat or eggs.^{5,6,7,8} This is why the term “antibiotic-free” is misleading – all Canadian meat and animal foods are free of antibiotic residues because of this mandatory withdrawal period.

In some sectors, such as chicken, pork, and beef production, antibiotics have historically been used prophylactically (as a preventive measure) to promote animal health or improve feed efficiency and growth. These industries are working to reduce or eliminate this practice, especially with regard to use of antibiotics important in human medicine.^{5,6,8}

For example, as of 2014, the preventive use of Category 1 antibiotics (those important for human health) in chickens in Canada is no longer allowed.⁶ The industry continues to work with government to ensure safe use of antibiotics, explore methods to reduce antibiotic use, and make changes.⁶ Whether used to treat a sick animal or to prevent disease and promote health, any animal that has received antibiotic treatment must go through the prescribed withdrawal period after antibiotics are stopped and before the animal or food from that animal goes to market.²

Some people have mistaken the term “residue” with “resistance,” but **antimicrobial resistance** is something completely different: it is a result of the global use and misuse of antibiotics in both humans and animals.² It results in bacteria building up defences to antibiotics, allowing them to survive exposure to antibiotic treatment.² Ultimately, this makes it increasingly difficult to treat infections in both humans and animals.² Health professionals in both human and animal medicine are concerned about this global problem.

To help reduce antibiotic resistance worldwide, antibiotics – both for humans and animals – must be used responsibly and only when needed (i.e., as little as possible).² Agricultural groups are looking at best practices to help reduce overall antibiotic use, but they have also committed to eliminating the prophylactic use of antibiotics

important for human health.² A number of strategies are being used to reduce the need for antibiotics altogether, such as improving hygiene, ensuring good nutrition, providing better housing to ensure animals are less stressed, and using vaccinations when new animals are brought into an existing herd.² Animal health research in this area continues.

Part 2: Use of Growth Hormones in Farm Animals

Hormones are naturally occurring compounds produced by living things – plants, animals, and people.¹⁰ Inherently, both animal- and plant-based foods naturally provide some level of hormones to the diet. Therefore, marketing advertisements that identify meat products as “hormone-free” are misleading – hormones are naturally found in all animal foods.¹⁰

Added or synthetic **growth hormones** are **NOT** used in poultry, pork, or milk production in Canada.^{10,11} This is not necessarily the case in other countries, such as the United States, where regulations related to hormone use are different.¹²

In the United States, the recombinant bovine somatotropin (rBST) hormone is allowed in dairy production.¹¹ However, in Canada, the use of rBST in dairy production is not approved by Health Canada.¹¹ After careful scientific study, it was determined that rBST had a negative impact on animal health, although no adverse effect on human health was found.¹¹

In Canada, added growth hormones **ARE** allowed in beef production, and some beef farmers choose to use approved and regulated hormones to help produce leaner beef.¹¹ **Hormonal growth promoters** are naturally occurring or synthetic products approved for use in beef cattle to increase lean tissue growth.¹¹ Fat development is reduced and since fat is so energy dense, food conversion efficiency is increased, resulting in a leaner product that is produced at a lower cost to the consumer.¹¹ Since less feed is needed for beef cattle to gain weight, environmental inputs are reduced.¹²



Beef farmers who use growth-promoting hormones with their cattle must follow strict withdrawal timelines before the animals are sent to market; these withdrawal periods are enforced by the CFIA.² Health Canada has endorsed hormone use in beef cattle as safe for both humans and animals, but some food businesses or consumers may choose to buy beef that is raised without additional hormones.¹¹

This video explores regulations and safeguards in place in Canada to protect both human and animal health when antibiotic and hormone use is indicated.



Video 4 – Screen Sample A



food products that come from those animals are safe for us to consume.

Video 4 – Screen Sample B



This is a big threat to global health today, which is why it's being addressed in both

Video 4 – Screen Sample C



DISCUSSION QUESTIONS

Pre-video

Q1: What comes to mind when you think of antibiotics? Hormones?

A1: There is no wrong answer here. The purpose is to get students thinking about what they have heard on this topic before. Some students may only relate to these issues from their own human perspective (e.g., taking antibiotics when they are sick). Other students may have experiences connecting these issues with the food system. These experiences, which may be linked to popular food documentaries, are often from an American rather than a Canadian perspective. Explain to students that this video will focus on the regulations and safeguards in place in Canada to protect human and animal health.

Q2: Why do you think antibiotics are used in food production? What about growth hormones?

A2: This question aims to have students think about the use of antibiotics and hormones in the food system, especially if they are not familiar with the terms from an animal context.

Antibiotics: Even under the best conditions, animals, like people, sometimes get sick and may need to be treated. Farmers use antibiotics in individual animals to treat infections and prevent or control diseases from spreading to other animals.¹ Farmers use antibiotics carefully, and veterinarians supervise administration.¹

Growth hormones: Hormonal growth promoters increase the growth rate of the animal they are used in (only beef cattle in Canada), which means less feed and water are needed.¹² That means there is less impact on the environment and on food costs for consumers.¹² Essentially, the use of growth hormones in the beef industry helps to create a more sustainable food system where fewer resources are required to produce the same volume of food.

Post-video

Q3: What are some of the safeguards in place to ensure that food products are free from antibiotics and safe for human consumption? Include actions to prevent animals from getting sick and actions taken if antibiotics are needed.

A3: A number of strategies are being used to reduce the need for antibiotics altogether, such as improving hygiene, ensuring good nutrition, providing better housing to ensure animals are less stressed, and using vaccinations when new animals are brought into an existing herd.²

In cases where antibiotics cannot be avoided, safety measures are in place to ensure drug residues are not present in food. On-farm assurance programs help ensure food products are free from antibiotics and safe for human consumption.¹³ For example, in the dairy industry, cows treated with antibiotics must be clearly identified and/or separated from the herd, and the milk of a treated cow must be properly discarded during the treatment period.⁴ Proper treatment records must also be kept. Additionally, a specific mandatory withdrawal period must be observed after antibiotic treatment is complete to allow the medication to clear the cow's system before its milk is used.⁴ A sample of every load of raw milk that is picked up is tested.⁴ The load of milk is dumped if antibiotic residue is found, and the farmer who produced the load is severely penalized.⁴

Similarly, chickens, turkeys, pigs, and beef cattle that have been given antibiotics for illness also have withdrawal periods enforced by the CFIA to avoid antibiotic residue reaching the food cycle.^{5,6,7,8}

**Q4: What is antimicrobial resistance? How can we prevent it?**

A4: Antimicrobials (antibiotics) are used to treat, control, and prevent disease. However, the global overuse of antimicrobials in both humans and animals has dramatically increased the emergence of antimicrobial resistance.² Antimicrobial resistance results in bacteria building up defences to antibiotics, allowing them to survive exposure to antibiotic treatment.² Ultimately, this makes it increasingly difficult to treat infections in both humans and animals by available methods.²

In human medicine, physicians are careful to prescribe antibiotics judiciously.² Veterinarians and farmers recognize their role in preventing antimicrobial resistance by prescribing and using antimicrobials only when necessary and administering them properly, finding and using alternatives to antimicrobials whenever possible, and focusing on other means of preventing disease (e.g., pasture management, stocking density, ventilation, nutrition, biosecurity and infection control, vaccination, and genetics).²

Q5: In Canada, are growth hormones used in dairy farming?

A5: In Canada, growth hormones are not used in milk production.^{10,11} However, this is not necessarily the case in other countries, where regulations for hormone use are different. For example, in the United States, recombinant bovine somatotropin (rBST), a growth hormone that stimulates milk production, is approved for use.¹¹ This type of growth hormone is not licensed for sale in Canada and is not allowed in Canadian dairy production because of its negative effects on animal health.¹¹ To have productive animals without the use of growth hormones, Canadian farmers work with experts to improve animal handling, nutrition, and genetics.¹⁴ This results in optimal animal growth and production.

Q6: Why are labels that say “hormone-free” misleading?

A6: This type of labelling is false. Hormones are naturally occurring compounds produced by all living things – plants, animals, and people.¹⁰ Inherently, all foods, animal- or plant-based, naturally provide some level of hormones to the diet. Therefore, labelling a food item as “hormone-free” is inaccurate.¹⁰ The CFIA regulates compliance with proper food labelling.¹⁵ The claim “hormone-free” does not comply with CFIA regulations and would require corrective action.¹⁵

In beef products, “Raised Without the Use of Added Hormones” is an accepted claim.¹⁵ However, a similar claim may **not** be used in chickens, where hormone use is prohibited.¹⁵ Using such a claim would imply that other chicken products were raised with hormones, which is false.¹⁵



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.

Fish Bowl

Students will identify their remaining questions from Video 4. Ask students to take out a piece of paper and a pen and write down one question they have after watching the video. Have students deposit their questions in a fish bowl or other container. Draw questions one by one from the bowl and either answer them if you are able or set them aside for further exploration. Assign each outstanding question to a small group of about two to four students to research. Remind students to look for credible sources of information while researching their question. Have them report their findings to the class.

Option 1: Have students complete the fish bowl exercise again, but this time use the prompt, “What was the clearest point for you in this video?” After class, review students’ responses and note any themes that stand out. During the next class, facilitate a discussion based on the themes that arose.

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

Additional Resources

- [Antibiotic Resistance snapAg](#)
- [Antibiotics: What and Why snapAg](#)
- [Antibiotics in Food snapAg](#)
- [Hormones snapAg](#)



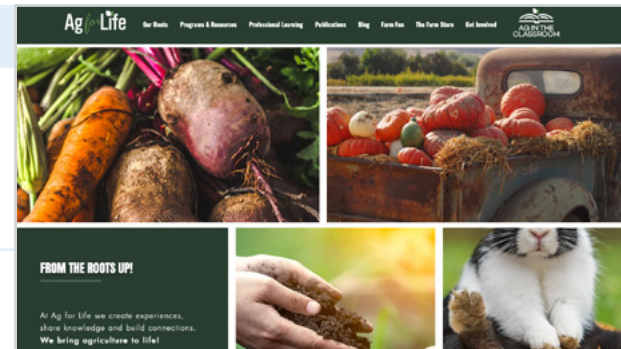
EXTENDED LEARNING

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.





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CURRICULUM CONNECTIONS

Grade 11

Practical Applied Arts

Ag/Agrifood11 AG-10 Explain the relationships among the variables (space, food, population, and health) for livestock and/or plant farming.

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-21 Compare food safety regulations and processes locally and compare globally.

Science

Bio11 Identify and describe the role of chemicals, including elements, compounds, biochemicals, and water on the structure and function of various body systems (314-1, 314-2, 314-3).

AdvBio11 Identify and describe the structure and function of the important biochemical compounds, carbohydrates, proteins, and lipids (314-3).

Grade 12

Science

Bio12 Analyze how and why technologies and drugs developed and improved over time can affect homeostasis (115-5, 317-7).

Bio12 Identify and describe the structure and function of important biochemical compounds, including protein and steroid hormones (314-3).

Bio12 Evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4).

FoodSci12 2.4 Explain simple measures that can be taken to keep foods safe.



GLOSSARY

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

Antimicrobial resistance: Bacteria building up defences to antibiotics, allowing them to survive exposure to antibiotic treatment, ultimately making it increasingly difficult to treat infections in both humans and animals. It can occur due to use and misuse of antibiotics in both humans and animals.

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.

Hormonal growth promoters: Naturally occurring or synthetic products approved for use in beef cattle to increase lean tissue growth. Fat development is reduced and since fat is so energy dense, food conversion efficiency is increased, resulting in a healthier product produced at a lower cost to the consumer.

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.



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!

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