

EXPLORING PLANT-BASED MEAT

75 MINUTES
+ TAKE HOME
ASSIGNMENTS
SBI3U, SCH3U, SNC4M, HFN1O/2O

A high school lesson plan provided by the University of Guelph

This lesson plan presents a fun and engaging opportunity for students to learn about meat simulation products and their nutritional implications. They will learn about the factors that processors, researchers and other industry stakeholders consider in creating plant-based meat alternatives. Students are encouraged to think critically about nutritional goals of food and will creatively compare meat vs. plant-based sources of protein.

This lesson plan surrounds Episodes 5 of The Why and How Podcast [“How does plant-based “meat” change the menu?”](#) The podcast looks to answer big questions in agriculture, food, and the environment through casual conversations rooted in research. It is hosted by undergraduate students and published by the Ontario Agricultural College of the University of Guelph.

Curriculum Alignments and Expectations

- Assess how societal needs (e.g., the need for healthy foods) lead to scientific and technological developments related to internal systems
- Evaluate the risks and benefits to human health of some commonly used chemical substances (e.g., chemical additives in foods)
- Evaluate the impact of some personal and societal factors (e.g., allergies, disease, body image, cultural preferences) on eating behaviours
- Describe factors that affect people’s food needs (e.g., food preferences, dietary and health needs)

Learning Objectives

- Compare and contrast the nutritional and taste profiles of meat and meat simulation products
- Understand the production process of

- meat simulation products
- Explore the food industry and careers in food science

Assessment Strategies and Success Criteria

- Take home activities
- Group and class discussions
- Open-ended questions
- Creative project
- Researching and summarizing information
- Reflection and debriefing

Cross Curricular Links

- Science – Nutritional Science
- Nutrition and Health – Food Guides & Diverse Food Needs
- Food and Culture – Culture and Food Habits
- Food and Nutrition – Nutrition and Health, Food Choices, Eating Patterns and Trends
- World Issues - Social Change and Quality of Life
- Living in a Sustainable World - Geographic Inquiry and Skill Development

Materials

- Small pieces of paper
- Writing utensils
- A/V capabilities
- Access to internet



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TEACHER NOTES

Pre-Lesson Discussion

1. Before playing the podcast, have a discussion with students to learn their current level of understanding of meat and plant-based meat alternatives.

Note: Ensuring no students are alienated for their dietary choices is very important. It may be beneficial to lay ground rules before your discussion.

- *What comes to mind when you hear the phrase “meat simulation product”? Briefly explain what a meat simulation product is.*
- *Have you ever tried a burger, hotdog or taco with a meat simulation product? If you have, do you regularly opt for plant-based meat alternatives? If you have not, are you willing to try in the future? Why/why not?*
- *In your opinion, what does it taste like? How does it compare to the taste of traditional meat products?*
- *Do you believe plants can perfectly mimic the nutritional value obtained from eating meat?*

Take-Home Work

2. Assign students the task of listening to the podcast as their homework (36 minutes) and to define the following terms discussed in the episode. Some terms may require additional online research to provide a definition.

- Food processing
- Food science

- Food engineering
- Food chemistry
- Food microbiology
- Macronutrients
 - Carbohydrates
 - Lipids
 - Proteins
- Micronutrients
 - Vitamins
 - Minerals
- Ultra-processed food

3. Activity 1: Nutritional Note Taking (Part 1)

Ask students to compare the nutrition label of a plant-based meat alternative product with a meat product (burger, hot dog etc.). Most fast-food companies post the nutritional information for their products on their website. Ask students to write down some observations from the comparison. Students should look out for:

- Sodium content
- Carbohydrates
- Fat
- Protein
- Cholesterol
- Ingredient list (be sure to look up unfamiliar ingredients)

Watch the [video about the Impossible Burger](#) and ask students to pay attention to some of the key themes and messages relayed. Students should make brief notes about:

- Production process
- Sensory experience through neuroscience



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- Skills needed by the lab employees
- Anything that stood out to them

In-Class Lesson

4. In a class discussion, ask students to explain the differences between terms they researched as part of their pre-discussion homework.

Break class into smaller groups of approximately four students per group. Ask students to explore the following questions amongst themselves,

- *Has your perception of food processing and meat simulation products changed from listening to the podcast? If so, how?*

Ask students to draw on evidence from the podcast and their knowledge from other sources to respond to the following statements:

- *“Meat simulation products are a viable replacement for whole vegetables.”
Yes or no? Why?*
- *“Farmers who produce animals for meat will go out of business in the near future.”
Yes or no? Why?*
- *“Meat simulation products present consumers with lower cancer risk.”
Yes or no? Why?*
- *“Meat simulation products are simply ultra-processed junk food.”
Yes or no? Why?*

5. Activity 2: Nutritional Note Taking (Part 2)

Lead the class in a discussion focussing in on the students' observation from the video they watched as take-home work.

- *Does anything shock you about the way this product is developed?*
- *How do you think meat simulation products such as the Impossible Burger should be marketed?*
- *Do you think creating a plant-based product that mimics the taste and texture of meat is counterintuitive? Why/why not?*

In small groups, ask students to share their observations from reviewing the nutrition labels they found on meat and plant-based products.

- *Are the differences in nutritional content surprising? Why or why not?*
- *Did anything on the ingredient list shock you? What are the ingredients and what your research say about these ingredients?*
- *If you have never tried plant-based meat alternatives, have your observations compelled you to try the product in the future? Why or why not?*

6. Activity 3: Careers in Food Science

Professor Ben Bohrer urges students who are interested in food science to explore the many specialties it entails, including:

- Food chemistry
- Food safety



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- Food microbiology
- Food engineering and processing
- Nutrition
- Sensory analysis
- Food technology

In small groups, pick one of these specialties and conduct research which highlights its role in the advancement of food processing, preservation, packaging or distribution (or any area of the food industry).

Ask each group to prepare a brief and broad career advertisement (job posting) to appeal to students considering a career in food science.

- *What type tasks does this career include?*
- *What level and type of education is required?*
- *How much do people make in these roles?*
- *Examples of innovations in the specialty.*
- *How has food been made more accessible through this work?*

7. Activity 4: Debrief and Reflection

Required Materials: Small pieces of paper and writing utensils

Hand out small pieces of paper and ask students to anonymously write one thing they are taking away from the podcast or accompanying activities. Collect the responses and read a few of them aloud. Continue with a larger group debrief.

Additional Resources

- [Podcast Episode Transcript](#)
- The [Department of Food Science](#), University of Guelph
- Visit us by registering for an [on-campus experience](#) and take part in a hands-on food science workshop from The Department of Food Science by selecting the session “The Gluten Project”, “Exploring Food Chemistry”, and more.

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