



Socially-based Curriculum Unit: GMO - Friend or Foe?

Unit Title: Genetically Modified Organisms - Friend or Foe?

Time Frame: 4-5 periods

Unit Developer: Nina Murray

Developed for Course Name and Course Code: The Environment and Resource Management (CGR4M)

Strand(s) and Curriculum Learning Expectations Addressed:

Human-Environment Interactions Strand

HEV.01 - Explain significant short-term and long-term effects of human activity on the natural environment

HE2.02 - Explain the impact of selected land use practices (e.g., irrigation, pesticide use, urban sprawl, wetland alteration) on human and natural systems

Global Connections Strand

GCV.01 - Analyse environmental and resource management issues and explain their global implications;

GC2.05 - Analyse and assess selected viewpoints regarding a sustainability or resource management issue

Understanding and Managing Change Strand

UCV.01 - Evaluate the impact of economic, social, political, and technological change on natural and human systems;

UC2.01 - Evaluate the environmental implications of developments in selected areas of technology (e.g., renewable-energy technologies, biotechnology, forest-harvesting technologies);

UC2.02 - Explain ways in which we can improve our protection of natural systems while continuing to meet human needs (e.g., through organic food production, wetland restoration)

Methods of Geographic Inquiry and Communication

GIV.01 - Analyse and interpret data gathered through research and investigation, using a variety of methods and geotechnologies; gather geographic information from primary sources (e.g., observations and data gathered through field research, surveys, interviews) and secondary sources (e.g., books and journals, mainstream and alternative media, CD-ROMs, the Internet) to research an environmental or resource management topic or issue;

GI2.04 - Use graphic organizers (e.g., semantic webs, timelines, Venn diagrams, cross classification charts) to clarify and interpret information related to environmental and resource management issues;

GI3.01 - Communicate the results of geographic inquiries, for different audiences and purposes, using a variety of forms (e.g., oral and written reports, debates, multimedia presentations, essays) and including geographic visual supports, both conventional (e.g., photographs, sketches, charts, graphs, models, organizers, diagrams, maps) and geotechnological (e.g., computer - generated maps and graphs, aerial photographs, satellite images)



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Desired Results

Unit Description:

The world is full of examples reinforcing the complex interconnection of human and natural systems. Genetically Modified Foods or Organisms are one exemplary example of this complexity. In this unit, students will learn the background of Genetically Modified Organisms (GMOs), including positive and negative aspects, as well as examining sustainability. Students will hone their research and debating skills on this highly controversial issue. They will also learn the role of various stakeholders in this issue, including multinational corporations. Lastly, students will explore some global perspectives on the GMO issue (as well as Canadian perspectives).

Enduring Understandings / Learning:

The short and long-term affects of GM foods are not fully understood. There are many pros and cons of genetic modification of our foods. Genetic modification has economic, environmental and social consequences.

Assessment Tasks

Performance Tasks and Other Evidence That Will Demonstrate the Knowledge and Skills Acquired:

- Formal Debate
- Article questions
- Optional Extension exercise: position essay

Assessment Criteria:

Students be assessed on the effectiveness of their debate through:

- Demonstration of knowledge of both sides of the GM issue
- Research by submission of debate notes on the debate handout
- Marked using the debate rubric

Students will be assessed on the effectiveness of their understanding of the role of small farmers and multinational corporations in the Genetically Modified foods issues through answering article questions.



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Unit Planning Notes

Prior Learning Necessary (if any):

Preparation Notes (if any):

(What resources, supplies, equipment need to be gathered or arranged for prior to the beginning of this unit?)

Computer with projector, PowerPoint or PowerPoint viewer.

Video: Deconstructing Supper

3 organic and 3 GM food items from a grocery store

Video copy of Deconstructing Supper, 2002. This is available online through many licensed educational video providers. Many boards may already have a copy of this video for loan purposes.

Learning Plan

- **Lesson 1: Introduction to GM foods**
- Group Brainstorm
- Introductory note on Green Revolution and “New” Green Revolution (*Appendix A*)
- PowerPoint presentation on the sides of the GMO debate

Supplies:

Chart Paper or large paper & markers

Overhead projector

Computer and projector

Procedure:

1. Have students form groups of 3-4 people. Using one piece of chart paper per group (and markers), brainstorm within small groups about GM foods in a mind map fashion. Topic: GM foods, subtopics: Pros, Cons. Take up brainstorm on board, creating a master mind map for students to copy into notes.
2. Note on the Green Revolution & “New” Green Revolution (*Appendix A*) as historical context to farming and food supplies. Incorporate a class discussion on these topics as progressing through the note.
3. PowerPoint on Genetically modified foods. (*Appendix B*) Have students add to their mind maps throughout the PowerPoint. Encourage discussion and feedback on the issues raised in the PowerPoint.



Socially-based Curriculum Unit: GMO - Friend or Foe?

Lesson 2 Research & Debate!: 2 periods

Research debate on GMOs

Supplies:

Photocopied handout of argument sheet in parliamentary debate format. (*Appendix C*)

Debate Rubric (*Appendix D*)

Procedure:

1. Explain the assignment to students. They will require at least one research period in the library or computer lab to prepare for this debate.
2. Debate: format: 2 on 2, either peer marked, all at once, or in front of class, teacher marked.
3. Follow-up

Extension

1. Students could write a position essay based on the two sides of the GMO debate.

Lesson 3: GM or Organic Video

Video dealing with global GMO perspective, as well as the “Organic” option

Supplies:

Video copy of Deconstructing Supper, 2002

Question Sheet (*Appendix E*)

Procedure

1. Give some context of the content of this Canadian video. The narrator is a leading Canadian chef (John Bishop) who became interesting in the issue of Genetically Modified Foods when customers starting asking questions about the ingredients he used in his restaurant. Bishop travels through Canada, the UK and India, interviewing farmers and scientists to investigate all angles of the GMO issue.
2. Distribute questions sheet and play the video.
3. Follow-up discussion of questions and other issues discussed in this video.



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Lesson 4 : Taste the Difference

- David vs. Goliath, Monsanto versus Percy Schmeiser: a Canadian lawsuit
- GMO taste test

Supplies

- CBC Percy Schmeiser's battle Article and questions photocopied (*Appendix F*)
- 3 genetically modified foods with 3 organic counterparts
 - (hint, President's choice carries a nice organic line...Organics in Canada must not contain genetically modified foods. Most processed snacks containing corn or soy in Canada will have genetically modified ingredients. The no-name line is fine.)
- GM or Not comparison tasting chart (*Appendix G*)

Procedure

1. Distribute Article & Questions. Students will submit for marks.
2. Taste Test: Distribute Handout. Explain the exercise to students
3. Give out one sample at a time. Be clear so that students know what sample they are consuming. Have students make their guesses after each food item, filling out the GM food chart as they go.
4. Follow-up the entire exercise with an aural discussion about the tastes of GM foods versus the organic options. Would students be willing to pay more for organic choices? How much more money would one pay for organic foods?

Extension

1. The CBC archives website has many wonderful radio and video clips streamed on the internet outlining both sides of this issue, including the Percy Schmeiser vs. Monsanto story. Showing several of these clips would be a great extension to the end of this unit. Link http://archives.cbc.ca/science_technology/biotechnology/topics/1597/

Lesson 5 Spin off exercise: Multinationals OR Approved!! Canadian GMOs

Procedure

1. Assign a research paper assignment as a spin-off to this unit plan. Have students individually or in pairs research one of the 70 GM foods that have been approved for sale in Canada. They should include how it is modified, what company it was developed by, its advantages and disadvantages.
2. In World Issues, the topic of Multinationals would fit the curriculum best. Have students pick one multinational, researching their establishment history, products produced, countries affected (sales and production), positive and negative track records (environment, human rights...)
3. There are several formats for presentation of this research. A written paper, a Power Point or other slide show presentation would be appropriate.



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Attachments

(List any attachments—handouts, worksheets, rubrics etc.—in the order that they are needed as indicated by the Learning Plan above. List each as an Appendix A (B, C, etc.) both within the Learning Plan above and on the attachment.)

- Appendix A: Green Revolution Note
- Appendix B: Power Point: Digital file
- Appendix C: Debate Guideline
- Appendix D: Debate Rubric
- Appendix E: Deconstructing Supper Questions
- Appendix F: CBC Article Questions
- Appendix G: Taste Test Chart

Other Possible Course Applications

This unit would also easily apply to CGW4U Canadian and World Issues.