Ethical Concerns of Genetically Modified Foods

Introduction

With limited resources to meet the increased demand for food along with the increasing use of biotechnology, genetically modified foods (GMOs) are becoming more prevalent. It is important for students to be knowledgeable about the science and technology in order to separate fact from fiction and make informed decisions regarding the use of genetically modified foods.

Grade Level: 7 – 10
Time Needed: 3-4, 45 min classes

Learning Objectives

After completing this lesson, students will be able to:

1. Explain what is considered a genetically modified food
2. Describe the benefits and drawbacks of genetically modified foods
3. Defend and present a position for or against the use of genetically modified foods based on research

Materials

- ☐ Pencil/paper
- ☐ Computer with Internet access

Next Generation Science Standards (NGSS)

As a result of activities for grades 7-10, all students will learn content in these areas:

Topic

- **LS3:** Matter and Energy in Organisms and Ecosystems
- **LS4:** Interdependent Relationships in Ecosystems

Performance Expectation

- **MS-LS2-1:** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
- **HS-LS2-7:** Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

Dimension

Practices:

- Obtaining, Evaluating, and Communicating Information
- Engaging in Argument from Evidence

Disciplinary Core Ideas:

- **ETS1.B:** Developing Possible Solutions

Cross-Cutting Concepts:

- Connections to Engineering, Technology, and Applications of Science

Instructional Process

1. Designate two areas in your classroom as AGREE or DISAGREE.

Write or post one or more of these statements for the classroom:

- Genetically modified foods will help feed future populations more cheaply and efficiently
- The use of genetically modified organisms is harmful / dangerous to the environment
- Genetically modified food is just as safe to eat as food not genetically modified
- Agriculture has been improved through the use of genetically modified crops

After posting the prompt(s), have students go to the area that most expresses their feeling on the issue.

1. Tell students that those who choose AGREE will be responsible defending their position and will attempt to persuade those who disagree. Those who chose DISAGREE will be responsible for defending that position and will attempt to persuade those who agree.
2. Allow students to research each of their positions using the websites in supplemental materials. Specifically, students will need to research the pros and cons of genetically modified foods and be able to give examples of modified foods and benefits/drawbacks. They will also need to research safety and the approval process for genetically modified foods. Allow students 1-2 class periods to research their position.
3. Students should be group into groups of 3-4 based upon their position. As a group they are to prepare a presentation to help support their position and try to convince their opposition to change sides. They can use PowerPoints, poster boards, videos, pictures, etc to help with their argument. Allow students one full class period to prepare their presentation.
4. Each group will be paired against another group of the opposite stance and present their case. After each group has presented their argument, allow each side to prepare a short summary or counter-argument. Each counterargument should take two minutes or less. Have students vote on which side was more persuasive in their argument.
5. Repeat step 4 until all groups have been able to share their presentation.
6. Ask students to complete the Follow-up Questions as homework.

Supplemental Content

http://getbiotechsmart.com/student/podcasts
http://ucbiotech.org/resources/factsheets/8178.pdf
http://ucbiotech.org/resources/factsheets/8180.pdf
http://ucbiotech.org/resources/factsheets/8187.pdf
http://www.actionbioscience.org/biotech/oxfam_spinney.html
http://www.actionbioscience.org/biotech/gould.html
http://www.actionbioscience.org/biotech/borlaug.html
http://www.actionbioscience.org/biotech/pusztai.html
http://www.actionbioscience.org/biotech/sakko.html
http://www.scu.edu/ethics/publications/submitted/schulman/tomatoes.html
http://www.edinformatics.com/biotechnology/food_gentically_modified.htm

Follow-Up Questions

1. What was your initial position on the use of genetically modified foods?

2. On what factors did you base this position?

3. Did you find out anything that shocked you or surprised you? What was it?

4. Write down three points made by the group that AGREED with the statement.

5. Write down three points made by the group that DISAGREED with the statement.

6. Did you change your position after your research and the arguments made by each side? Why or Why not?

7. If you changed your position, what piece of information swayed you the most?

Ethical Concerns of Genetically Modified Foods– Student Sheet

Introduction

With limited resources to meet the increased demand for food along with the increasing use of biotechnology, genetically modified foods (GMO) are becoming more prevalent. It is important for students to be knowledgeable about the science and technology in order to separate fact from fiction and make informed decisions regarding the use of genetically modified foods.

Materials

- ☐ Pencil/paper
- ☐ Computer with Internet access

Procedure

DAY 1

1. Read the statement(s) on the board.
2. Following your teachers directions, go to the area in the room that is designated with whether you AGREE or DISAGREE with the statement.
3. Research genetically modified foods using the internet. Your goal is to find information and data that supports your opinion.
4. The following websites are good sources of information:

   http://getbiotechsmart.com/student/podcasts
   http://ucbiotech.org/resources/factsheets/8178.pdf
   http://ucbiotech.org/resources/factsheets/8180.pdf
   http://ucbiotech.org/resources/factsheets/8187.pdf
   http://www.actionbioscience.org/biotech/oxfam_spinney.html
   http://www.actionbioscience.org/biotech/gould.html
   http://www.actionbioscience.org/biotech/borlaug.html
   http://www.actionbioscience.org/biotech/pusztai.html
   http://www.actionbioscience.org/biotech/sakko.html
   http://www.scu.edu/ethics/publications/submitted/schulman/tomatoes.html
   http://www.edinformatics.com/biotechnology/food_gentically_modified.htm

During your research, you will include benefits and risks associated with genetically modified foods. You will also include examples, safety issues, and regulation of genetically modified foods. Feel free to include pictures, videos clips, articles, or anything you feel will help you prove your position. You will also want to research the opposite view to help present an effective counter-argument.

DAY 2

Partner with 1-2 students who shared your opinion. As a group, compile your research and create a 5-10 minute presentation with all of your information to persuade the other members of your class. You can use poster board, PowerPoint, video, or pictures to help argue your position. Make sure to plan who will present each of your points. Make sure you also have discussed the possible counter-arguments for the points the opposing view may be presenting.

DAY 3-4

Now, each side AGREE and DISAGREE will present their position. Your group will be paired against a group of the opposite side and present your case. After both sides have presented their initial argument, each side will have the opportunity to present a two-minute rebuttal. Once both groups have finished the class will be polled to determine which group was more persuasive in their argument. All groups will complete their presentations and voting will take place. We will conduct a final class poll at the end to determine if anyone was persuaded to switch from their initial position.

Follow-Up Questions

1. What was your initial position on the use of genetically modified foods?

2. On what factors did you base this position?

3. Did you find out anything that shocked you or surprised you? What was it?

4. Write down three points made by the group that AGREED with the statement.

5. Write down three points made by the group that DISAGREED with the statement.

6. Did you change your position after your research and the arguments made by each side? Why or Why not?

7. If you changed your position, what piece of information swayed you the most?