

Harvest of Fear: SAC regarding Genetically Modified Foods

Introduction:

11th and 12th grade Biology II students will participate in a structured academic controversy regarding the biotechnology industry and in particular the production of genetically modified foods. After a brief opening "hook" students will view the Frontline NOVA documentary "Harvest of Fear" (#GMOF-101) noting the arguments for and against the genetically modified food industry. Students will then form groups of four and participate in a structured academic controversy.

Lets debate the pro's and con's of G.M.O.

The topic of genetically modified foods is an example of the perennial issue of "Should we because we can?" The question students will grapple with is "Are genetically modified foods a vital scientific breakthrough that will end world hunger and reduce global pollution, or are they "Frankenfoods" that will ruin health and provoke environmental disaster?"

Rationale:

Students choose to take Biology II to learn more about biotechnology. Biotechnology is a growing and significant business in Wisconsin and many students express an interest in studying biology and biotechnology upon leaving high school. By studying biotechnology, students can further develop and apply their knowledge of genetics, Cell theory, evolution and ecology (WI state life science content standards) to grapple with the sociological, economic and scientific issues surrounding the biotech industry. As well as the life science content standards covered, students will also address the science application and science in social and personal perspectives content standards in particular H.12.1-H12.5 which require students be able to evaluate and analyze the costs, risks, benefits, and consequences of resources and how those decisions are based on many factors. Students are required to use their scientific knowledge and to advocate for solutions to these very complex and real issues they will encounter.

Logistics:

This SAC will transpire over three classes. The first two days will be spent introducing the SAC, and gathering (watching the video) and organizing the arguments. The 3rd day will be spent presenting arguments, clarifying arguments, switching sides and team discussion and reflection. Materials needed are Frontline video and S.A.C. organization sheet.

The Structure:

1. Hook: Show first 5 minutes of video. A researcher at Michigan State University realizes her office and lab is engulfed in flames. The cause is arson, set by Earth Liberation Front, followed by some comments by scientists on both sides.
2. Team assignment: heterogeneous group of four students (if necessary 5)
3. Give students an overview of the issue – 2nd paragraph on introduction and the teacher assigns position for each pair. Position 1: Lobbyists for the genetically modified food industry (Pro-genetically modified food for human consumption) and

- Position 2: Representatives from a non-profit public information research group (Anti-genetically modified foods for human consumption and strict regulation of biotech application).
4. Students sit with their partners and view video annotating support for their position. At the end of the first day, students spend 10-15 minutes discussing what they have viewed and organize their notes into: argument with supporting evidence.
 5. 2nd day students finish the video, repeat the organizing step from day 1 and then decide which 4 arguments and supporting evidence they will use to advocate their position.
 6. 3rd day students review their notes and they meet with their team to present their positions. Teacher will remind students about positive discussion attributes (which they have listed in posters around the room) and repeat that this is not a debate, but an opportunity for all of us to further our understanding of the issue, therefore, listen carefully, take notes and ask clarifying questions. Explain that the notes they are taking of the other viewpoint are the notes they will use in order to develop their counter argument, therefore it is important that they have a solid understanding of the argument being presented. Each member has 3-5 minutes to express and support their argument and then the next team member will proceed.
 7. After both sides have had an opportunity to express their argument, the sides will use their notes from the presentation along with the notes the other group took while watching the video. The team argues for the other position in the same manner as the first round. Remind students that they are not merely repeating the other groups' argument, they are required to come up with a new twist or angle.
 8. Teams discuss (20 minutes?): Each student shares their concerns about the issue. Some possible prompting questions by the teacher are: What are some valid concerns about the use of genetically engineered foods? What are some concerns that you as a consumer have? What could the FDA, US government or Industry do to ensure these concerns are addressed? Who should be making these decisions? Does either side use "science" to defend their argument? How does your understanding of cells, genetics, evolution and ecology help you understand these issues? How has your opinion of genetically modified foods changed? What additional information is needed to make an informed decision?
 9. Teams debrief the process: Ask groups what the goal was of this SAC. Do they feel they have achieved the goal? Using a whiteboard teams will come up with a positive about the activity and something they would do differently about the activity to share with the class.

References:

Hess, Diana (2003). Adapted SAC Structure. University of Wisconsin - Madison

Johnson, D.W. & Johnson, R.T. (1988). Critical thinking through structured controversy. *Educational Leadership*, 45 (8) 58-64.

Name: _____ # _____

S.A.C. Organization Sheet - Day 1

Question:

Are genetically modified foods a vital scientific breakthrough that will end world hunger and reduce global pollution

OR

Are they "Frankenfoods" that will ruin health and provoke environmental disaster?

Position: _____

Notes:

Claim: _____

Evidence:

Claim: _____

Evidence:

Claim: _____

Evidence:

Claim: _____

Evidence

- With your partner, determine your strongest claim and rate 1-4, 1 being strongest

Name: _____ # _____

S.A. C. Organization Sheet - Day 2

Question:

Are genetically modified foods a vital scientific breakthrough that will end world hunger and reduce global pollution

OR

Are they "Frankenfoods" that will ruin health and provoke environmental disaster?

Position: _____

Notes:

Claim: _____

Evidence:

Claim: _____

Evidence:

Claim: _____

Evidence:

Claim: _____

Evidence

- With your partner, determine your strongest claim and rate 1-4, 1 being strongest
- Use your 4 strongest claims to support your position

Name: _____ # _____

Structured Academic Controversy

Write your group's arguments and the evidence they used to support them.

1. Claim: _____

Evidence:

Questions or clarification?:

2. Claim: _____

Evidence:

Questions or clarification?:

3. Claim: _____

Evidence:

Questions or clarification?:

4. Claim: _____

Evidence:

Questions or clarification?:

Name: _____ # _____

Structured Academic Debate Day

Write the other group's arguments and the evidence they used to support them.

1. Claim: _____

Evidence:

Questions or clarification?:

2. Claim: _____

Evidence:

Questions or clarification?:

3. Claim: _____

Evidence:

Questions or clarification?

4. Claim: _____

Evidence:

Questions or clarification?:
