

Biotech Foods Community Snapshot



Introduction

Lesson Introduction

Biotechnology is becoming a commonly used term in today's society. Recent surveys conducted on consumer attitudes toward biotech foods, however, reveal that a large number of Americans are unaware of the issues often associated with "genetically engineered" or "genetically modified" (GM) foods - in other words, foods produced by biotechnology. Consumers in other parts of the world, such as Europe, have a heightened awareness of biotech foods and the debate involving their approval and use, and are voicing their opinions on food safety and consumer acceptance of foods produced with this new technology. What are some common opinions shared by American consumers on this topic? Have your students investigate!



Grade Level: Grades 9 - 12

Time Needed: 40 - 60 minutes
(20 to 30 mins. over two class periods)
Extension Activity could take a possible 2-3 additional days.

Learning Objectives:

After completing this lesson, students will be able to:

1. Define biotechnology and discuss general ways in which it can be applied to plant, animal, and food production
2. Examine consumer opinions of biotechnology and genetically modified foods
3. Formulate their own opinions of biotechnology and its value to society

Next Generation Science Standards (NGSS)

As a result of activities for grades 9-12, all students will learn content in these areas:

Topics

- **LS2:** Inheritance & Variation of Traits

Performance Expectation

- **HS-ETS1-3:** Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural and environmental impacts.

Dimension

Practices:

- Analyzing and interpreting data
- Designing solutions
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

Disciplinary Core Ideas:

- **LS3.A:** Inheritance of Traits
- **LS1.A:** Structure and Function
- **ETS1:** Engineering design

Cross-Cutting Concepts:

- Patterns
- Structure & Function



Materials

- Copies of the Biotech Foods Community Snapshot Survey (eight per student)
- Copies of the Community Snapshot Tally Sheet (one per student)



Instructional Approach

1. Make copies of the Biotech Foods Community Snapshot Survey (eight per student) and Tally Sheet (one per student) and distribute to students.
2. Introduce the topic of biotechnology (referring to the supplemental content/discussion prompts on the following page).
3. Introduce the Biotech Foods Community Snapshot Survey and explain its purpose: to obtain a snapshot overview of community members' knowledge and attitudes of foods produced through biotechnology.
4. Talk through each question on the survey with students to ensure they are comfortable with the information to be gathered (i.e. knowledge and attitudes about foods produced through biotechnology).
5. Explain how each student should select eight individuals to survey. As much as possible, survey participants should represent diversity in: age, race, gender, occupation, social status, etc. Surveys may be conducted in the following manner:
 - a. The survey may be completed by the participant in person. He/she should circle the most appropriate response.
 - b. The survey conductor may ask the participant questions in person or via phone and document the responses on behalf of the participant.
 - c. If any qualitative comments are provided by the respondent, the student should document these, as well, to contribute to the classroom discussion at a later date.
6. Give students the following assignment:
 - a. Conduct the survey with eight diverse individuals.
 - b. Record findings (by question sheet) on the survey sheet provided.
 - c. To present the collective results of each question, create a pie or bar chart representative of your findings on the tally sheet provided.
 - d. Finally, document (on the tally sheet provided) any topic-related observations which were noted during the survey process to contribute during the classroom discussion of group findings.



7. After completing the survey process, ask students to turn in their tally sheets. While you are manually tallying the collective results, randomly select students to present their findings (by question) to the class.
8. After a number of students have presented their findings, report the collective results of the tally (by question) to the class.
 - a. What observations can we make from these findings?
 - b. Do the results surprise you?
 - c. Are the results dramatically different from your findings? Why do you believe this to be true?
 - d. What can we learn from this activity?

Extension Activity

9. Based upon the information that was gathered have students use the survey results to design and promote their own genetically modified organism. They will need to take into consideration the survey results and how they can address issues that were brought up from the survey. They will need to take into consideration the following criteria when promoting their product:
 - a. Cost to produce the GMO
 - b. Safety of the GMO to the general public
 - c. Reliability
 - d. Aesthetics
 - e. Social, Cultural and environmental impacts



Supplemental Content – Discussion of Biotechnology

1. Ask students to share their opinions of what they believe the term “biotechnology” means.

(General definition: the use of living organisms to create, enhance, or improve something.)

2. How can biotechnology be applied to seeds? To animals? To foods?

(Possible responses: Biotechnology can be applied to seeds to improve crop yields, to animals to enhance the species, and to foods to improve quality and overall nutritional value.)

3. Do you anticipate there to be a lack of understanding of biotech foods within the community? If so, why might this be?

(Discussion prompts: How might people feel about buying biotech foods in their supermarkets? Why might there be debate over genetically modified foods? Do you believe biotech foods should be labeled as such? If so, why?)

4. How do you believe the majority of people you will survey will respond to the questions? What is your anticipation of their knowledge and attitudes? Do you perceive this knowledge/attitude might differ by age group (50 and under? And over 50?) If so, explain.



Follow Up Questions

1. What observations can we make from the tallied findings?
2. Do the results surprise you?
3. Are the collective results dramatically different from your survey results? If so, why do you believe this to be true?
4. What are your general impressions of people's knowledge of biotechnology?
5. How do impressions vary by age group? By understanding of agriculture?
6. What additional comments (if any) were noted by your survey participants regarding the subject matter?
7. What can we learn from this activity?
8. Is there any particular group of people that support the use of biotechnology for commercial use? Explain and support using the data collected.
9. Is there any particular group of people that are against the use of biotechnology for commercial use? Explain and support using the data collected.



Biotech Foods Community Snapshot Survey

1. In what age group do you fall?

1. *Below age 50* 2. *Above age 50*

2. Would you describe yourself as having a strong understanding of today's agricultural practices, including the use of biotechnology?

1. *Yes* 2. *No*

3. Stated simply, biotechnology refers to the use of living organisms to create, enhance, or improve something. When biotechnology is applied to the engineering behind crop production, for example, in tomatoes, corn, and soybean plants, seeds can be genetically modified to improve the overall crop. How much have you heard about these genetically modified plants?

1. *Nothing* 2. *Almost nothing* 3. *A little* 4. *A fair amount* 5. *A lot*

4. Through the use of biotechnology, some new soybean plants have been genetically engineered so that they may be sprayed with herbicide to kill the weeds without causing harm to the crop. Do you believe this use of biotechnology is a good idea?

1. *Definitely not* 2. *Probably not* 3. *I don't know* 4. *Probably* 5. *Definitely*

5. How likely would you be to purchase vegetables in grocery store that were grown from plants that were genetically modified to resist certain pests?

1. *I wouldn't buy them!* 2. *Not very likely* 3. *I don't know* 4. *Somewhat likely* 5. *Very likely*

6. If you saw two kinds of tomatoes in the grocery store that looked the same in appearance and cost the same, but you knew one was genetically modified, which one would you purchase?

1. *Conventional tomato* 2. *Genetically modified tomato*

7. If the genetically engineered tomato cost 15 percent less than the conventional tomato, how likely would you be to purchase it?

1. *I wouldn't buy it!* 2. *Not very likely* 3. *I don't know* 4. *Somewhat likely* 5. *Very likely*

8. If a grocery store sells genetically engineered foods, do you believe they should be required to label the products as such?

1. *Definitely not* 2. *Probably not* 3. *I don't know* 4. *Probably* 5. *Definitely*



Snapshot Survey Tally Sheet

1. In what age group do you fall?	2. Would you describe yourself as having a strong understanding of today's agricultural practices, including the use of biotechnology?
3. When biotechnology is applied to the engineering behind crop production, for example, in tomatoes, corn, and soybean plants, seeds can be genetically modified to improve the overall crop. How much have you heard about these genetically modified plants?	4. Through the use of biotechnology, some new soybean plants have been genetically engineered so that they may be sprayed with herbicide to kill the weeds without causing harm to the crop. Do you believe this use of biotechnology is a good idea?
5. How likely would you be to purchase vegetables in grocery store that were grown from plants that were genetically modified to resist certain pests?	6. If you saw two kinds of tomatoes in the grocery store that looked the same in appearance and cost the same, but you knew one was genetically modified, which one would you purchase?
7. If the genetically engineered tomato cost 15 percent less than the conventional tomato, how likely would you be to purchase it?	8. If a grocery store sells genetically engineered foods, do you believe they should be required to label the products as such?

Biotech Foods Community Snapshot – Student Sheet



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Biotechnology is becoming a commonly used term in today's society. Recent surveys conducted on consumer attitudes toward biotech foods, however, reveal that a large number of Americans are unaware of the issues often associated with "genetically engineered" or "genetically modified" (GM) foods - in other words, foods produced by biotechnology. Consumers in other parts of the world, such as Europe, have a heightened awareness of GM foods and the debate involving their approval and use, and are voicing their opinions on food safety and consumer acceptance of foods produced with this new technology.

What are some common opinions shared by American consumers on this topic? Let's investigate!

Materials

- Copies of the Biotech Foods Community Snapshot Survey
- One copy of the Biotech Foods Community Snapshot Survey Tally Sheet

Procedure

1. Select eight individuals to survey. Try to obtain diversity, if possible, in age, race, gender, occupation, social status, etc.

2. Conduct surveys in the following manner:
 - a. You may conduct the surveys in person or via phone.
 - b. If conducting the survey in person, you may ask the participant to complete the written survey, or you may ask the participant the questions and then document his/her responses yourself.
 - c. If conducting the survey via phone, carefully read each question to the participant and then document their responses on the survey form.
 - d. If any qualitative comments are provided by the participant, document these on the back of the survey sheet. These comments may be discussed during the classroom review of survey findings.

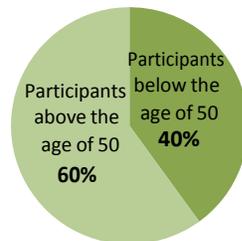
Note: the names of survey participants are not required.



3. After completing eight surveys, tally each question's findings (by response) and draw a bar chart, graph, or pie chart – representative of each question's results in the space provided on the tally sheet.

Example:

Age of Participants



4. Be prepared to discuss your findings with your class.

Follow Up Questions

1. What observations can we make from the tallied findings?
2. Do the results surprise you?
3. Are the collective results dramatically different from your survey results? If so, why do you believe this to be true?
4. What are your general impressions of people's knowledge of biotechnology?
5. How do impressions vary by age group? By understanding of agriculture?
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