**Lesson Plan: Designing GMO Campaigns**

**Learning Overview:** This activity will help students gain a better understanding of what GMOs are and how they can be a valuable resource for research and the production of food and medicines. Students will assess how their understanding of GMOs changes after reading the *Science News* article “[8 GMOs Tell a Brief History of Genetic Modification](https://www.sciencenews.org/article/8-gmo-history-genetic-modification).” Students will evaluate how their perception and knowledge of GMOs has changed after exposure to unbiased information. Based on their experiences, students will create an awareness campaign about GMO use that will be presented to the school or their peers.

**NGSS-DCI:** HS-LS3, HS-LS4, HS-ESS3.

**Paired Article:**

*Science News:*“[8 GMOs Tell a Brief History of Genetic Modification](https://www.sciencenews.org/article/8-gmo-history-genetic-modification)”

Readability Score:9.0

**Directions**: At the start of this activity, students will answer a quiz that assesses their current understanding of GMOs. Students will then read the *Science News* article “[8 GMOs Tell a Brief History of Genetic Modification](https://www.sciencenews.org/article/8-gmo-history-genetic-modification)” before recompleting the quiz. After completing both the “before” and “after” quizzes, students will tally their answers to assess how their view on GMOs has changed. Once students have discussed how and why their scores may have changed, they will examine how GMOs are labeled and marketed before forming groups to create a GMO awareness campaign for their school.

**Approximate class time:** 2 class periods

**Supplies:**

* GMO Quizzes
* GMO Quiz Keys
* Computers
* Student Worksheets
* Creative supplies: Poster board, markers, etc.

**The setup**

Prepare two copies of the GMO quizzes for each student.

For student awareness campaigns, provide students with resources, such as poster boards and markers, to promote creativity. Make sure these resources are available to students prior to starting the activity.

**GMO Knowledge**

Before covering the topic of GMOs with students, give students a copy of the following GMO quiz. For this quiz, students will read a statement and then decide whether it is true or false. After students have completed this quiz, they should read the article “[8 GMOs Tell a Brief History of Genetic Modification](https://www.sciencenews.org/article/8-gmo-history-genetic-modification).”

After reading this article, give students another copy of the quiz to complete. Once the second quiz has been completed, ask students to use the quiz key to add up their scores on both quizzes.

For basic information on GMOs, refer to the *National Geographic* article, “[Genetically Modified Organisms](https://education.nationalgeographic.org/resource/genetically-modified-organisms/).”

**GMO Quiz Key**

|  |  |  |
| --- | --- | --- |
| **Question** | **True** | **False** |
| 1. GMOs have been proven to cause cancer in humans. | ○ |  |
| 2. GMOs are safe to eat. |  | ○ |
| 3. GMOs are not used in medicine. | ○ |  |
| 4. Animals cannot be GMOs. | ○ |  |
| 5. GMO crops create a dependency on corporations. | ○ |  |
| 6. GMOs are responsible for the decline in pollinators. | ○ |  |
| 7. GMOs are uncommon in food products. | ○ |  |
| 8. The creation of GMOs is not the first-time humans have modified organism DNA. |  | ○ |
| 9. GMOs are not regulated by the government. | ○ |  |
| 10. Exposure to GMOs is more likely to cause an allergic reaction than exposure to their non-GMO counterparts. | ○ |  |

**Fixing Misconceptions**

As a class, discuss how reading an unbiased article on GMOs changed student perception of GMOs and quiz scores. Optionally, students may calculate average quiz scores for the class and discuss how their collective knowledge about GMOs has changed. Use the following questions to help guide the discussion if needed:

* What do you think influenced your “before” score?
* Do you feel that the *Science News* article was unbiased?
* How did your score change after reading the article on GMOs?
* If your score changed, why do you think it changed?
* Did you change any answers to questions not directly addressed by the article? If so, why?

After discussing student perceptions of GMOs, have students look through the “[Non-GMO Project](https://www.nongmoproject.org/)” and the U.S. Department of Agriculture website on [Bioengineered products](https://www.ams.usda.gov/rules-regulations/be). Students should use these references and an online grocery store to answer the following questions.

1. Find the Non-GMO and Bioengineered labels on the two websites. Based on appearance, what feelings do these labels invoke?

 *Answers may vary. Generally, the blue butterfly on the Non-GMO label is more appealing than the Bioengineered label. I would feel like the non-GMO products are safer to eat.*

2. Go to ”[Steps to Get Non-GMO Project Verified](https://www.nongmoproject.org/get-non-gmo-verified)” on the Non-GMO Project website and read about how products receive the butterfly label. What does having a Non-GMO label on a product mean?

*The Non-GMO label indicates that a company has applied for a product to be verified as GMO-free and has gone through a product evaluation and verification process with the Non-GMO Project.*

3. Go to the U.S. Department of Agriculture website on [Bioengineered products](https://www.ams.usda.gov/rules-regulations/be). What does the Bioengineered label indicate?

*The Bioengineered label indicates that the product is a GMO or contains GMO ingredients.*

4. Could either or both of these labels be misleading? Why?

*Both of these labels could be misleading. The Non-GMO label is only given to products that have applied for the label, so products without the Non-GMO label may be GMO free. The Bioengineered symbol is only on some products that contain or are derived from GMOs. Bioengineered products are required to mention the presence of GMOs, but this can take the form of listing an ingredient as bioengineered, using the Bioengineered symbol, using a QR code, or adding a phone number to the packaging. This means that not all bioengineered products have the Bioengineered symbol on their packaging. Neither one of these labels indicates information about the impacts of product consumption.*

5. Go to an online grocery store and look at the ingredients in products labeled as GMO-free. Did you identify any products labeled as GMO-free that are incapable of containing GMOs? If so, what product(s) did you identify and why can it not contain any GMOs?

*Answers will vary. For instance, we found that one brand of salt was labeled as Non-GMO, but salt is not produced through or by an organism.*

6. Why would a manufacturer apply for the Non-GMO label if their product is already guaranteed not to contain GMOs?

*The manufacturer may apply for the Non-GMO label because GMOs are perceived negatively by the general public. By having a Non-GMO label, they may be able to outsell competitors who do not have the Non-GMO label.*

**Creating an Awareness Campaign**

Have students break into groups, assign each group a section of the *Science News* article “[8 GMOs Tell a Brief History of Genetic Modification](https://www.sciencenews.org/article/8-gmo-history-genetic-modification),” and direct them to create an awareness campaign about how GMOs can be advantageous for the use described in their section of the article. Students may create their awareness campaign about the specific organism or the general use of GMOs that was referenced in their section of the article. For example, students assigned section 1 of the article could create their campaign about how genetically modified *Escherichia coli* can be used to produce insulin or about how GMOs may be used to manufacture drugs.

To guide students in creating an awareness campaign, ask students to refer to the article “[New ‘Feed Your Mind’ Initiative Launches to Increase Consumer Understanding of Genetically Engineered Foods](https://www.fda.gov/news-events/press-announcements/new-feed-your-mind-initiative-launches-increase-consumer-understanding-genetically-engineered-foods)” and examine the “[Feed Your Mind](https://www.fda.gov/food/consumers/agricultural-biotechnology)” website created by the United States Food and Drug Administration. Make sure that students see how the “Feed Your Mind” campaign includes everything from PDF pamphlets to videos that directly address misconceptions about GMO crops. While not all students will be creating campaigns about agricultural GMOs, similar techniques can be used to create campaigns for any GMO use described in the *Science News* article.

While this part of the assignment is highly flexible, it should be based on a specific GMO use and should indicate how GMOs can be used safely or responsibly. In the process of creating their awareness campaign, students must identify potential misconceptions about the GMO use they were assigned and address these misconceptions. Ask the students to use facts or data to support the arguments made in their campaign. Student awareness campaigns must also describe how the GMO use is beneficial to society and address ethical use of these GMOs.

This awareness campaign should be posted in or around the classroom or school after completion. Encourage students to use all resources available to them and get creative in designing their awareness campaign.