

Lesson Title	Genetically Modified Organisms
How many days are needed to teach this lesson?	3
Grade Level(s)	9-12
Subject(s)	Math
Lesson Summary	Students will examine the relationships between diet, GMOs, and health through the article <a href="#">“This ‘Super Banana’ Was Designed To Save Lives. Will It Matter That It’s Orange?”</a> . As students are introduced to the themes presented in this article, they connect their personal diets and possible lack of nutrients to the issues in the article. After reading and discussing, students delve into research to decide “Can a healthy diet contain GMOs?” ending with the creation of an infographic to defend their answer to that claim.
Standards	<p><a href="#">CCSS.MATH.S-IC.B.6</a> Make inferences and justify conclusions from sample surveys, experiments, and observational studies.</p> <p><a href="#">CCSS.MATH.S-MD.B.7</a> Use probability to evaluate outcomes of decisions.</p>
Focus Pulitzer Center news story/stories	<a href="#">“This ‘Super Banana’ Was Designed To Save Lives. Will It Matter That It’s Orange?”</a> by Agostino Petroni for <i>National Geographic</i>
Additional Resources	<p><a href="#">“GMOs, Farm to Table” video from the U.S. Food and Drug Administration</a></p> <p>Article Analysis Task Sheet [<a href="#">.pdf</a>]</p> <p>Pulitzer Center stations recording document [<a href="#">.pdf</a>][<a href="#">.docx</a>]</p> <p>Stations resources:</p> <ul style="list-style-type: none"> <li>• <a href="#">MyPlate Quiz</a></li> <li>• Guidance from the <a href="#">National Institute of Diabetes and Digestive Kidney Diseases</a></li> <li>• <a href="#">GMO Crops in the U.S., Where Can You Find GMOs?, Adoption of Genetically Engineered Crops in the U.S. 1996-2023</a></li> <li>• <a href="#">FDA: GMOs: Government Regulation and Your Safety, 26 Countries Ban GMOs-Why Won't the U.S.?, Talk About GMOs: Experts Who Know Them and Grow Them</a></li> </ul> <p>Rubric for infographic performance task [<a href="#">.pdf</a>][<a href="#">.docx</a>]</p>

### Lesson Plan

<b>Lesson Objective(s) or Essential Question(s)</b>
Should GMOs be banned from our food supply?
<b>Focus Pulitzer Center News Story/Stories</b>
<a href="#">“This ‘Super Banana’ Was Designed To Save Lives. Will It Matter That It’s Orange?”</a> by Agostino Petroni for <i>National Geographic</i>
<b>Introducing the Lesson</b>
This lesson allows students to engage with reporting about a health issue in Uganda while allowing them to connect to their personal lives. It asks students to investigate healthy diets, nutrients, and GMOs to develop their ideas about the issue at hand before defending their claims using statistics via an infographic.
<b>Warm-up/Opening</b>
<p>Students complete a gallery walk to answer the following questions:</p> <ol style="list-style-type: none"> <li>1. What is a healthy diet for teens?</li> <li>2. What foods are in your diet regularly?</li> <li>3. Where do you get your food?</li> <li>4. What nutrients should you get from your food?</li> <li>5. How is your diet related to your health?</li> </ol> <p>Display each question on a chart paper or board, and have students write their responses on the posters. After students respond, engage the class in a discussion about each question. Optional: Invite students to discuss in small groups and then share a summary with the class. Then, engage the students in a discussion identifying trends in what came up in small groups.</p>
<b>Preparing to Engage with the Focus Resource(s)</b>
Students will be introduced to GMOs through the brief <a href="#">YouTube video</a> , <a href="#">“GMOs, Farm to Table.”</a> from the US Food and Drug Administration.
<b>Exploring the Resource(s)</b>
<p>As students read the article, they will complete an article analysis graphic organizer <a href="#">[.pdf]</a> including spaces for new vocabulary words, places to look at on the map, connections to self, and space to write down their thoughts to the following questions:</p> <ol style="list-style-type: none"> <li>1. What is special about the “super banana” and why is it important in Uganda?</li> <li>2. What solutions have been tried to combat the issue and why have they failed?</li> <li>3. Why has the “Super Banana” not been allowed to be distributed to people in Uganda?</li> <li>4. What is your interpretation of the following quote at the end of the article? “Culture is dynamic. Otherwise, we would continue writing on stones.”</li> </ol>
<b>Processing the Resource(s)</b>

After reading the article, the teacher will facilitate a discussion using the following questions:

1. How do you feel about the idea of “super bananas”? Would you eat them? Do you think this is a good solution?
2. How would you feel about GMOS in your food that would increase nutrients? Do you think that is a better solution than having access to more foods with those nutrients in communities?
3. If you were to create a GMO that would introduce a healthier diet to your day or community, what nutrient(s) would you focus on?

On day 2, after reading and analyzing the article, students will rotate through five stations to deepen their understanding of the themes from the article. They will record their responses to questions in the Pulitzer Center stations recording document [[.pdf](#)][[.docx](#)].

1. “What nutrients may be missing from my diet?”
  - a. Students will take the [MyPlate Quiz](#) from the U.S. Department of Agriculture to see what food groups may be missing from their diet. They will then use the guidance from the [National Institute of Diabetes and Digestive Kidney Diseases](#) to identify possible missing nutrients in their diet.
2. “How are GMOs used in the U.S.?”
  - a. Students will look through resources ([GMO Crops in the U.S.](#), [Where Can You Find GMOs?](#), [Adoption of Genetically Engineered Crops in the U.S. 1996-2023](#)) to analyze statistics on the use of GMOs in American food sources.
3. “How many countries grow GM crops?”
  - a. Students will use resources (“[Where GMO Crops are Grown](#), [Public Perception of GMOs](#)” from [geneticliteracyproject.org](#)) to analyze global GMO availability and find and process statistics.
4. “To GMO or Not to GMO”
  - a. Students will use resources ([FDA: GMOs: Government Regulation and Your Safety](#), [26 Countries Ban GMOs-Why Won't the U.S.?](#), [Talk About GMOs: Experts Who Know Them and Grow Them](#)) to find arguments to support both sides of the GMO debate.
5. “Create a GMO”
  - a. Students will review their notes and confer with their group to decide on a GMO-enhanced food or crop they would add to their diet and explain why, beginning to answer the question, “Can a healthy diet include GMOs?”

### Performance Task

Students will use their notes from their analyses to develop an infographic to defend their answer to the question, “Can Genetically Modified Organisms be part of a healthy diet?” including statistics from their research in stations.

### Assessment

Students will be assessed formatively via analysis of the discussion, graphic organizers, and exit tickets. Students’ performance tasks will be assessed via a rubric [[.pdf](#)][[.docx](#)] as a summative assessment.