



**UNIT 3:  
FOOD AND POWER**

L.26

# DEBATE ON GENETIC MODIFICATION

## Note to Teachers

While students may have heard the name Monsanto, they often have little sense of the complexity of genetic modification. They may even have difficulty defining it. While students often think of genetic modification as a high tech version of seed breeding, scientists emphasize that it is the transfer of genetic material from one species into another. In other words, it could never occur in nature like traditional breeding could.

Lesson 26 is a multi-day exercise that will help students to engage in the complexity of practices, intentions, and consequences of genetic modification. They will learn more about what we know and do not know about genetic modification, and that there are many stakeholders and many issues to consider in this debate.

The Food Ed. course as a whole seeks to give students a sense of the complexity of food, its meanings, our relationships to it, and avenues of learning it can elucidate. Genetic modification is a case in point.

## Goals *In this lesson, students will*

- understand that genetic modification is a deeply complex topic—scientifically, economically, politically, and morally.
- learn to engage in complicated issues with the confidence that they have the skills and patience to understand them more fully.
- identify the traits of successful debate participation.

## Objectives

- Students will use a recorded debate on genetic modification to gain a basic knowledge of the topic.
- Students will evaluate the debate as a means to understand what different levels of debaters bring to the table.
- Students will research one side of the debate, using online resources to extend and deepen their understanding.

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# DEBATE ON GENETIC MODIFICATION

Please use this margin to notate how to best adapt this curriculum to your students.

## Objectives CONT.

- Students will use the debate to test their understanding and their ability to communicate complex information efficiently and persuasively.

## Instructions

### Day 1 Introduction

For homework, students should view, read, or listen to the Intelligence Squared Debate at the following url:

<http://www.intelligencesquaredus.org/debates/genetically-modify-food>

This website includes a video of the full debate, as well as an audio version and the full transcript

As they study this debate, they should take notes on:

- The arguments and evidence they hear for and against genetic modification
- The qualities that constitute a more or less effective debate performance.

One of the debaters offers a very poor performance, so this debate is ideal in modeling both very good and poor debate performance.

### Part I: First 30 minutes of class

Ask students to get into groups of two or three, and go through their notes.

**\*\*Students should not yet know what side of the debate they will take for this exercise.\*\***

1. **TASK #1:** Make a list of all of the arguments they hear for and against genetic modification, and the evidence provided to support those arguments.  
Students should seek to be exhaustive. The idea here is not to identify a few or some of the arguments, but to identify all of the arguments raised in this debate.
2. **TASK #2:** Identify which arguments have strong evidence and which evidence seems weak. Which arguments could use research to better improve the argument or evidence?
3. **TASK #3:** Are you aware of other arguments for or against genetic modification? Add these to your lists.

### Part II: Rest of the class period and subsequent research day(s)

Distribute the debate instructions handout and ask students to regroup themselves with their debate groups.

1. **TASK #1:** Ask students to review in their new groups the arguments and evidence they identified in their small groups above.  
It is vital that students take the time to ensure that everyone in the group understands these arguments. If students find a point they cannot clarify, they should record their question as one goal for their research.



# DEBATE ON GENETIC MODIFICATION

2. **TASK #2:** Using the resource sheet, divide up the resources on the handout so that each member of the group reads *at least* one of the resources identified. Focus on the general resources and those related to your side of the debate.

This reading is the first part of students' homework for Day II.

Remind students that as they read, they should take careful notes on the ideas and arguments provided, and record their questions about what they read. Encourage students to do research that will help them better understand and support the arguments provided in their source(s).

Then, using students' reading and notes from the Intelligence Squared debate, ask them to draft a series of arguments that they can address during the debate. Remind them to cite their sources and to offer specific, concrete evidence to support their claims.

Remind students to weigh their evidence: What are its strengths? Are there weaknesses that can be exploited by the other side?

3. **TASK #3:** As students prepare for the debate, they also need to consider the arguments their opponents are likely to raise. Which compelling counter arguments came up in their discussion about the Intelligence Squared debate? Each of these issues will need to be considered and addressed in your students' research by considering how to address, question, reframe, or refute those points on the basis of their own arguments and evidence.

A successful debate makes a strong case and works directly to disarm opposing views.

Remind students to always take notes so that they have a record of issues to consider as they research, assess, and write.

4. **TASK #4:** Assign roles. Who will speak when? Who will act as respondent?

Feel free to nudge students toward particular roles, or even to assign them.

Be sure that the skills of the students match as closely as possible the roles they are taking on, as a means to support their success.

5. **TASK #5:** What do your students need to know about what makes an excellent debate participant? What quality of participation sets the standard for your own contributions? (Use the Intelligence Squared debate to consider what makes a model participant.)

Again, remind students to take notes during these discussions.

[Note to the teacher: Circulate during class to help the groups clarify issues of concern. If you can, take a few moments at the end of class to address this last task: What expectations should you bring to the debate in terms of the quality of participation?]

## Part III: Cooking Lab

Lesson 26's cooking lab consists of polenta with sautéed greens and onions. Students generally come into this project knowing that corn and soy are two crops commonly raised with genetically modified seeds. So we return in this lab to polenta, made where possible from Otto File corn. Otto File reminds us that products made from non-genetically modified seeds are still available and delicious!



## DEBATE ON GENETIC MODIFICATION

### POLENTA topped with sautéed kale and onions

16 students

Multiply this recipe by two.

#### Equipment List

- 6-qt pot or large saucepan
- induction burner
- whisk
- 1 quart wet measuring
- 2, wooden spoon
- large saucepan
- 16 cutting boards
- 16 knives
- 8 graters

#### Food Items

- 8 cups water
- 2 cups medium or coarse polenta corn meal
- $\frac{1}{4}$  cup butter ( $\frac{1}{2}$  stick) or olive oil
- $\frac{1}{2}$  cup grated parmesan cheese (optional)
- $\frac{1}{4}$  cup olive oil
- 4 shallots
- 4 garlic cloves
- 2 bunch of kale
- salt and pepper to taste



# DEBATE ON GENETIC MODIFICATION

## POLENTA topped with sautéed kale and onions

YIELD: 6 servings as a side dish

### Ingredients

#### POLENTA

- 4 cups of water
- 1 cup medium or coarse polenta corn meal
- Kosher salt
- 2 tablespoons butter or olive oil
- ¼ cup grated parmesan cheese (optional)

### Directions

#### POLENTA

1. Add water to a 3-quart pot or saucepan and set over high heat. Sprinkle in cornmeal while whisking (water does not have to be boiling).
2. Bring to a boil, stirring frequently. Let boil, continuing to stir frequently until polenta thickens enough that it starts to spit. Lower heat immediately to prevent spitting and continue to cook, stirring frequently scraping bottom to prevent scorching, until polenta becomes thick and pulls away from side of saucepan, about 30 minutes for pre-soaked cornmeal and 50 minutes for dry cornmeal.
3. Season with salt and whisk in the olive oil or butter. Stir in Parmesan, if you wish.

#### SAUTÉED KALE AND ONIONS

- 2 tablespoons olive oil
- 2 shallots, peeled and finely sliced
- 2 small cloves of garlic, minced
- 1 bunch of kale, rinsed and torn into bite-sized pieces
- Salt and pepper to taste

#### SAUTÉED KALE AND ONIONS

1. Heat sauté pan over medium heat and pour in the olive oil.
2. Add shallots and cook until soft.
3. Add garlic and cook for 1 minute more.
4. Add the kale and stir until wilted and soft.
5. Season to taste with salt and pepper. Top polenta with mixture.



# DEBATE ON GENETIC MODIFICATION

**TEAM FOR THE PROPOSITION:**

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## RESOLUTION

Genetically modified foods are an essential tool to feed the world’s growing population.

## ORDER OF DEBATE

*Teacher: adapt this framework on the basis of the size of the class or your particular typical debate format.*

### Round One

- Speaker 1 for the Proposition (2 Minutes)
- Speaker 1 for the Opposition (2 Minutes)
- Speaker 2 for the Proposition (2 Minutes)
- Speaker 2 for the Opposition (2 Minutes)
- Speaker 3 for the Proposition (2 Minutes)
- Speaker 3 for the Opposition (2 Minutes)
- Speaker 4 for the Proposition (2 Minutes)
- Speaker 4 for the Opposition (2 Minutes)

**TEAM FOR THE OPPOSITION:**

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### Round Two<sup>1</sup>

- Respondents from the Proposition, answering questions from the Opposition side (4 minutes)
- Respondents from the Opposition, answering questions from the Proposition side (4 minutes)

\*\*Team Meeting to Prepare the Rebuttal Speech (5 minutes)\*\*

### Round Three

- Rebuttal speech from the Opposition (3 minutes)
- Rebuttal speech from the Proposition (3 minutes)

<sup>1</sup> The rebuttal speaker should be a team member who thinks fast on their feet and has a strong analytical mind



## DEBATE ON GENETIC MODIFICATION

Each of you will take responsibility for reading and understanding at least one of these sources.

### As you read:

- Take careful notes on the ideas and arguments provided and which source they come from.
- Record the questions that come up as you read.
- Undertake further research if it helps you better understand and support the arguments provided in your sources.

Once you feel very comfortable with your source(s), use your notes from this research and from your discussion about the Intelligence Squared debate to draft a series of arguments that you can address during the debate.

### Be sure to

- Take on the full complexity of the topic
- Cite your sources
- Offer concrete, specific evidence to support your claims
- Weigh your evidence. Where can your argument be exploited by the other side, and where might more research eliminate that risk?
- Consider counter arguments you noticed in the Intelligence Squared debate. Can you refute them on the basis of your own research?



## DEBATE ON GENETIC MODIFICATION

### General Resources and Resources That Consider More Than One Side of the Issue

**Ag BioSafety at the University of Nebraska-Lincoln, “What is genetic engineering and how is it done?”**

[http://agbiosafety.unl.edu/basic\\_genetics.shtml](http://agbiosafety.unl.edu/basic_genetics.shtml)

**David Freedman, “The Truth about Genetically Modified Food” (2013)**

<https://www.scientificamerican.com/article/the-truth-about-genetically-modified-food>

**Deborah Whitman, “Genetically Modified Foods: Harmful or Helpful” CSA Discovery Guides**

<http://biomed.brown.edu/arise/resources/docs/GM%20of%20foods%20review.pdf>

**Decoded Science, “Genetically Modified Organisms: Pros and Cons of GMO foods”**

<http://www.decodedscience.org/gmo-food-pro-and-con/23179>

**Health Research Funding (a project supported by the National Institutes of Health)**

<http://healthresearchfunding.org/pros-cons-genetically-modified-foods>

**John Biewen, “Engineering Crops in a Needy World”**

[http://americanradioworks.publicradio.org/features/gmos\\_india/index.html](http://americanradioworks.publicradio.org/features/gmos_india/index.html)

**Profile and critique of Vandana Shiva, “Seeds of doubt”**

<http://www.newyorker.com/magazine/2014/08/25/seeds-of-doubt>

**Public Broadcasting System, “Harvest of Fear (2001)”**

<http://www.pbs.org/wgbh/harvest>

**Theresa Phillips, Genetically Modified Organisms (GMOs): Transgenic Crops and Recombinant DNA Technology**

<http://www.nature.com/scitable/topicpage/genetically-modified-organisms-gmos-transgenic-crops-and-732>

### Pro

**Bill Nye (the Science Guy), “GM Foods”**

[https://www.youtube.com/watch?v=8z\\_CqyB1dQo](https://www.youtube.com/watch?v=8z_CqyB1dQo)

**Drake Bennett, “How GMOs Can Be Good for the Environment,”**

<http://www.bloomberg.com/news/articles/2014-11-18/how-gmo-crops-can-be-good-for-the-environment>

**GMO Answers (an industry organization)**

<https://www.youtube.com/watch?v=2G-yUuiqIZo>

**Mark Lynas, “How I got Converted to GMO Food,”**

[http://www.nytimes.com/2015/04/25/opinion/sunday/how-i-got-converted-to-gmo-food.html?\\_r=0](http://www.nytimes.com/2015/04/25/opinion/sunday/how-i-got-converted-to-gmo-food.html?_r=0)

### Con

**Forrest Pritchard, “We’ve missed the entire point about GMO foods,”**

[https://www.huffingtonpost.com/forrest-pritchard/weve-missed-the-entire-point-about-gmo-food---a-farmer-explains-why\\_b\\_8153978.html](https://www.huffingtonpost.com/forrest-pritchard/weve-missed-the-entire-point-about-gmo-food---a-farmer-explains-why_b_8153978.html)

**Lynn Peeples, “Pesticide Use Proliferating with GMO Crops, Study Warns,”**

[http://www.huffingtonpost.com/2012/10/04/pesticides-gmo-monsanto-roundup-resistance\\_n\\_1936598.html](http://www.huffingtonpost.com/2012/10/04/pesticides-gmo-monsanto-roundup-resistance_n_1936598.html)

