

FEAST ON FACTS



FROM ACADEMY AWARD® NOMINEE **SCOTT HAMILTON KENNEDY**

FOOD|EVOLUTION

NARRATED BY **NEIL DEGRASSE TYSON**



**EDUCATIONAL
RESOURCE GUIDE**



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BRINGING FOOD EVOLUTION INTO THE CLASSROOM

This Educational Resource Guide was created with educators in mind and can be used in a variety of ways in the classroom, as well as in more informal educational settings like community screenings, farmers markets, workshops, after-school programs, community education programs, or training sessions.

The history, implications, problems, and potential solutions surrounding food sustainability, agricultural technology, organic farming, corporate greed, climate change and the environment, the international economy, and global hunger are complex and nuanced and have been studied, written about, and explored by many academics, policy makers, and experts alike. This guide does NOT endeavor to do the same; rather, we hope to shed a new light on how these issues affect individuals and communities by learning about them through the lens of critical thinking and the everyday application of the scientific method. Because the stories and themes explored in the film cannot be fully understood without context, some abridged background information is included—but more comprehensive background information can be found by exploring the organizations and websites listed in the Additional Resources section of this guide.

Additionally, the Screening Guidelines section provides activities that can be performed in a group or individually before watching the film, while watching it, and afterwards, to provide an opportunity for analysis and making connections. The subsequent lesson plan provides teachers with specific procedures that drill down into some of the important themes and topics that the film presents, making connections to national curriculum standards in a variety of courses, formatted for classroom use. And because one of the main messages of the film is the importance of activism, there is a comprehensive section of social action project prompts that provide educators and students opportunities to deepen their exploration of the topics that the film and this guide raise and turn their understanding into action—both locally and nationally.

By learning more about the issues raised in this film, and perhaps more importantly, the significance of critical thinking, analyzing information as we consume it, and the application of the scientific method in everyday life, we hope to foster productive dialogues around the country that can lead to real and sustainable change.

“FOOD EVOLUTION makes some fascinating points about human behavior ... about how we don’t make decisions based on facts as often as we think we do. This documentary may not change your mind, but it will make you consider what caused you to decide in the first place.”

**—Kenneth Turan,
*Los Angeles Times***



DIRECTOR'S STATEMENT

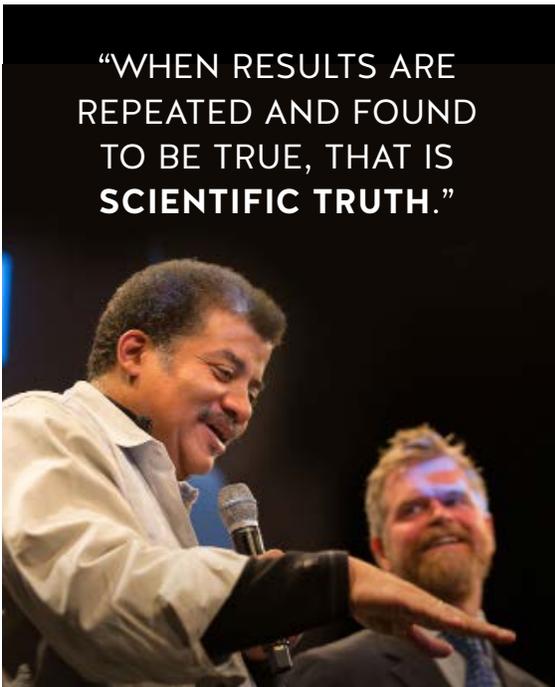
FROM SCOTT HAMILTON KENNEDY

IS FOOD EVOLUTION "PRO-GMO" OR "PRO-SCIENCE"?

While on first glance I can see why some people might call FOOD EVOLUTION a "pro-GMO" film, if you look a bit deeper, the GMO controversy is a metaphor for the importance of using the scientific method to make informed decisions.

Or as our esteemed narrator Dr. Neil deGrasse Tyson put it at our world premiere in New York City:

"WHEN RESULTS ARE REPEATED AND FOUND TO BE TRUE, THAT IS SCIENTIFIC TRUTH."



"LAWS SHOULD BE BASED ON TRUTH."



"...OR THAT IS THE END OF AN INFORMED DEMOCRACY."



PHOTOS: MARGARITA CORPORAN, BLACK VALLEY FILMS

THE RESPONSE TO THE FILM HAS BEEN AMAZING.



Following FOOD EVOLUTION's theatrical release in the summer of 2017, the critical response has been incredible, including receiving and maintaining 100% on Rotten Tomatoes. And at hundreds of screenings around the world, we have seen the film's power to change minds

from cautious or fearful about GMOs to, thanks to the science and data presented in the film, informed not only about GMOs, but about how to use the scientific method to make decisions in all aspects of our lives.



“I am happy to see the huge interest in today’s showing of FOOD EVOLUTION. It shows that the topic of biotechnology is an important one, and we are promoting a constructive dialogue on this topic in the European Parliament.

When it comes to the GMO debate, problems arise when value systems are confused with facts and political decisions are dressed up as science based when they are not. Questioning the safety of GMOs is like denying climate change. If policy makers rely more on alternative facts than science, it makes our mission even more challenging.”

**—Jens Gieseke,
Member of the European
Parliament from Germany**

“I applaud the makers of this film for taking the time to examine the multiple arguments within this debate. This is a good film, an extraordinary film, and I’m proud that it’s being shown right here in our nation’s capital.”

**—SENATOR PAT ROBERTS,
Chairman of the U.S.
Senate Committee
on Agriculture,
Nutrition and Forestry,
Capitol Hill screening**



Director Scott Hamilton Kennedy presenting FOOD EVOLUTION to the FAO in Rome.
PHOTO: ALISON VAN EENENNAAM

THE RESPONSE FROM SCIENTISTS AND POLICYMAKERS HAS BEEN JUST AS STRONG.

We have had the honor of screening FOOD EVOLUTION at the National Academy of Sciences, Capitol Hill, the European Parliament in Belgium, the U.S. Mission to the United Nations Food and Agriculture Organization in Rome, and many more prestigious settings.

And we are happy to say that the impact of FOOD EVOLUTION is growing as we reach more communities around the world. We are especially excited about the educational front, connecting the film with students from 6th grade through to college and university postgraduates. We invite you to participate in this important conversation.



FOOD EVOLUTION EDUCATIONAL OUTREACH COALITION

GALVANIZING THE COMMUNITY AROUND FOOD EVOLUTION

In today's "post-truth" society, it is more crucial than ever that each of us become informed consumers of information. If each of us—from parents to politicians—fails to use science and data to help us curb our biases and get outside of our bubbles, then, to quote Mark Lynas from the film, all public dialogue will become simply "an amorphous blob of competing world views." The most effective way to interrupt this disintegration of public discourse is to enable educators and students to rethink the way they approach questions and the way they search for answers. Since its theatrical release in June 2017, FOOD EVOLUTION has been shifting hearts and minds across the globe.

The FOOD EVOLUTION Educational Outreach Coalition strives to inspire middle-school,

high-school, and college students—and communities at large—to use the scientific method to guide their decision-making. This guide, which serves as the curricular cornerstone of the Educational Outreach Coalition, is meant to mobilize stakeholders in the educational community and in communities at large to think differently about how they consume information, how they interact with evidence, and how these processes feed into how we look to solve the problems that face us as a global community—such as climate change, food sustainability, and the management of public discourse. To meet these objectives, we are organizing screenings, professional development opportunities, and other programs for communities and schools around the country.

For more information on this coalition, including how to host a screening, go to

WWW.FOODEVOLUTIONMOVIE.COM/HOST-A-SCREENING/

OR

SCREENINGS@FOODEVOLUTIONMOVIE.COM



ABOUT THE FILM

“With a soft tone, respectful to opponents but insistent on the data, FOOD EVOLUTION posits an inconvenient truth for organic boosters to swallow: In a world desperate for safe, sustainable food, G.M.O.s may well be a force for good.”

**—Daniel Gold,
New York Times**

FOOD EVOLUTION is set amidst a brutally polarized debate marked by fear, distrust, and confusion: the controversy surrounding GMOs. Academy Award® nominated director Scott Hamilton Kennedy travels from Hawaiian papaya groves to Ugandan banana farms to cornfields in Iowa, documenting how agricultural technology can be used in such varied crop settings.

FOOD EVOLUTION looks at one of the most critical questions facing the world today—that of food security—and demonstrates the desperate need for common sense, solid information, and calm logical deliberation. Using the often angry and emotional controversy over genetically modified foods as its entry point, the film shows how easily fear and misinformation can overwhelm objective, evidence-based analysis.

FOOD EVOLUTION takes the position that science and scientists hold the key to solving the food crisis. But whose science? In the GMO debate, both sides claim science is on their side. Who’s right? How do we figure this out? What does this mean for the larger issues of food security, sustainability, and environmental well-being? FOOD EVOLUTION seeks to answer these critically important questions.

Narrated by Dr. Neil deGrasse Tyson, FOOD EVOLUTION presents an inside look at how misinformation travels with fear and the uphill battle to prove that what is accepted might not always be true.



SCREENING GUIDELINES

PRE-VIEWING GUIDELINES

1. Create a chart on the chalkboard, white board, or chart paper.

CHALLENGE	SOLUTION

2. Ask the group, “What is one challenge that we are facing on a global scale?” Allow time for volunteers. Chart their responses on the board or chart paper in the “CHALLENGE” column.
3. Ask the group, “How would one begin to look for answers to these challenges? In theory, what sorts of steps should we take to find solutions?” Again allow time for volunteers and chart responses on the board or chart paper in the “SOLUTION” column.
4. Conduct a short, whole group discussion using some or all of the following questions as a guide:
 - › How could you turn the challenges we listed into questions? How does viewing a problem as a question start the solution process?
 - › What do all of these problems have in common? What do the solutions have in common?
 - › What do you currently do that makes you part of the problem? What do you currently do that makes you part of the solution?
 - › What else could you do to help solve these problems?
 - › How can science help solve these problems?
 - › What makes these problems global? How do you see them manifesting nationally and locally as well?
5. Before the film, ask the group, “By a show of hands, how many of you fear or have concerns about your safety or the safety of the environment with regard to GMOs?”
6. Count the hands so you can compare it to a show of hands after the film.
7. Then, provide a brief introduction based on your objectives. Refer to the About The Film section (page 7) of this guide for a general description and the Food For Thought section (pages 8-15) for background information and context on the topics of agricultural science, scientific consensus, GE technology, media literacy, and others.



POST-VIEWING GUIDELINES

1. Now ask the group again, “By a show of hands, how many of you fear or have concerns about your safety or the safety of the environment with regard to GMOs?” Count the hands so you can compare it to the show of hands from before the film.
2. Ask for volunteers who raised their hands before viewing, but not after viewing, to explain what changed their minds about GMOs. Encourage volunteers to share specific examples and moments from the film that they felt affected their opinions.
3. Conduct a whole group discussion using some or all of the following questions as a guide:
 - › What is one thing that surprised you in this film?
 - › What is one new piece of data that you got from this film about GMOs and the history of GE technology?
 - › After watching this film, why do you think there is such a difference between public opinion and scientific consensus when it comes to GMOs?
 - › After viewing this film, what are your thoughts on the role of independent science and scientists in society at large?
 - › What are some ways you can advocate for the application of science and the scientific method in your daily life?
 - › What are some small changes you can make to work toward a sustainable, environmentally friendly global food supply?

Note: For more in-depth discourse, see the Classroom Mini Unit and Questions for Further Discussion sections of this guide.



ACTION STEPS

Use the following project prompts to encourage viewers to take their learning beyond the classroom or screening room. Once they've gained new knowledge and insight, these project prompts can get them to turn that knowledge into action.

- Go to your local supermarket or take a look in your fridge or pantry and make a list of 10 packaged products that you eat most often (e.g., pasta, cereal, milk, snack bars). Look carefully at the packaging. Note specific details such as the colors, font sizes, images, and descriptive language. Note which aspects of the food the manufacturers chose to highlight—nutritional content? Flavor? Something else? Write down everything you noticed and then consider: What do these packaging choices tell you about the food? How does the package design influence what you think about the food? Find differences in packaging, nutritional values, and labeling in the foods you list. How are two different pastas packaged differently, and what perception does the consumer get from these different packages? After completing this exercise, consider: What purpose does food packaging serve, and why is it so influential in our economy?
- Research the difference in public opinions on GMOs in the United States, Europe, Asia, and Africa. Write a first-person monologue or journal entry from the perspective of a commodity or subsistence farmer from each of those continents and compare them. How do these personal narratives overlap? How are they different? What do you notice about each perspective in relation to the GMO debate? What can you learn about similar debates by completing this creative writing exercise? See if you can publish one or more of these narratives in a local or school newspaper, with an editorial about the global food crisis. What other ways can you use your writings to help your peers and neighbors to engage in a productive dialogue around science, technology, and the future of our planet?
- With your classmates, colleagues, or friends, create two small groups, one pro-GMO and the other anti-GMO. Each side will run a full campaign for its position. The campaign must include:
 - › Campaign Video
 - › Campaign Twitter (at least 15 tweets with cited facts)
 - › Graphic Organizer that shows your campaign goals, an overview of your campaign, and full rationale behind it
 - › 500-word Campaign Speech
 - › Campaign Trail – Map out which states to visit, and which to fundraise in, and explain why you chose these geographical locations and how they relate to your campaign goals.



GMO
ORGANIC



ABOUT THIS MINI UNIT

How does the public become informed about the important issues that affect us? What is the difference between opinion and fact, and how do these differences affect policy and public safety? How much of what we think is fact is actually opinion? How does public opinion form? These big questions and related issues are explored in this cross-curricular, multimedia lesson for middle and high school students studying the sciences, civics, media literacy, and more. While the lesson is geared toward participants aged 13-18, it can be easily modified for other age groups.

TECHNIQUES + SKILLS

Vocabulary building, large group discussion, small group work, critical and analytical thinking, supporting ideas with examples, comparing and contrasting information sources, research, listening skills, expository, creative, and responsive writing.

CURRICULUM CONNECTIONS

This lesson fits in perfectly with units that address curriculum standards in the sciences, including agricultural and environmental science, social studies, civics, media literacy, language arts, thinking and reasoning, film studies, conflict mediation and resolution, expository and creative writing, and service learning.

KEYWORDS + PHRASES

Scientific method, hypothesis, experiment, analyze, correlation, causation, spurious, conclusion, data, sustainability, genetics, modify, agriculture, climate, corporate, stakeholder, toxicity, perception, influence.

REQUIREMENTS

MATERIALS

- › Whiteboard and markers, chalkboard and chalk, or chart paper and markers
- › Monitor/projector, DVD player, or computer with internet access
- › Notebook paper
- › Student Handouts

TIME

- › 6 periods

LESSON PREPARATION

MATERIALS

- › Prepare a DVD player, television set or monitor, and a DVD of the film FOOD EVOLUTION
- › Prepare copies of Student Handouts for distribution



SAMPLE STANDARDS ALIGNMENTS

CCSS.ELA-LITERACY.RI.9-10.4

Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper).

CCSS.ELA-LITERACY.W.11-12.2

Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

CCSS.ELA-LITERACY.RH.11-12.3

Evaluate various explanations for actions or events and determine which explanation best accords with textual evidence, acknowledging where the text leaves matters uncertain.

CCSS.ELA-LITERACY.RH.9-10.2

Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.

CCSS.ELA-LITERACY.RH.9-10.4

Determine the meaning of words and phrases as they are used in a text, including vocabulary describing political, social, or economic aspects of history/ social science.

CCSS.ELA-LITERACY.RH.11-12.7

Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.

CCSS.ELA-LITERACY.SL.11-12.1.B

Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed.

CCSS.ELA-LITERACY.SL.11-12.1.C

Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.

CCSS.ELA-LITERACY.SL.11-12.1.D

Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.

CCSS.ELA-LITERACY.W.9-10.1

Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.



GMO
ORGANIC



PROCEDURES DAY THREE

1. Divide the class into 5 groups. Assign each group one of the following themes:

- Group 1 - Climate Change & GMO
- Group 2 - Corporate Distrust & GMO
- Group 3 - Alternative Facts/Fake News & GMO
- Group 4 - Science and Technology & GMO
- Group 5 - World Health & GMO

2. Draw the following graph on the chalkboard, white board, or on chart paper:



3. Tell the class that they'll be working in small groups to go through their Viewing Logs from yesterday and arranging the notes they took on their particular theme on this graph. One side of the graph represents one extreme of an argument or outcome, for example, "completely safe," "completely corrupt," or "completely false." The other side is the opposite, such as "completely toxic," "completely ethical," or "completely true."
4. Allow 10-15 minutes for students to work in small groups, first identifying which extreme position they're charting and then placing their notes from yesterday's viewing on this continuum. Encourage students to look for notes that fall in the center of the graph, in that "grey zone."
5. Reconvene as a class so each small group can report back to the larger group. Conduct a short debrief on the activity using some or all of the following questions as a guide:
 - › Approximately what percentage of your groups' notes fell into one extreme or the other?
 - › How much of your groups' notes were in the "grey zone"?
 - › As you hear from the other groups, how much of their notes seem to be in conflict with yours? What are we noticing about each of your group's notes and how your information relates to one another's?



PROCEDURES DAY THREE [CONT.]

6. Tell students to turn their attention to the screen, as they will be watching the next segment of FOOD EVOLUTION. Instruct them to continue taking notes on their Viewing Logs.
7. Screen the next 12 or so minutes of the film, stopping at timecode 24:18, just before the narrative shifts from the Hawaiian papaya to banana wilt in Uganda.

NOTE:

In this segment, viewers learn that the Hawaii County Council grandfathered in the Rainbow papaya, still making all other GMOs illegal. Viewers also learn how the scientists behind the Rainbow papaya used the scientific method to develop a disease-resistant, “vaccinated” papaya, and viewers begin to see the huge divide between scientific consensus and public opinion.

8. After the class views this segment, conduct a large group discussion on what the class just saw. Use some or all of the following questions as a guide:
 - › What tensions are shown between protesters and farmers in Hawaii? Why do you think there is this tension?
 - › What feeling do you get about Margaret Wille’s position in her interview in this segment? Why do you think you’re getting this feeling about her position?
 - › What might be considered hypocritical about the Hawaii County Council allowing the Rainbow papaya while banning all other GMOs?
 - › Why does it undermine the council’s fears about GMO safety when they allow the genetically modified Rainbow papaya?
 - › What happened to the papaya industry on Hawaii before GE?
 - › Where did the idea of the Rainbow papaya come from?
 - › How did scientists use the scientific method to develop the Rainbow papaya?
 - › How did they distribute the new, disease-resistant papaya seeds to papaya farmers?
 - › Why did a vocal opposition develop against GE technology?
 - › What do you notice about the tone of the media coverage of GMO technology?
 - › What does Andrew Kimbrell claim regarding the dangers of GE agriculture?
 - › Why is there such a large gap between public opinion and scientific opinion on the subject of GMO technology?



PROCEDURES DAY THREE [CONT.]

- ▶ Michael Pollan talks about the dangers of “fear-mongering.” What does he mean by this?
 - ▶ What is the difference between scientific opinion and scientific consensus? Why is this an important distinction?
 - ▶ The film points out that scientific consensus shows that GMOs are safe to eat and safe for the environment. Why, then, does the film say we should continue to assess GMOs on a case-by-case basis?
 - ▶ What is your perspective on Jeffrey Smith based on his depiction in this film?
 - ▶ How do Michael Shintaku and Dennis Gonsalves analyze the video from the council meeting? Why do they think the council voted the way it did?
 - ▶ According to Michael Shintaku, what makes the GMO debate so confusing? What do people on both sides of the debate have in common?
 - ▶ What might be some “real-world consequences” of acting against scientific consensus?
 - ▶ What examples of information that could fall into the “grey zone” did you notice in this segment?
9. For homework, students should write a one-page expository essay in response to the following essay prompt, which can be written on the chalkboard, white board, or chart paper, or, alternatively, copied and distributed to each student:

ESSAY PROMPT

Allison Van Eenennaam calls GMO technology a “politicized scientific topic.” Why do you think she uses this term? What does this term mean to you? What are other “politicized scientific topics”? Why would a scientific topic become politicized, and what impact—both good and bad—might politics have on science? How does the “grey zone” play into the phenomenon of “politicized science”? Do you think there is a place for politics in science? Support your opinion using examples from the film FOOD EVOLUTION.



QUESTIONS FOR FURTHER DISCUSSION



- ▶ Early in the film we see several people say they are against GMOs, but they admit they don't know what GMOs are. How can people be fearful of things when they don't know what they are?
- ▶ How might you communicate about scientific topics differently, now that you have seen FOOD EVOLUTION? What will you do if the facts are not enough in your discussions with others about GMOs?
- ▶ Mark Lynas, Nathanael Johnson, and Bill Nye changed their opinions about GMOs. In the film, we see even staunch anti-GMO advocates appear to give in when Andrew Kimbrell admits there are some positive applications of GMOs and Margaret Wille permits grandfathering the Rainbow papaya into public policy in Hawaii. Has your opinion about GMOs changed since watching the film?
- ▶ The Pew Research Center report shows that 88% of scientists believe GMOs are safe for human consumption, compared to only 37% of the public, creating the largest gap of any politicized scientific topic. What accounts for this large gap? The majority of the public trusts the scientific community on evolution, vaccines, and climate change. Why does the public trust science on some issues and not others?
- ▶ A film only has so many topics that it can cover. What are other topics that you wish had been covered in FOOD EVOLUTION?
- ▶ Answer Tamar Haspel's question: When was the last time you changed your mind about an issue of substance? What made you do it?
- ▶ What are some common myths about GMOs?
- ▶ One of the benefits of GE technology is the engineering of crops to be resistant to pests, which translates to putting fewer pesticides into the environment. What are some of the other benefits of GE technology? What are other creative uses of GE technology that might be beneficial to society?
- ▶ Vani Hari, the Food Babe, and Zen Honeycutt want food that Mother Nature or God made: they trust it because it is "perfect." Many new trends such as the Paleo Diet or raw water movement seek to return to purely natural foods. What is the definition of "natural food"?
- ▶ Nathaniel Johnson says, "Technology doesn't have a moral valence. It's how the technology is used." Is this true? Can or should technology be created outside of moral or ethical considerations?