Grade 7 ELA Summer Assignment
Due Date: September 7, 2018

TASK:

Read the following articles about the pros and cons of GM foods.
Write a 5 paragraph essay that answers the following question:

Are GM foods good or bad for our world?

In your essay be sure to include:

- An introduction
- Three body paragraphs with textual evidence from the readings
- A conclusion
- A counter argument and rebuttal

Questions?

You can email Ms. Matthusen at amatthusen@ewsis.org

Can GM Foods End World Hunger?

Genetically modified crops promise to ease world hunger, but some people argue that too little is known about them.

KUNMING, China (Achieve3000, December 30, 2008). Zeng Yawen's outdoor laboratory on the outskirts of Kunming, China, is brimming with genetic potential. Zeng is a researcher whose experiments include the cultivation of several unusual rice varieties. Some of them thrive in dry soil, and others contain enhanced nutrition. Still others can better tolerate seasonal changes.

"See these plants?" asked Zeng as he walked through fields sown with different GM rice varieties. "They can tolerate the cold. We can extract the cold-tolerant gene from this plant and use it in a genetically manipulated variety to improve its cold tolerance."

Chinese researchers like Zeng have helped to bring their country to the forefront of a movement to create "bioengineered crops." These are crops that have been genetically modified (GM) to possess or improve favorable traits. Government officials in China are promoting this trend as a cost-effective way to boost food production and aid in the battle against world hunger. Other countries, however, question the safety of altering the natural traits of foods.

In genetic manipulation, the desirable genes of one plant are inserted into the DNA of another that is naturally lacking those genes. This is done to accelerate beneficial changes. Such changes include making crops resistant to insects and disease or enabling them to tolerate cold weather. The genes of livestock can be similarly altered using the same process.

Robert Zeigler is the director of the International Rice Research Institute (IRRI) in Asia. According to Zeigler, this form of biotechnology is bound to play a significant role in the agriculture of the future. "[Such crops] bring tremendous power and advantages to producers and consumers," he said.

Zeigler and other proponents of GM crops list the technique's many advantages. These include the potential to boost the economic fortunes of farmers. Zeigler points out that growing insect-resistant crops would allow farmers to purchase less chemical pesticide and fewer fuel-running tractors to spread those chemicals.

Genetic modification does not benefit only farmers. It could also help ease world hunger. Genetic modification enables crops to survive a variety of conditions. Therefore, proponents of the technique say countries will be able to increase harvests. This means that fewer people would go without food.

Hunger is a global problem. Surging food costs, population growth, drought, and other challenges are taxing world food supplies. According to estimates by experts at the United Nations, the number of people in the world going hungry has soared to more than 923 million. This number, experts say, could increase by 50 percent by 2030.

Spurred by concerns about current food shortages around the world, China has set aside funds to GM research. In July 2008, for example, China endorsed a 13-year, $2.9 billion program to promote the use of GM crops and livestock.

"I strongly advocate making great efforts to pursue [genetic] engineering," said Chinese official Wen Jiabao. "The recent food shortages around the world have further strengthened that belief."

Other countries, however, have yet to embrace genetic modification. They remain unconvinced that the technique is an appropriate way to ease world hunger. Many agricultural experts are concerned about the safety of eating genetically modified foods. Due to these concerns, many experts and consumers in many parts of the world, but particularly in Europe, remain wary. They are fighting to keep GM crops out of their fields and supermarkets.

"Why should we change what nature has given us, when it is everything we need?" asked Filippo De Angelis, a resident of Rome. "I don't think we can solve the problem of world hunger through genetics."

In China, too, some citizens remain cautious.
"It's impossible to know if it's harmful to the body," said Zheng Wencai, a resident of Kunming. "There is still a global debate on this, so basically, I don't use it."

Despite lingering questions over the safety of GM foods, some countries that had previously resisted importing them and banned the cultivation of such crops are now reconsidering their position. Some have even loosened restrictions.

"Influential voices around the world are calling for a re-examination of the GM debate," says C.S. Prakash, a professor of plant molecular genetics at Alabama's Tuskegee University. "Biotechnology provides such tools to help address food sustainability issues."

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Dig Deeper

When you go to the supermarket, you can most often count on a steady supply of meat, dairy, and produce. These foods come from *commercial farmers*, who farm large pieces of land using modern equipment and chemicals that help them grow great quantities of food and protect crops from diseases.
However, more than half of the world's population is dependent on *subsistence farming*.

Subsistence farmers grow only enough food for themselves and their families. They may sell what is left over at small markets, but they are very different from commercial farmers. Subsistence farmers mostly live in developing nations, and many are poor, working without the modern equipment that commercial farmers have. In some cases, subsistence farmers rely on farming methods that have been in use for generations.
Consider this about Southeast Asia: Much of the rice available to buy around the world is grown in Southeast Asia—the region's warm, humid climate makes it an ideal place to grow rice. Here's what it takes to grow rice: A farmer plows the field, or paddy, using water buffalo or oxen, and then floods the paddy with water from a nearby waterway. After that, the farmer scatters rice seeds across

the field, where the seeds are soaked for most of the season through constant irrigation. The farmer must weed the field while the crop is growing, and later, he harvests the rice by hand. The farmer may use the off-season to cultivate other crops, like vegetables.

What are some of the challenges a subsistence farmer might face? For one thing, it's backbreaking work, so a farmer's health is essential. (In developed countries, commercial rice farmers use tractors to plow the land, and they might use an airplane to scatter their seeds.) In addition, a subsistence farmer needs a constant supply of local water—a drought could spell disaster. The farmer needs to be able to plant enough rice to feed his whole family, and there is often just the one small piece of land. Additionally, as with other crops, rice can fall victim to insects and diseases, and some subsistence farmers cannot afford pesticides that help control these problems.

What's the future of subsistence farming? This is a tough question. The world's population grows every year, which means that there are more mouths to feed. Meanwhile, the amount of land shrinks as cities expand. In Southeast Asia and other parts of the world, producing food is becoming more and more challenging.

Dictionary

biotechnology *(noun)* the use of living things to bring about changes in other things, such as the use of yeast to make bread, breeding animals for various characteristics, or genetic engineering

enhanced *(adjective)* improved

manipulated *(adjective)* operated or controlled in a specific way

technique *(noun)* a way of doing something

tolerate *(verb)* to put up with; to handle

The Most Comprehensive Source of GMO Health Information on the Web

Health Risks

"Several animal studies indicate serious health risks associated with genetically modified (GM) food (AAEM 2009)," including infertility, immune problems, accelerated aging, faulty insulin regulation, and changes in major organs and the gastrointestinal system. The AAEM has asked physicians to advise all patients to avoid GM foods.[1] Starting in 1996, Americans have been eating genetically modified (GM) ingredients in most processed foods. Why isn't the FDA protecting us?

In 1992, the Food and Drug Administration claimed they had no information showing that GM foods were substantially different from conventionally grown foods. Therefore they are safe to eat, and absolutely no safety studies were required. But internal memos made public by a lawsuit[2] reveal that their position was staged by political appointees who were under orders from the White House to promote GMOs. In addition, the FDA official in charge of creating this policy was Michael Taylor, the former attorney for Monsanto, the largest biotech company, and later their vice president. In reality, FDA scientists had repeatedly warned that GM foods can create unpredictable, hard-to-detect side effects, including allergies, toxins, new diseases, and nutritional problems. They urged long-term safety studies, but were ignored.

Today, the same biotech companies who have been found guilty of hiding toxic effects of their chemical products are in charge of determining whether their GM

foods are safe. Industry-funded GMO safety studies are too superficial to find most of the potential dangers, and their voluntary consultations with the FDA are widely criticized as a meaningless façade.[3]

GM plants, such as soybean, corn, cottonseed, and canola, have had foreign genes forced into their DNA. The inserted genes come from species, such as bacteria and viruses, which have never been in the human food supply.

Genetic engineering transfers genes across natural species barriers. It uses imprecise laboratory techniques that bear no resemblance to natural breeding, and is based on outdated concepts of how genes and cells work.[4] Gene insertion is done either by shooting genes from a "gene gun" into a plate of cells or by using bacteria to invade the cell with foreign DNA. The altered cell is then cloned into a plant.

Widespread, unpredictable changes

The genetic engineering process creates massive collateral damage, causing mutations in hundreds or thousands of locations throughout the plant's DNA.[5] Natural genes can be deleted or permanently turned on or off, and hundreds may change their behavior.[6] Even the inserted gene can be damaged or rearranged,[7] and may create proteins that can trigger allergies or promote disease.

Genetically modified foods on the market

Major commodity crops raised from GMO seed include: corn (92%*), soybeans (94%*), and cotton (94%*). Almost 98% of Canadian grown canola is genetically engineered for herbicide resistance. U.S. sugar beet production is estimated to

be over 95% genetically modified for herbicide resistance. GMO sweet corn, papaya, zucchini, and yellow summer squash are also for sale in grocery stores, but in lesser amounts. Genetically modified alfalfa is grown for use as hay and forage for animals. For more information about avoiding GMOs in food, go to **NonGMOShoppingGuide.com**.

*percentages are based on U.S. acreage as of 2015 (USDA)

Growing evidence of harm from GMOs

GM soy and allergic reactions

- Soy allergies skyrocketed by 50% in the UK, soon after GM soy was introduced.**[8]**
- A skin prick allergy test shows that some people react to GM soy, but not to wild natural soy.**[9]**
- Cooked GM soy contains as much as 7-times the amount of a known soy allergen.**[10]**
- GM soy also contains a new unexpected allergen, not found in wild natural soy.**[11]**

Bt corn and cotton linked to allergies

The biotech industry claims that Bt-toxin is harmless to humans and mammals because the natural bacteria version has been used as a spray by farmers for years. In reality, hundreds of people exposed to Bt spray had allergic-type symptoms,**[12]** and mice fed Bt had powerful immune responses**[13]** and

damaged intestines.[14] Moreover, the Bt in GM crops is designed to be more toxic than the natural spray and is thousands of times more concentrated.

Farm workers throughout India are getting the same allergic reactions from handling Bt cotton[15] as those who reacted to Bt spray.[16] Mice[17] and rats[18] fed Bt corn also showed immune responses.

GMOs fail allergy tests

No tests can guarantee that a GMO will not cause allergies. Although the World Health Organization recommends a screening protocol,[19] the GM soy, corn, and papaya in our food supply fail those tests—because their GM proteins have properties of known allergens.[20]

GMOs may make you allergic to non-GM foods

- GM soy drastically reduces digestive enzymes in mice.[21] If it also impairs your digestion, you may become sensitive and allergic to a variety of foods.
- Mice fed Bt-toxin started having immune reactions to formerly harmless foods.[22]
- Mice fed experimental GM peas also started reacting to a range of other foods.[23] (The peas had already passed all the allergy tests normally done before a GMO gets on the market. Only this advanced test, which is never used on the GMOs we eat, revealed that the peas could actually be deadly.)

GMOs and liver problems

- Rats fed GM potatoes had smaller, partially atrophied livers.[24]
- The livers of rats fed GM canola were 12-16% heavier.[25]
- GM soy altered mouse liver cells in ways that suggest a toxic insult.[26] The changes reversed after they switched to non-GM soy.[27]

GMOs, reproductive problems, and infant mortality

- More than half the babies of mother rats fed GM soy died within three weeks.[28]
- Male rats[29] and mice[30] fed GM soy had changed testicles, including altered young sperm cells in the mice.
- The DNA of mouse embryos functioned differently when their parents ate GM soy[31]
- The longer mice were fed GM corn, the less babies they had, and the smaller their babies were.[32]
- Babies of female rats fed GM soy were considerably smaller, and more than half died within three weeks (compared to 10% of the non-GM soy controls).[33]
- Female rats fed GM soy showed changes in their ovaries and uterus.
- By the third generation, most hamsters fed GM soy were unable to have babies.

Bt crops linked to sterility, disease, and death

- Thousands of sheep, buffalo, and goats in India died after grazing on Bt cotton plants after harvest. Others suffered poor health and reproductive problems.[34]
- Farmers in Europe and Asia say that cows, water buffaloes, chickens, and horses died from eating Bt corn varieties.[35]

- About two dozen US farmers report that Bt corn varieties caused widespread sterility in pigs or cows.[36]
- Filipinos in at least five villages fell sick when a nearby Bt corn variety was pollinating.[37]
- The stomach lining of rats fed GM potatoes showed excessive cell growth, a condition that may lead to cancer. Rats also had damaged organs and immune systems.[38]

Criteria	Level 4: Exceeding Standards	Level 3: Meeting Standards	Level 2: Approaching Standards	Level 1: Below Standards
Focus & Structure	Essay maintains a clear and relevant organization **throughout**. Each new paragraph relates to and **builds** on the previous section logically.	Essay maintains a clear organization **throughout**. **Each** paragraph is essential to the purpose of the essay.	Essay contains a **somewhat** clear organization. **Most** paragraphs are essential to the purpose of the essay.	Essay **does not** contain a clear organization. **Few** paragraphs are essential to the purpose of the essay.
Introduction	Introductory section provides a strong **opening**, adequate **context** and a **clear** thesis statement.	Introductory section offers **context** and a **clear** thesis statement.	Introductory section contains **some** context and an **unclear** thesis statement	Introductory section contains neither **context** nor a **clear thesis** statement
Evidence	Student supports their thesis statement with **multiple** clear and relevant examples from credible sources using **quotes**. Evidence **acknowledges** alternate or opposing points of view.	Student supports their thesis statement with **multiple** clear and relevant examples from credible sources.	Student supports their thesis statement with **some** clear and relevant examples from credible sources.	Student supports their thesis statement with **few** clear and relevant examples from credible sources.
Conclusion	Essay provides a concluding statement that **summarizes** the major points of the argument and explains their **significance** fully	Essay provides a concluding statement that accurately **summarizes** the major points of the argument	Essay provides a concluding statement that is vague or **unclear** in its summary of the major points of the argument	Essay provides a concluding statement that is unrelated to the argument **OR** essay does not include a conclusion.
Style (Language Choice & Conventions)	Uses strong words, transitional phrases and complex sentences **throughout**. Grammatical conventions are followed successfully (95% accuracy)	**Frequently** uses strong words, transitional phrases and complex sentences. Grammatical conventions are **usually** followed with success (85% accuracy)	**Sometimes** uses strong words, transitional phrases and complex sentences. Grammatical conventions are **sometimes** followed with success (75% accuracy)	**Rarely** uses strong words, transitional phrases and complex sentences. Grammatical conventions are **rarely** followed with success (65% accuracy)