

Join the national conversation!



Focus Words

consequence | undernourish | extract | modify | DNA

WEEKLY PASSAGE



What do canned soup, Doritos, and bacon bits have in common? They all have genetically **modified** ingredients. Seventy percent of processed foods are made with genetically modified ingredients. The **consequences** of eating genetically modified foods are unclear. Currently, companies do not have to tell consumers if they use genetically modified ingredients.

Engineers genetically modify foods to make them tastier, healthier, or easier to grow. Engineers **extract** a gene from one plant and put it into another plant's **DNA**. The plant is slightly different than before it was genetically modified. For example, engineers are able to create rice that has vitamin A and iron. The modified rice is more nutritious.

Genetic engineering can also make plants that resist harmful insects and diseases. Insects can destroy millions of crops each year. Insect damage costs millions of dollars and can cause starvation in some countries. Genetically engineering food could help feed the 800 million **undernourished** people in the world. The United Nations estimates that the world population will grow from 6 billion to 9 billion by 2050. Some say we need to use new biotechnology to produce enough food for poor countries.

However, many European countries ban or regulate genetically modified foods. Others require labels on them. Europeans are concerned about their food containing unnamed ingredients. For example, if a banana gene is added to corn, then it could cause an allergic reaction in people with rare banana allergies.

Twenty-five percent of U.S. corn is genetically modified. The United States is the largest producer of genetically modified food in the world. Many people in the United States are pressuring the Food and Drug Administration to force companies to label foods with any genetically modified ingredients. This would allow consumers to use their own discretion when buying food.

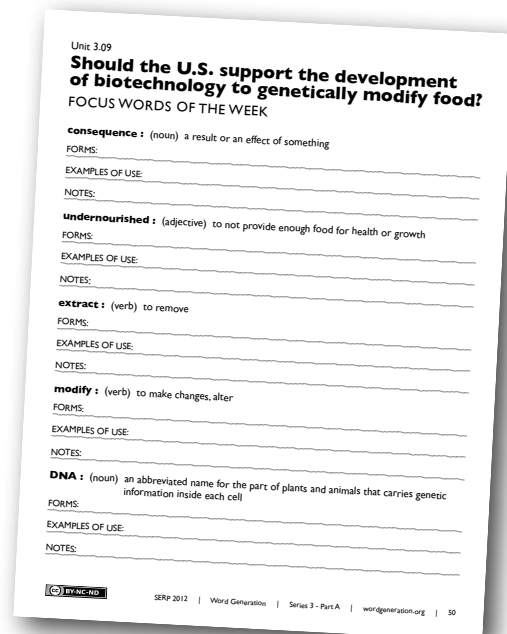
The United States Food and Drug Administration (FDA) insists that genetically modified plants are not very different from the original plants. FDA officials believe genetically modified foods are safe. The FDA requires companies to label their products only when the genetically modified ingredients contain common food allergens.

Genetically modified foods could be helpful in feeding the hungry. They could help poor countries produce more food. But do we have enough research to ensure the modified food is safe? Should the United States support the production of genetically modified food?

TEACHER: Discussion Questions

- ▶ Why are modified foods developed?
- ▶ Who supports genetically modified foods?
- ▶ Who does not support genetically modified foods?
- ▶ Why do people think foods should be labeled if they contain genetically modified ingredients?
- ▶ Why might genetically modified foods help poor countries?

PLEASE NOTE:
THE STUDENT VERSION OF THIS
PAGE IS FORMATTED
DIFFERENTLY



Unit 3.09

WORD CHART FOR TEACHERS

This chart is not in the student book. It is a resource for teachers to support students in the use of the focus words each. Students are provided one page in each unit immediately following the weekly passage with a basic definition printed and space for taking notes.

Word	Meaning	Forms			Related Words
		Inflectional	Basic Word Classes	Prefixes/Suffixes	
consequence	(n.) - a result or an effect of something			consequently consequential	sequence subsequent
undernourished	(adj.) - to not provide enough food for health or growth	undernourish undernourishes undernourishing	nourish	nourishment	nutrition nutriment
extract	(v.) - to remove	extracts extracted extracting		extraction extractable extractability	retract traction protractor
modify	(v.) - to make changes, alter	modifies modifying modified		modifiable modification modifier modifiability	
DNA	(n.) - an abbreviated name for the part of plants and animals that carries genetic information inside each cell				

Should the U.S. support the development of more biotechnology to genetically modify food?



PROBLEM OF THE WEEK

Option 1: One argument for genetically **modified** foods is that they can help us feed the world's rapidly growing population. If we don't produce more food, the **consequence** will be billions of **undernourished** people. **Extracting** a gene or two from one organism and adding it to the **DNA** of a corn or soybean seed, some say, can help us create crops that will feed the hungry.

By 2050, the world's population is expected to grow from 6 billion to 9 billion. How much of an increase is this?

- A) a 3% increase
- B) a 30% increase
- C) a 50% increase**
- D) a 20% increase

Option 2: Genetically **modifying** a crop can have unplanned **consequences**. For instance, alfalfa is cross-pollinated by bees. When bees fly from plant to plant **extracting** nectar for **nourishment**, they transport sticky pollen from one plant to another. Bees can spread **DNA** from a field of genetically modified (GM) alfalfa to other fields of alfalfa, even if the other farmers don't want GM crops.

U.S. farmers planted GM alfalfa before a judge told them to stop in 2007. Out of the 24.7 million acres of alfalfa harvested in 2006, about 300,000 acres were GM. What percentage of the 2006 alfalfa crop was GM?

about 1.2%

The GM alfalfa referred to in Option 2 is glyphosate-tolerant alfalfa, a Monsanto product better known as Roundup Ready alfalfa. The genetic modification allows farmers to spray fields with the pesticide Roundup without harming the crop.

This website describes the legal battle over Roundup Ready alfalfa: United States Department of Agriculture, Animal and Plant Health Inspection Service. (2010, March 8). Biotechnology: roundup ready alfalfa. Retrieved on April 21, 2010 from <http://www.aphis.usda.gov/biotechnology/alfalfa.shtml>

Discussion Question: There are many possible **consequences** of **modifying** the **DNA** of our food. Simply **extracting** a few genes here and inserting a few genes there could help feed millions of **undernourished** people. It could also result in the unintended spread of these genetic modifications. Who should decide whether GM is worth the risk? Scientists? Farmers? Politicians? Why?

Should the U.S. support the development of more biotechnology to genetically modify food?



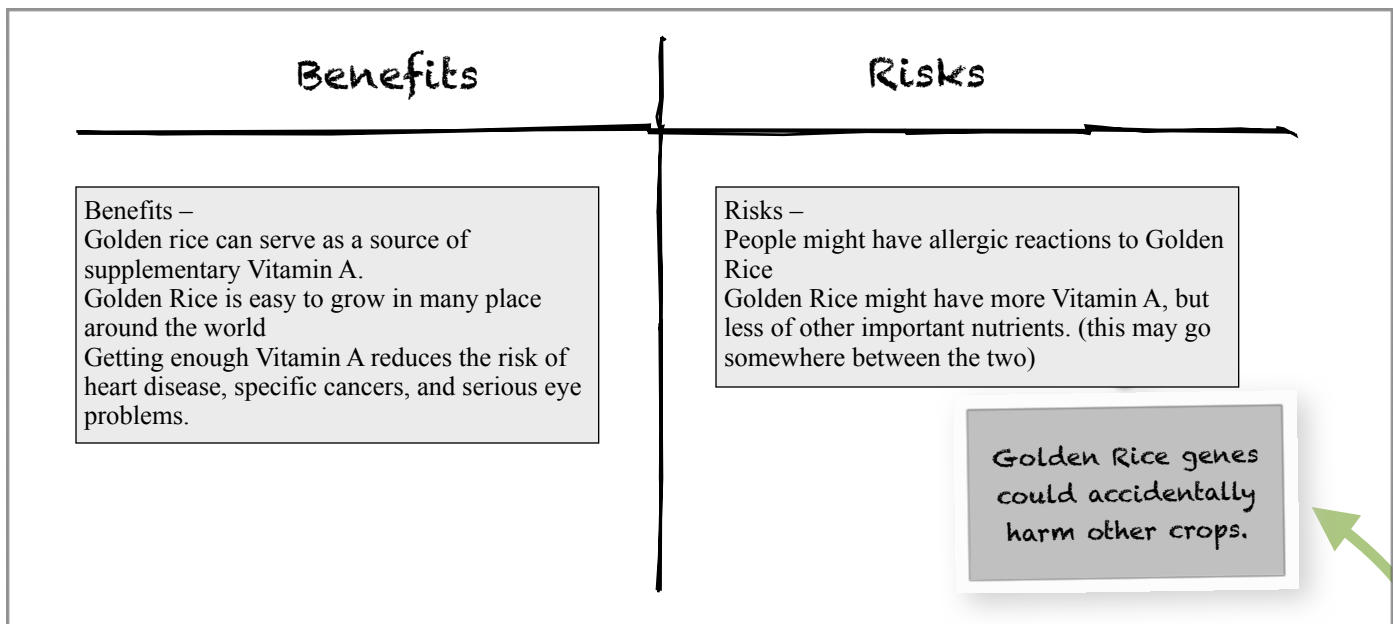
THINKING SCIENTIFICALLY

Every living thing has **DNA**. DNA has the genetic codes necessary for life. Scientists can **modify** the DNA of living things by **extracting** the genes from one living thing, such as a carrot, and inserting them into another living thing, such as a tomato. Scientists do this to combine the helpful traits of different plants. Foods that have been genetically engineered are called transgenic foods.

For example, rice is an important food for lots of people around the world, but it doesn't include very many vitamins. On the other hand, daffodil flowers are full of vitamin A but are not good to eat. Mr. Seemy's class read an article about a group of scientists who invented a transgenic rice called "Golden Rice" that includes a daffodil's gene for making vitamin A. The author of this article claimed that eating Golden Rice instead of regular rice would make people healthier by preventing them from being **undernourished**.

On a different day, Mr. Seemy assigned his class to read an article that was critical of transgenic foods. This skeptical author thought that producing more genetically modified food could have unexpected and dangerous **consequences**.

→ Mr. Seemy drew a T-chart on the whiteboard. He also passed out slips of paper with statements about Golden Rice.



Here are the statements about Golden Rice. Can you and a partner sort them into the correct section of the T-chart? One has already been done for you as an example.

People might have allergic reactions to Golden Rice.

Golden Rice is easy to grow in many places around the world.

Golden Rice can serve as a source of supplementary Vitamin A.

Golden Rice might have more Vitamin A, but less of other important nutrients.

Getting enough Vitamin A reduces the risk of heart disease, specific cancers, and serious eye problems.

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DEBATING THE ISSUE

Get ready...

Pick one of these positions (or create your own).

A If the consequences of eating genetically modified foods are unclear, then the foods should be illegal. Until we know the consequences, no one should be eating genetically modified foods.

B We should allow companies to continue to grow genetically modified crops only in well-regulated settings. Scientists should study these crops a lot before they are allowed in foods.

C We cannot get rid of genetically modified foods because they account for many of the U.S. crops. Many companies would lose a lot of money if we outlawed genetically modified ingredients.

D The Food and Drug Administration says there is not much difference between genetically modified foods and the original foods. People are over-reacting. If we require companies to label their food, they will just raise their prices.

E _____

TEACHER

Whatever debate format you use in your class, ask students to use academically productive talk in arguing their positions. In particular, students should provide reasons and evidence to back up their assertions. It may be helpful to read these sample positions to illustrate some possibilities, but students should also be encouraged to take their own positions on the issue at hand.

Get set...

Be ready to provide evidence to back up your position during your class discussion or debate. Jot down a few quick notes:

GO!

Be a strong participant by using phrases like these.

In my experience...

That's similar to what I think.

What makes you think that?

When I re-read the text, it reminded me...

Should the U.S. support the development of more biotechnology to genetically modify food?



WRITE ABOUT IT

Support your position with clear reasons and specific examples.
Try to use relevant words from the Word Generation list in your response.

Focus Words

consequence | undernourish | extract | modify | DNA

TEACHER

Ask students to write a response in which they argue a position on the weekly topic.

Put the writing prompt on the overhead projector (or the board) so that everyone can see it. Remind students to refer to the word lists in their Word Generation notebooks as needed.

Source References:

Burros, M. (1997, May 21). Eating well. The New York Times. Retrieved from <http://nytimes.com>

Gates, B. (2000, June 19). Will frankenfood feed the world? Time. Retrieved from <http://www.time.com/time/magazine/article/0,9171,997266,00.html>

Pusztai, A. (2001, June). Genetically modified foods: Are they a risk to human/animal health? Retrieved June 24, 2008 from <http://www.actionbioscience.org/biotech/pusztai.html>

Roosevelt, M. (2000, July 31). Taking it to main street. Time. Retrieved from <http://www.time.com/time/magazine/article/0,9171,997621,00.html>

Other Resources:

josse's blog. (2008, May 12). EC sounds alarm bells of GM crops. Retrieved August 18, 2008, from <http://www.greenpeace.org.uk/blog/gm/ec-sounds-alarm-bells-over-gm-crops20080512>

Greenpeace (UK) website discusses the controversy with a bias against genetically modified foods.

McWilliams, J. E. (2008, February 5). Food politics, half-baked. The New York Times. Retrieved from <http://www.nytimes.com>

Article discusses both sides of the argument and a middle ground Pollack, A. (2008, June 5). Monsanto seeks big increase in crop yields. The New York Times. Retrieved from <http://www.nytimes.com>