This week's issue:

SHOULD THE U.S. HAVE TIGHTER REGULATIONS ON GENETICALLY MODIFIED FOOD?

Before buying a snack, Alex checks the nutrition panel. He says that knowing the number of calories per portion helps him to make healthy choices. Nutrition panels are a relatively new feature on food packaging. In 1990, the U.S. government started requiring all food products to display information about sugar, fat, and other key ingredients. Now, about 90% of Americans want those labels expanded to show whether the food contains genetically modified (GM) ingredients.

Scientists genetically **modify** foods to make them tastier, healthier, or easier to grow. For example, to make "Bt corn," scientists **extract** part of a bacteria's **DNA** and insert it into corn DNA. Consequently, Bt corn produces a chemical that kills insects that try to eat it. Insects can destroy acres of crops and even cause starvation in some countries, but DNA modifications keep Bt corn safe from pests.

"Golden Rice" has been genetically modified to include vitamin A and iron, making it more nutritious than regular rice. GM foods like Golden Rice could help feed the 800 million **undernourished** people in the world.

Still, many are concerned that GM foods may not be safe to eat. They worry that consuming GM foods could have serious **consequences**, like causing allergies or cancer. They say that until long-term studies have proven GM foods safe, consumers should have the right to avoid them. For example, other advances in science—like adding lead to paint to make it shinier and last longer—were once celebrated, but later found to cause developmental problems in children. Over 60 countries require GM foods to be labeled, and most Americans think it is time that the U.S. does the same.

The Food and Drug Administration (FDA), a government agency that monitors food safety, insists that GM foods are similar to non-GM foods. The FDA says that no scientific evidence shows GM foods to be dangerous, so they don't need to be labeled. Some people worry that these decisions are influenced by powerful businesses that produce GM foods. While waiting for the FDA to modify its position, many Americans are turning to their state governments to require GM labeling.

Genetically modified foods could help feed the hungry and help poor countries produce more food. But should we postpone enjoying the advantages of GM foods until we are absolutely sure they are safe? Should the U.S. government require GM foods to be labeled?

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consequence | undernourished | extract | modify | DNA

USE THE FOCUS WORDS *and alternate parts of speech

consequence *(noun)* a result or effect of something

➡️ *Sample Sentence:* The **consequences** of eating genetically modified foods are unclear.

💬 *Turn and Talk:* What is a negative **consequence** of winning the World Series, Super Bowl, or NBA championship?

undernourished *(adjective)* without enough food for health or growth

➡️ *Sample Sentence:* Genetically engineering food could help feed the 800 million **undernourished** people in the world.

💬 *Turn and Talk:* What can people do to help **undernourished** members of their community?

extract *(verb)* to remove

➡️ *Sample Sentence:* Engineers **extract** a gene from one plant and put it into another plant's DNA.

💬 *Turn and Talk:* Why might a dentist have to **extract** a person's tooth?

*extract *(noun)* a product made of the active ingredient of something

➡️ *Sample Sentence:* Many cookie and cake recipes call for vanilla **extract**.

💬 *Turn and Talk:* Would you rather use herbal **extracts** or medication to cure a headache? Explain.

modify *(verb)* to make changes to, to alter

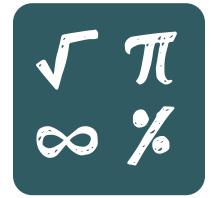➡️ *Sample Sentence:* Many of our favorite foods contain ingredients that have been genetically **modified**.

💬 *Turn and Talk:* How can a person **modify** his behavior to make more friends?

DNA *(noun)* an abbreviated name for deoxyribonucleic acid, the part of plants and animals that carries genetic information inside each cell

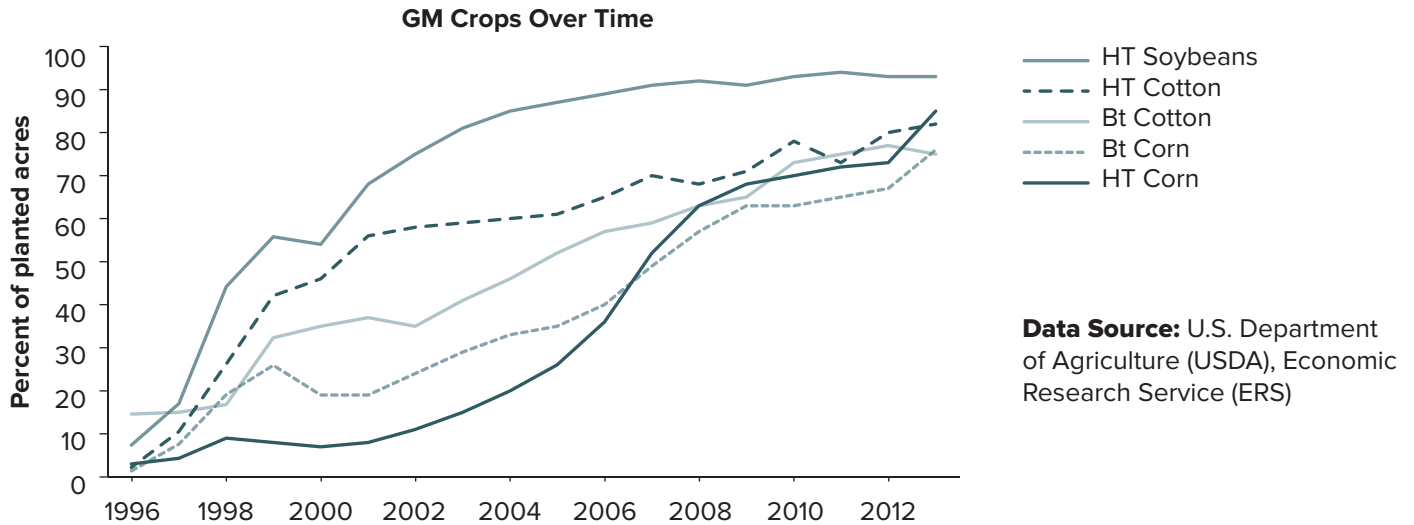➡️ *Sample Sentence:* Engineers extract a gene from one plant and put it into another plant's **DNA**.

💬 *Turn and Talk:* Do you think everyone should have to register his or her **DNA** with the government? Why or why not?

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DO THE MATH

GM Crops Over Time

Legend:
- HT Soybeans
- HT Cotton
- Bt Cotton
- Bt Corn
- HT Corn

Data Source: U.S. Department of Agriculture (USDA), Economic Research Service (ERS)

Option 1: Soybeans are the second most common crop in the United States, but we don't normally see soybeans in their natural form. Typically, oil and proteins are **extracted** from soybeans and then used as ingredients in food products for people or farm animals. HT (herbicide tolerant) crops have had their **DNA modified** to protect them from herbicides, or chemicals that kill plants. Unwanted plants near crops can hog water, sunlight, and nutrients, leaving crops **undernourished** as a **consequence**. Farmers that plant HT crops can spray herbicides on their farms, killing unwanted plants and leaving HT crops to grow unharmed.

During which period did the percentage of HT soybeans increase most dramatically?

A.   1997–1998
B.   2000–2001
C.   2004–2005
D.   2011–2012

Option 2: About 80% of food sold in the U.S. contains ingredients that have had their **DNA modified**. For example, monoglycerides and diglycerides are common ingredients in processed foods that come from plant or animal sources. If you analyzed 45 food products from an American grocery store, how many products would you expect to contain GM ingredients?

Discussion Question: There are many possible **consequences** of **modifying** the **DNA** of our food. Simply **extracting** some **DNA** here and inserting it there could help feed millions of **undernourished** people. It could also result in the contamination of non-GM foods, as animals spread seeds from farm to farm. Who should decide whether GM foods are worth the risk? Scientists? Farmers? Politicians? Consumers? Why?

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THINK SCIENTIFICALLY

Every living thing has **DNA**. **DNA** has the genetic codes necessary for life. Scientists can **modify** the **DNA** of living things by **extracting** genes from one organism, 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 included 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 GM 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.

Benefits	Risks
	Golden Rice genes could accidentally harm other crops.

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

People might have allergic reactions to Golden Rice.

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

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

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.

Do the benefits of Golden Rice outweigh the risks?

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DEBATE THE ISSUE

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

A ☐ The U.S. should have tighter regulations on food that has been genetically **modified**.
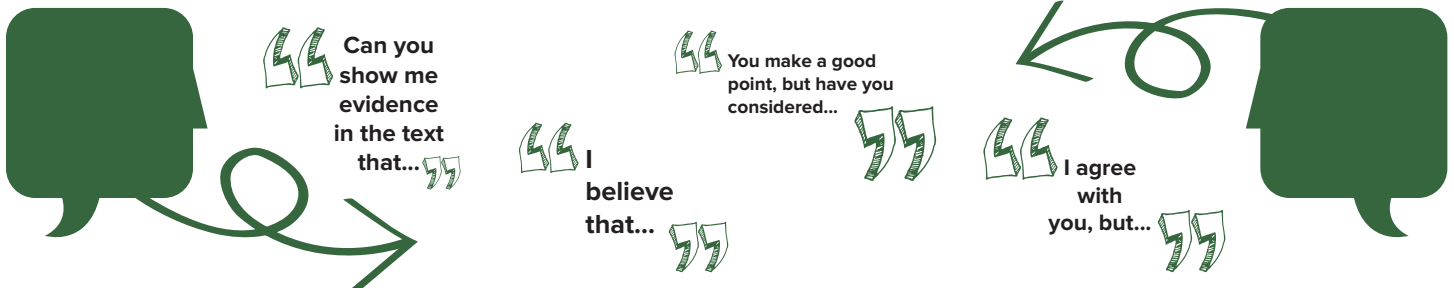
OR

B ☐ There is no need for extra regulations on food that has been genetically **modified**.

OR

CREATE YOUR OWN ☐ _____
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Jot down a few notes on how to support your position during a discussion or debate.

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Be a strong participant by using phrases like these:

Can you show me evidence in the text that...

I believe that...

You make a good point, but have you considered...

I agree with you, but...

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TAKE A STAND

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

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