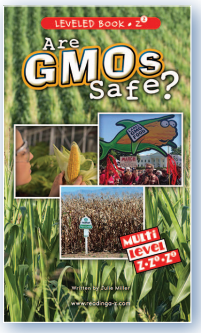
Focus Question:

Why is agriculture being changed with GMOs?



Book Summary

Text Type: Nonfiction / Pro/Con

People have been eating foods grown from genetically engineered seed for only the past two decades. While hundreds of published reports have explored the benefits and risks of GMO foods, many people strongly believe GMOs are unsafe for human consumption. *Are GMOs Safe?* provides students with a detailed look at the pros and cons of genetically modified foods in the agricultural industry. The book can also be used to teach students how to distinguish between fact and opinion and the proper use of commas in a series. The book and lesson are also available for levels Z and Z1.

Lesson Essentials

Instructional Focus

- ❑ Summarize to understand text
- ❑ Determine whether a detail is a fact or opinion
- ❑ Describe information provided by captions
- ❑ Recognize and use commas in a series
- ❑ Identify and use synonyms and antonyms

Materials

- ❑ Book: *Are GMOs Safe?* (copy for each student)
- ❑ Fact or opinion, commas in a series, synonyms and antonyms worksheets
- ❑ Discussion cards
- ❑ Book quiz
- ❑ Retelling rubric

Vocabulary

Boldface vocabulary words also appear in a pre-made lesson for this title on VocabularyA–Z.com.

- **Words to Know**

  Story critical: ***agriculture*** *(n.)*, ***altered*** *(v.)*, ***assess*** *(v.)*, ***consumers*** *(n.)*, ***genetically*** *(adv.)*, ***ingest*** *(v.)*

  Enrichment: *bestow (v.)*, ***biased*** *(adj.)*, *deficiencies (n.)*, ***herbicides*** *(n.)*, ***impartial*** *(adj.)*, *intermingle (v.)*, *mandatory (adj.)*, *monoculture (n.)*, ***pesticides*** *(n.)*, ***proponents*** *(n.)*, ***splicing*** *(v.)*, *vulnerable (adj.)*

- **Academic vocabulary:** *environment (n.)*, *evidence (n.)*, *label (v.)*, *opinion (n.)*, *require (v.)*, *technology (n.)*

Guiding the Reading

Before Reading

Build Background

- Place students in small groups and provide each group with several food labels from everyday foods. Have students review the ingredients listed on each label and discuss the origins of each ingredient.
- Write the word *agriculture* on the board and read it aloud with students. Point out that agriculture is the practice of farming or raising livestock. Invite volunteers to share their prior knowledge about farming or raising livestock.
- Discuss with students some of the potential problems that might face the agricultural industry such as drought, pests, disease, and so on.
- Write the words *genetic engineering* on the board and read them aloud to students. Explain that *genetic engineering* is the process by which scientists create a brand-new organism by combining the genes of existing, unrelated organisms. Point out that this process is currently being used to alter many of the foods we eat, especially to combat agricultural problems. Explain that genetically altered food sources are controversial.

Introduce the Book

- Give students their copy of *Are GMOs Safe?* Guide them to the front and back covers and read the title. Have students discuss what they see on the covers. Encourage them to offer ideas as to what type of book it is (genre, text type, and so on) and what it might be about.
- Show students the title page. Discuss the information on the page (title of book, author's name).
- Preview the table of contents on page 3. Remind students that the table of contents provides an overview of the book. Ask students what they expect to read about in the book, on the basis of what they see in the table of contents. (Accept all answers that students can justify.)

Guiding the Reading *(cont.)*

Introduce the Reading Strategy: Summarize

- Remind students that engaged readers pause to examine the most important details from the text and summarize what they have read. Point out that a summary also includes information such as *who, what, where, why,* and *when.* Explain that a summary may be created for the entire book or for each section of the book.
- Read the "The Birth of GMOs" section aloud. Have students work with a partner to orally summarize this section. Remind students to include only the most important details in their summary. Have partners identify the main idea and supporting details in their summary. Have students share their summaries with the class. Discuss with students whether each summary effectively captured *who, what, where, why,* and *when.*

Introduce the Comprehension Skill: Fact or opinion

- Write the words *Fact* and *Opinion* on the board. Remind students that a *fact* is a detail that is true and can be proven. An *opinion* is what someone thinks, feels, or believes about something. Have students read page 4 with a partner and identify the facts in the text. Invite students to come to the board and record this information under the *Fact* heading. Then have students create opinions about the same information. Record this information on the board under the *Opinion* heading. Have students review and discuss with their partner the difference between fact and opinion.

Vocabulary

Have students turn to the "Words to Know" box on the copyright page. Discuss each word with students. Then, have students turn to the glossary on pages 19 and 20. Explain that the glossary provides definitions for the vocabulary words in the book. Point out the use of each content word and academic vocabulary word in the book, and then use each word in a different model sentence. Have students work in groups to create posters for these words. Have them include on each poster the word and its part of speech, the definition, the word in an example sentence, and a picture illustrating the meaning of the word.

Set the Purpose

- Have students read to find out more about genetically modified organisms. Write the Focus Question on the board. Invite students to look for evidence in the book to support their answer.
- Have students make a small question mark in their book beside any word they do not understand or cannot pronounce. These can be addressed in a future discussion.

During Reading

Text-Dependent Questions

As students read the book, monitor their understanding with the following questions. Encourage students to support their answers by citing evidence from the book.

- *How were Flavr Savr tomatoes similar to other kinds of tomatoes? How were they different?* (level 1) page 4
- *In what ways do some people believe GMOs are beneficial? Why do others believe GMOs are dangerous?* (level 3) pages 9–11
- *How might the decreasing number of monarch butterflies be reflective of the negative effects of GMOs on the natural world?* (level 2) pages 12–13
- *In what ways might GMOs be hazardous to human health?* (level 2) pages 13–14
- *How are large GMO seed companies changing the face of the agricultural industry?* (level 3) multiple pages
- *How has the process of genetically modifying foods affected the world's historic and traditional food supply?* (level 2) page 18
- *What problems are scientists attempting to solve with the creation of GMOs* (level 3) multiple pages

Text Features: Captions

Explain that captions are the text that accompanies photographs and illustrations and helps the reader to understand them. Have students turn to page 12 and read the caption. Ask students the following questions: *How does the caption help you understand more about the effect of GMOs on the natural world? Why did the author choose to include a caption with this photograph?* Invite students to share their responses with the class. Have them work in small groups to read other captions in the text and discuss why the author included this information.

Skill Review

- Have students reread the section titled "The Benefits and Risks of GMOs." Remind them that a summary includes information such as *who, what, where, why,* and *when* and includes the main idea and the most important details. Have students write a brief summary of this section of the book. Invite them to share their summary with a partner and then have several volunteers share their summary with the class.
- Have students work with a partner to reread and orally summarize a section from the book. Invite students to work independently to create a written summary of the section. Have students compare and contrast their summaries with their partner's. Invite volunteers to share their summaries with the class.

Guiding the Reading *(cont.)*

- Read page 6 aloud and model identifying fact and opinion.
  Think-aloud: *This page discusses the advancements in the science of genetic engineering. Scientists are now able to give a seed a new trait by giving it a new gene. The result is a completely new organism. For example, most of the corn grown in the United States today has been changed to include genes from a soil bacterium that kills insects that ingest it. Like this corn, there are now many common foods made from GMOs that people in the United States eat every day. All of these details are facts because they can be proven. What would be an opinion about genetically modified food? An opinion expresses a feeling or belief about something, so an opinion might be the following: The science of genetic engineering and its application to agriculture is unnatural and extremely dangerous for humans. This statement expresses a belief about genetic engineering and therefore is an opinion. As I read, I will keep track of which details are facts and which details are opinions.*
- Have students work independently to identify facts and opinions in the section of the book that they summarized.
- Model how to complete the fact-or-opinion worksheet.

After Reading

Ask students what words, if any, they marked in their book. Use this opportunity to model how they can read these words using decoding strategies and context clues.

Skill Review

Graphic Organizer: Fact or opinion

Review the fact-or-opinion worksheet that students completed. Have students share and discuss their work in groups. Invite volunteers to share with the rest of the class.

Comprehension Extension

Discussion cards covering comprehension skills and strategies not explicitly taught with the book are provided for extension activities.

Response to Focus Question

Have students cite specific evidence from the book to answer the Focus Question. (Students' responses should include the following details: *Agriculture is being altered for a variety of reasons, many of which are controversial. These reasons include breeding the most desirable qualities of a plant, creating pest-resistant crops, reducing the amount of chemicals needed in farming, increasing food production, increasing the profitability of farming.*)

Comprehension Checks

- Book quiz
- Retelling rubric

Book Extension Activities

Build Skills

Grammar and Mechanics: Commas in a series

- Remind students that there are many different uses for commas. Point out that one specific way to use commas is with words in a series, or a list.
- Write the following sentence on the board: *The most common crops currently grown with GMO technology are alfalfa cotton canola corn sugar beets soy papaya zucchini and yellow squash.* Ask a volunteer to read the sentence aloud as it is written, without pauses. Ask students to suggest what is missing from the sentence to make it read more smoothly (commas).
- Explain that the names of foods in this sentence represent a list, or a series of words. Point out that commas are used to separate words in a series. Add the commas to the sentence. Have a volunteer read the sentence using the proper pauses.
- Ask students to turn to page 7 and locate the first sentence on the page. Ask students to identify and underline each item in this series.
- Independent practice: Introduce, explain, and have students complete the commas-in-a-series worksheet. If time allows, discuss their answers aloud after students finish.

Word Work: Synonyms and antonyms

- Write the word *vulnerable* on the board. Ask students to suggest a word that means almost the same thing. Review or explain that a word that means the same or almost the same as another word is called a *synonym.* Ask students to suggest a word that means the opposite of *vulnerable.* Review or explain that a word that means the opposite of another word is called an *antonym.*
- Circle the word *escalating.* Ask students to suggest a synonym *(growing, advancing).* Ask students to suggest an antonym *(declining, diminishing).*
- **Check for understanding:** Give pairs of students a thesaurus. Ask them to find the word *escalating* and have them name the synonyms listed. Ask a volunteer to identify the root word of *escalating (escalate).* If the thesaurus lists antonyms, have them find the antonyms for *escalate.* If needed, provide additional practice using the thesaurus.
- **Independent practice:** Introduce, explain, and have students complete the synonyms-and-antonyms worksheet. If time allows, discuss answers aloud after they are finished.

Connections

- See the back of the book for cross-curricular extension ideas.