

Extended Informational Reading Comprehension

Food Science



Directions: Read the passage about food science. Then answer the questions that follow.

- 1 Neat rows of bagged coffee, stacks of gleaming red peppers and ripe avocados, and refrigerators lined with fresh orange juice and milk—it's the middle of winter in Anchorage, Alaska, with snowdrifts outside, yet these and other foods are all available for purchase. Many of us take for granted that almost any type of food can be found in our local grocery stores year-round. However, the many complex systems that make this fresh food consistently available are all part of a larger **discipline** called food science.
- 2 Arguably, food science has been around since humans first figured out how to domesticate plants and animals thousands of years ago. These practices allowed our ancestors to survive difficult conditions by giving them more control over their food sources. Today, many fields of food science exist to address current food needs and preferences. Fields such as microbiology, engineering, chemistry/biochemistry, and sensory analysis play vital roles in the advancement of food science. Those disciplines aim to improve food preservation, safety, nutrition, variety, availability, and sustainability. These objectives drive how scientists think about food provision on a changing planet.
- 3 Food preservation and safety go hand in hand and are at the heart of most food science. Biologists study the impact of microorganisms such as molds, bacteria, and viruses on our food sources. While it is impossible to get rid of microorganisms completely, biologists work with engineers and other food preservation scientists to preserve food so that it is safe for consumption and has a longer shelf life. Some practices, such as refrigeration and protective packaging, are familiar to most people. Other methods are newer and more technical. For example, high-pressure processing, or HPP, applies intense cool pressure to sealed foods to deactivate harmful microorganisms. Heat has traditionally been a common way to cook away microbes, but that method often alters the taste and texture of food. HPP provides fresher-tasting foods that are safe to eat.



Image 1: Advances in food science mean that fresh fruits and vegetables can be available year-round all over the world.



Image 2: Many ready-made food items undergo HPP to ensure that they are safe to eat while still retaining their fresh taste and nutritional content.

- 4 Additional goals of food science are variety and easy availability. Think about the coffee and avocados at that Alaskan supermarket. Coffee beans typically grow in tropical rain forest conditions in places like Brazil, Africa, and Hawaii, while avocados grow best in places without freezing winter temperatures. In the past, Alaskans would not have had easy access to these foods. But improvements in preservation and transportation have given people all over the world extraordinary access to different food items. Avocados are transported long distances in special temperature-controlled containers, and the seemingly simple practice of roasting coffee beans preserves them so that they can be distributed around the world. Unfortunately, many of these practices are often environmentally unsustainable because they require huge amounts of energy to generate, store, and transport foods over such long distances.

discipline: a field of study

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Continue reading, and then answer the questions that follow.



Image 3: Food scientists use bioengineering to genetically alter a food to introduce new traits, such as drought or pest resistance.

- 5 Food scientists also work to increase food abundance. Food insecurity, or not having enough food to eat, is a real problem for many people around the world. Additionally, with Earth's ever-increasing population, there are always more people to feed in spite of diminishing resources. Humans have been refining the science of agriculture to address these issues for hundreds of years. In the last half-century, emerging science has tackled these challenges in a new way: bioengineering.
- 6 The genetic engineering of foods alters the DNA of organisms. This science, which was developed in the 1970s, can result in many advantages for food production. For example, some plants can

resist disease and pests, better withstand harmful weather conditions, and maintain ripeness longer after harvest with the help of genetic engineering. Bioengineers have also been able to boost the vitamin or mineral content in some plants. This alteration increases the plant's nutritional value. The science of genetic engineering makes it easier to grow, harvest, and distribute high volumes of nutritional food to those who need it most.

- 7 However, using genetically modified organisms (GMOs) in food has been a controversial practice ever since the first genetically engineered tomato was approved for consumers in 1994. Some fear that bioengineering foods is risky partly because it is such a new science. The concern is that we don't yet know the long-term impact that genetically modified foods will have on human health. Reliable organizations like the U.S Food and Drug administration consider many GMO foods safe. Still, some scientists argue that GMOs have unintended side effects on the ecosystems that surround them. Researchers continue to explore bioengineering's uses and risks as it relates to food science.
- 8 Despite differing views about certain aspects of the discipline, one thing is certain: food science is as complex as it is essential. The evolving methods and ideas in this field of study enable humans to have access to safe, nutritious, and—hopefully—sufficient food. Whether it's through creating safer methods of food storage or developing more nutritious food options, science seems to be permanently linked to what and how humans eat.



Image 4: From growing and harvesting to preparing, packaging, shipping, and beyond—food scientists are involved in every part of the process to get food to consumers.



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Answer the following questions about “Food Science.”

1. What are two central ideas in the passage?
 - a. Food science involves many different methods and specialties.
 - b. Food science was first used by humans thousands of years ago.
 - c. Bioengineering has more advantages than disadvantages.
 - d. The goal of food science is to improve foods for human consumption.
2. How do the photo and caption in Image 2 contribute to the development of ideas in paragraph 3? What is the benefit of presenting this information visually?

3. **Part A:** What can be inferred about microorganisms from the information in paragraph 3?
 - a. They enhance the flavors in some foods.
 - b. Some make foods dangerous to eat.
 - c. They can only be deactivated with heat.
 - d. Some are helpful for the health of food plants.

Part B: Cite at least two pieces of evidence from paragraph 3 that support the inference in Part A.

4. Why does the author refer to the Alaskan supermarket in paragraphs 1 and 4 of the text? How does this reference contribute to the development of the central ideas of the text?

5. **Part A:** What is the author’s overall point of view about food science?
 - a. It is expensive and potentially dangerous.
 - b. It is primarily helpful for large supermarkets in cold places.
 - c. It is necessary and continues to solve problems.
 - d. It is too new to evaluate effectively

Part B: Cite two sentences from the text that support your answer in Part A.

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Answer the following questions about “Food Science.”

6. According to the text, what are some positive and negative effects of food science research? Complete the chart below using evidence from the passage.

Positive Effects	Negative Effects

7. Circle **three** words in the passage that contain a Latin or Greek root or prefix. Record each word in the table below, underlining the root or prefix. Then complete the table with the meaning of the root or prefix and the meaning of the word. Use context clues from the passage and/or a dictionary to help you.

Word	Meaning of the Root/Prefix	Meaning of the Word
EXAMPLE: <u>bio</u> engineering	life	using biological techniques to create modified versions of organisms