

# 2022 MCAS Sample Student Work and Scoring Guide

## High School Biology

### Question 16: Constructed-Response

**Reporting Category:** Molecules to Organisms

**Practice Category:** Evidence, Reasoning, and Modeling

**Standard:** [HS.LS.1.5](#) - Use a model to illustrate how photosynthesis uses light energy to transform water and carbon dioxide into oxygen and chemical energy stored in the bonds of sugars and other carbohydrates.

**Item Description:** Complete a model of photosynthesis, identify the source of energy for photosynthesis, and describe how the products of photosynthesis are used in a human cell.

[View item in MCAS Digital Item Library](#)

### Scoring Guide

Select a score point in the table below to view the sample student response.

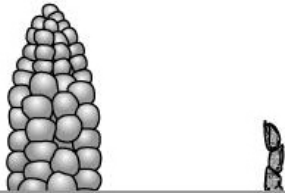
Score*	Description
<a href="#">3A</a>	The response demonstrates a thorough understanding of the processes of photosynthesis and cellular respiration. The response shows a correct chemical equation for photosynthesis and correctly identifies the source that provides energy for photosynthesis. The response also clearly describes how human cells use the products from photosynthesis.
<a href="#">3B</a>	
<a href="#">2</a>	The response demonstrates a partial understanding of photosynthesis and cellular respiration.
<a href="#">1</a>	The response demonstrates a minimal understanding of photosynthesis and cellular respiration.
<a href="#">0</a>	The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

\*Letters are used to distinguish between sample student responses that earned the same score (e.g., 3A and 3B).

## Score Point 3A

Corn is one of the most important crops grown in the United States. Corn, which is mostly starch, is used as a food source for humans and other animals.

Humans first developed corn as a food crop over 8000 years ago. These early farmers produced corn by selectively breeding a wild grass called teosinte. The kernels of teosinte have a hard coating that makes them difficult for humans to eat. A key step in developing corn as a food crop was selecting individual plants that produced kernels without this coating so that they could more easily be used as a food source. The illustrations show the kernels on an ear of corn and the kernels on an ear of teosinte.



This question has three parts.

Corn plants produce their own food through a chemical process.

## Part A

Drag and drop a molecule into each box in the equation to show the chemical reaction corn plants use to make food. Each chemical symbol may be used once or not at all.



## Part B

Identify the source that provides energy for the chemical reaction in Part A to occur.

The source that provides energy for the chemical reaction to occur is sunlight.

## Part C

Describe how human cells use the products from the chemical reaction in Part A. Be sure to include the process that occurs at the cellular level.

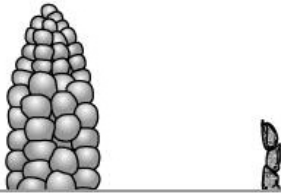
Human cells use the products from the chemical reaction in Part A to perform cellular respiration. This process provides usable energy to the cell from food molecules, in this case the plants.

[Back to Scoring Guide](#)

## Score Point 3B

Corn is one of the most important crops grown in the United States. Corn, which is mostly starch, is used as a food source for humans and other animals.

Humans first developed corn as a food crop over 8000 years ago. These early farmers produced corn by selectively breeding a wild grass called teosinte. The kernels of teosinte have a hard coating that makes them difficult for humans to eat. A key step in developing corn as a food crop was selecting individual plants that produced kernels without this coating so that they could more easily be used as a food source. The illustrations show the kernels on an ear of corn and the kernels on an ear of teosinte.



This question has three parts.

Corn plants produce their own food through a chemical process.

## Part A

Drag and drop a molecule into each box in the equation to show the chemical reaction corn plants use to make food. Each chemical symbol may be used once or not at all.



## Part B

Identify the source that provides energy for the chemical reaction in Part A to occur.

The sun is the source of energy for the chemical reaction in part one.

## Part C

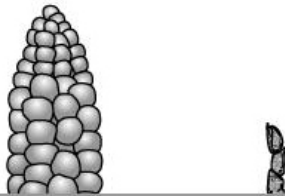
Describe how human cells use the products from the chemical reaction in Part A. Be sure to include the process that occurs at the cellular level.

Humans use sugars and oxygen to perform cellular respiration. Cellular respiration is the process where cells produce ATP (energy).

**Score Point 2**

Corn is one of the most important crops grown in the United States. Corn, which is mostly starch, is used as a food source for humans and other animals.

Humans first developed corn as a food crop over 8000 years ago. These early farmers produced corn by selectively breeding a wild grass called teosinte. The kernels of teosinte have a hard coating that makes them difficult for humans to eat. A key step in developing corn as a food crop was selecting individual plants that produced kernels without this coating so that they could more easily be used as a food source. The illustrations show the kernels on an ear of corn and the kernels on an ear of teosinte.



**This question has three parts.**

Corn plants produce their own food through a chemical process.

**Part A**

Drag and drop a molecule into each box in the equation to show the chemical reaction corn plants use to make food. Each chemical symbol may be used once or not at all.

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**Part B**

Identify the source that provides energy for the chemical reaction in Part A to occur.

the sun

**Part C**

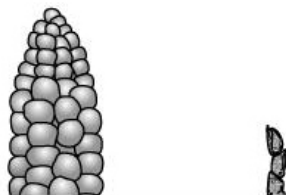
Describe how human cells use the products from the chemical reaction in Part A. Be sure to include the process that occurs at the cellular level.

people drink water and breathe oxygen

## Score Point 1

Corn is one of the most important crops grown in the United States. Corn, which is mostly starch, is used as a food source for humans and other animals.

Humans first developed corn as a food crop over 8000 years ago. These early farmers produced corn by selectively breeding a wild grass called teosinte. The kernels of teosinte have a hard coating that makes them difficult for humans to eat. A key step in developing corn as a food crop was selecting individual plants that produced kernels without this coating so that they could more easily be used as a food source. The illustrations show the kernels on an ear of corn and the kernels on an ear of teosinte.

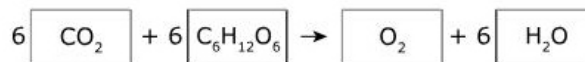


This question has three parts.

Corn plants produce their own food through a chemical process.

## Part A

Drag and drop a molecule into each box in the equation to show the chemical reaction corn plants use to make food. Each chemical symbol may be used once or not at all.



## Part B

Identify the source that provides energy for the chemical reaction in Part A to occur.

The source of the energy is the sun.

## Part C

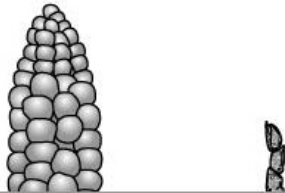
Describe how human cells use the products from the chemical reaction in Part A. Be sure to include the process that occurs at the cellular level.

Human cells use oxygen and water to make and have enough energy to operate efficiently

## Score Point 0

Corn is one of the most important crops grown in the United States. Corn, which is mostly starch, is used as a food source for humans and other animals.

Humans first developed corn as a food crop over 8000 years ago. These early farmers produced corn by selectively breeding a wild grass called teosinte. The kernels of teosinte have a hard coating that makes them difficult for humans to eat. A key step in developing corn as a food crop was selecting individual plants that produced kernels without this coating so that they could more easily be used as a food source. The illustrations show the kernels on an ear of corn and the kernels on an ear of teosinte.

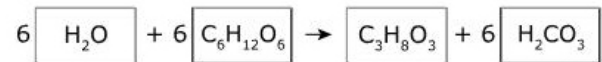
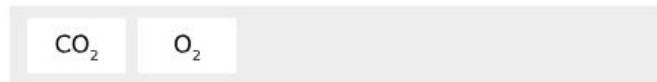


This question has three parts.

Corn plants produce their own food through a chemical process.

## Part A

Drag and drop a molecule into each box in the equation to show the chemical reaction corn plants use to make food. Each chemical symbol may be used once or not at all.



## Part B

Identify the source that provides energy for the chemical reaction in Part A to occur.

The source is the chloroplasts.

## Part C

Describe how human cells use the products from the chemical reaction in Part A. Be sure to include the process that occurs at the cellular level.

Humans consume organisms with chloroplasts and modifies the molecules into usable molecules.