Cambridge Assessment International Education

Cambridge IGCSE™

BIOLOGY **0610/23**

Paper 2 Multiple Choice (Extended) **May/June 2024**

45 minutes

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- There are **forty** questions on this paper. Answer **all** questions.
- For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the **one** you consider correct and record your choice in soft pencil on the multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.

This document has **20** pages. Any blank pages are indicated.

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1 Which characteristic do **all** living organisms show?

A breathing

B excretion

C photosynthesis

D tropism

2 What kind of skin do amphibians have?

A dry without scales

B dry with scales

C moist without scales

D moist with scales

3 Some components of cells are listed.

1 cell membrane

2 cell wall

3 chloroplasts

4 cytoplasm

Which cell components are present in plant cells but absent in animal cells?

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

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4 The image shows a pollen grain from a grass plant.

The image has a length of 60 mm.

The actual length of the pollen grain is 500 µm.

What is the magnification of the pollen grain?

A ×0.12 **B** ×30 **C** ×120 **D** ×30 000

5 What will increase the rate of diffusion across a gas exchange surface?

A a decrease in the concentration gradient

B a decrease in the diffusion distance

C a decrease in the kinetic energy of molecules

D a decrease in the surface area of the gas exchange surface

6 What happens when potato plant cells are placed in pure water?

A Water enters the cells and they become plasmolysed.

B Water enters the cells and they become turgid.

C Water leaves the cells and they become plasmolysed.

D Water leaves the cells and they become turgid.

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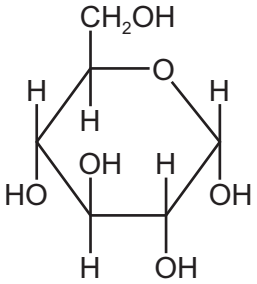
7 The diagrams show four molecules.

C represents carbon, H represents hydrogen, O represents oxygen and N represents nitrogen.

Which structure is an amino acid?

A



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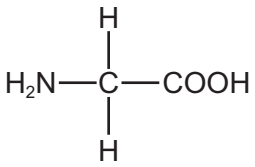

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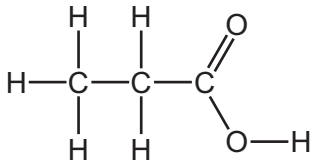
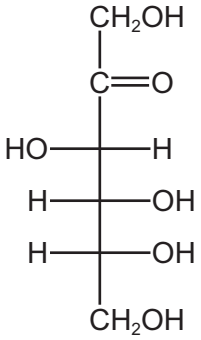
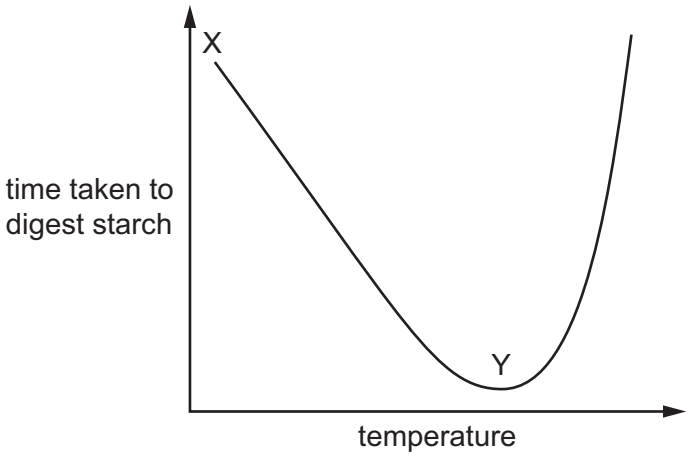


D



8 The diagram shows the effect of changing the temperature on the time taken for an enzyme to digest starch.



Which statement about the results is correct?

A The optimum temperature is at X and the rate of reaction decreases between X and Y.

B The optimum temperature is at X and the rate of reaction increases between X and Y.

C The optimum temperature is at Y and the rate of reaction decreases between X and Y.

D The optimum temperature is at Y and the rate of reaction increases between X and Y.

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9 Which structure contains the pigment that transfers energy from light into chemical energy?

A chloroplast

B mitochondrion

C nucleus

D ribosome

10 Which region in the leaf of a green plant contains phloem?

A palisade mesophyll

B spongy mesophyll

C upper epidermis

D vascular bundle

11 The table shows the percentage of the daily recommended intake of nutrients in a serving of four foods.

Which food would be the best choice to prevent scurvy?

	percentage of daily recommended intake in a serving of food			
	calcium	iron	vitamin C	vitamin D
A	71	1	0	6
B	24	11	2	73
C	3	3	72	0
D	1	72	1	0

12 What is the correct order of the processes that take place in the alimentary canal?

A absorption, digestion, ingestion, egestion

B digestion, ingestion, egestion, absorption

C egestion, digestion, absorption, ingestion

D ingestion, digestion, absorption, egestion

13 Why does chewing food speed up digestion?

A Bacteria in the food are killed.

B Food is mixed with protease.

C The surface area of the food is increased.

D The taste of food is improved.

14 Which substances are produced by the action of amylase on starch?

A amino acids

B fatty acids and glycerol

C salts

D sugars

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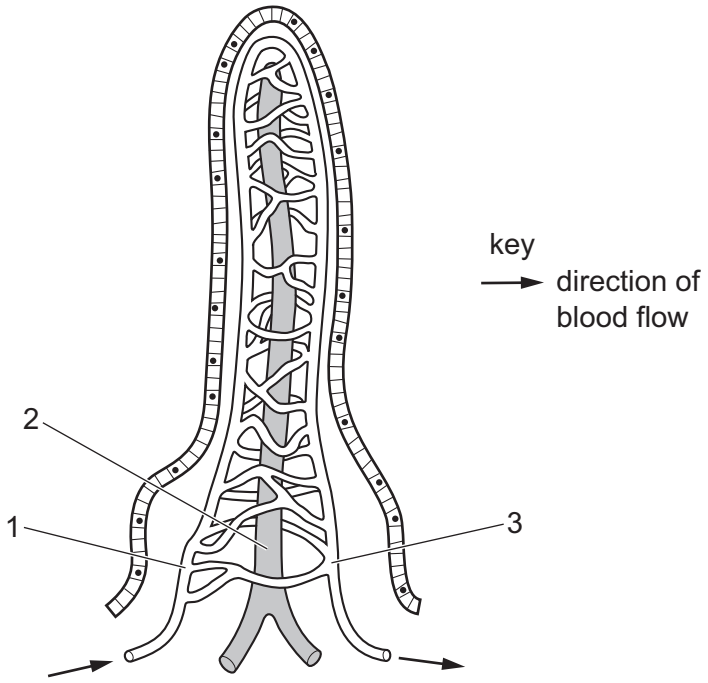
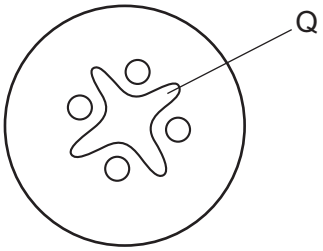
15 The diagram shows a section through a villus.



Several hours after a meal, where will the highest concentrations of amino acids and of glucose be found in the villus?

	highest concentration of amino acids	highest concentration of glucose
A	1	1
B	1	2
C	2	1
D	3	3

16 The diagram shows a cross-section of a plant root.



What is a function of the part labelled Q?

A storage of starch

B structural support

C transport of amino acids

D transport of glucose

17 Which part of the heart separates the deoxygenated and oxygenated blood?

A atrium muscle wall

B atrioventricular valve

C septum

D ventricle muscle wall

18 The diagrams show four components of blood.

Which component produces antibodies?

19 The cholera bacterium produces a toxin. The toxin causes the secretion of chloride ions into the lumen of the small intestine.

Why does this cause diarrhoea?

A The water potential in the lumen of the small intestine decreases and water moves into the small intestine by osmosis.

B The water potential in the lumen of the small intestine increases and water moves into the small intestine by osmosis.

C The water potential in the lumen of the small intestine decreases and water moves out of the small intestine by osmosis.

D The water potential in the lumen of the small intestine increases and water moves out of the small intestine by osmosis.

20 Which structure contains cartilage?

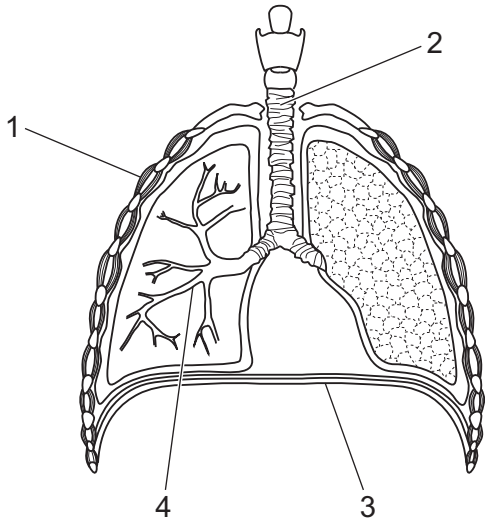
A alveoli

B diaphragm

C intercostal muscle

D trachea

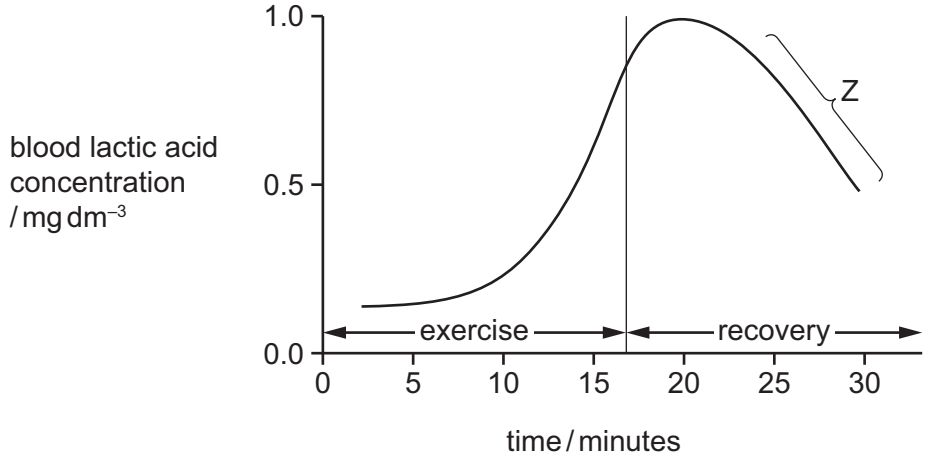
21 The diagram shows the human breathing system.



Which labels show structures that produce changes in volume and pressure during ventilation of the lungs?

A 1 and 3 **B** 1 only **C** 2 and 3 **D** 2 and 4

22 The graph shows the lactic acid concentration in the blood during exercise and during recovery after exercise.



Which process accounts for the shape of the graph at Z?

A aerobic respiration of lactic acid in the kidney

B aerobic respiration of lactic acid in the liver

C anaerobic respiration of lactic acid in the kidney

D anaerobic respiration of lactic acid in the liver

23 Which process takes place as the filtrate from a glomerulus passes along a nephron?

A production of amino acids

B excretion of oxygen

C production of urea

D reabsorption of glucose

24 A person moves from bright light into a dark room.

What changes occur in their eyes?

	pupil	radial muscles	circular muscles
A	constricts	contract	relax
B	constricts	relax	contract
C	dilates	contract	relax
D	dilates	relax	contract

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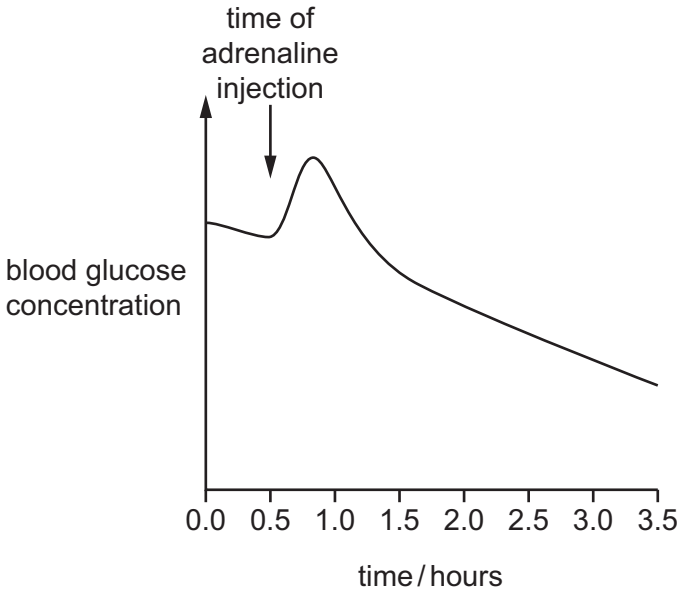
25 A person who had **not** eaten for a few hours was given an injection of adrenaline.

The person's blood glucose concentration was measured for 3.5 hours.

The graph shows the results.



What is the correct explanation for the change in blood glucose concentration immediately after the injection of adrenaline?

A Adrenaline causes less glucose to be converted to glucagon.

B Adrenaline causes less glucagon to be converted to glucose.

C Adrenaline causes more glucose to be converted to glycogen.

D Adrenaline causes more glycogen to be converted to glucose.

26 Which statement about insulin is correct?

A Insulin is produced by the liver when the blood glucose concentration is high. Its target cells are in the pancreas.

B Insulin is produced by the liver when the blood glucose concentration is low. Its target cells are in the pancreas.

C Insulin is produced by the pancreas when the blood glucose concentration is high. Its target cells are in the liver.

D Insulin is produced by the pancreas when the blood glucose concentration is low. Its target cells are in the liver.

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27 What is a function of the placenta?

A acts as a barrier to prevent some toxins reaching the fetus

B exchanges blood between the mother and the fetus

C prevents the transfer of excretory products from the fetus

D protects the fetus from mechanical damage

28 Which diagram shows the correct inheritance of sex chromosomes?

A

parent 1

parent 2		X	Y
	X	XX	XY
	Y	XY	YY

B

parent 1

parent 2		X	X
	X	XX	XX
	Y	XY	XY

C

parent 1

parent 2		X	X
	X	XX	XX
	X	XX	XY

D

parent 1

parent 2		X	Y
	X	XX	XY
	X	XY	XY

29 Which of the statements about the production of a protein are correct?

1 The sequence of bases in the gene determines the amino acid sequence used to make a protein.

2 The mRNA molecules are made in the nucleus and they remain there.

3 The ribosomes assemble amino acids together to make a protein.

A 1 and 2 only **B** 1 and 3 only **C** 2 and 3 only **D** 2 only

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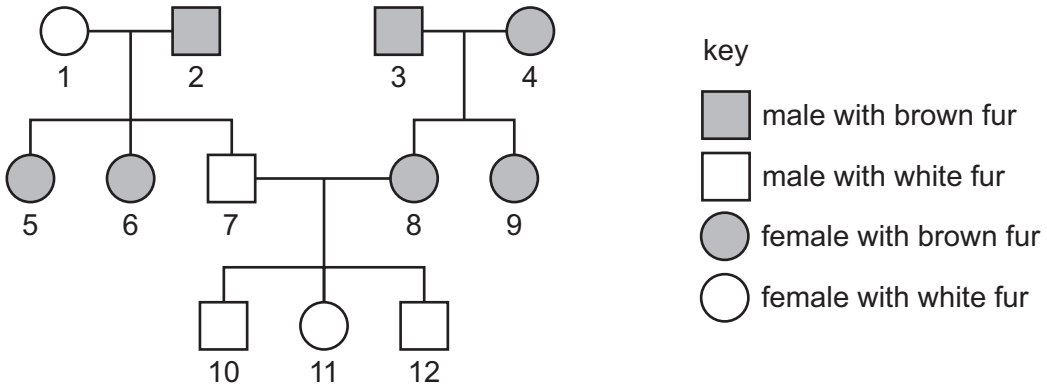
30 In mice, the allele for brown fur is dominant to the allele for white fur.

The diagram shows the inheritance of fur colour in a family of mice.



Which two individuals are heterozygous for fur colour?

A 1 and 4 **B** 2 and 8 **C** 6 and 7 **D** 7 and 10

31 Desert plants have evolved to survive in places where very little water is available.

Which process is reduced to enable them to retain as much water as possible?

A transpiration

B translocation

C respiration

D digestion

32 These events may happen when an antibiotic is used to treat a bacterial infection.

1 The antibiotic kills most of the bacteria.

2 The antibiotic-resistant bacteria reproduce.

3 The antibiotic-resistant bacteria survive.

4 Some bacteria mutate and are resistant to the antibiotic.

Which sequence may produce a strain of antibiotic-resistant bacteria?

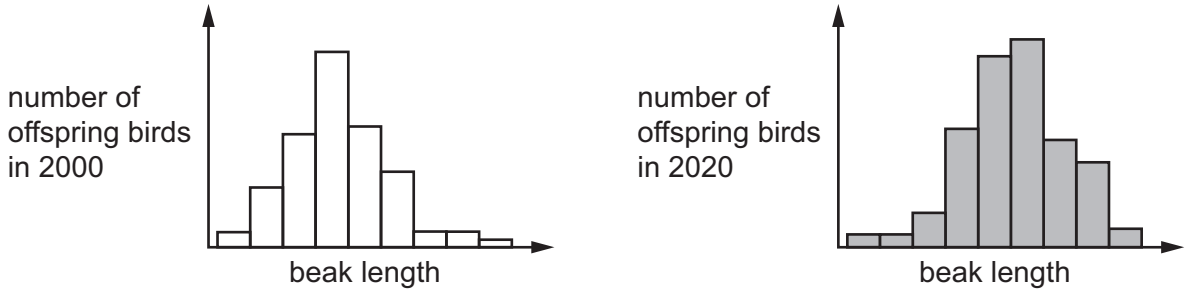
A $1 \rightarrow 2 \rightarrow 3 \rightarrow 4$

B $2 \rightarrow 3 \rightarrow 1 \rightarrow 4$

C $3 \rightarrow 1 \rightarrow 4 \rightarrow 2$

D $4 \rightarrow 1 \rightarrow 3 \rightarrow 2$

33 The graphs show the beak length of offspring of a wild bird population in 2000 and in 2020. The graphs are drawn to the same scale.



Which change has taken place in the overall beak length of the bird population, and what type of selection has brought this about?

	change in the beak length of the bird population	type of selection
A	decrease	artificial
B	decrease	natural
C	increase	artificial
D	increase	natural

34 What is the principal source of energy input into an ecosystem?

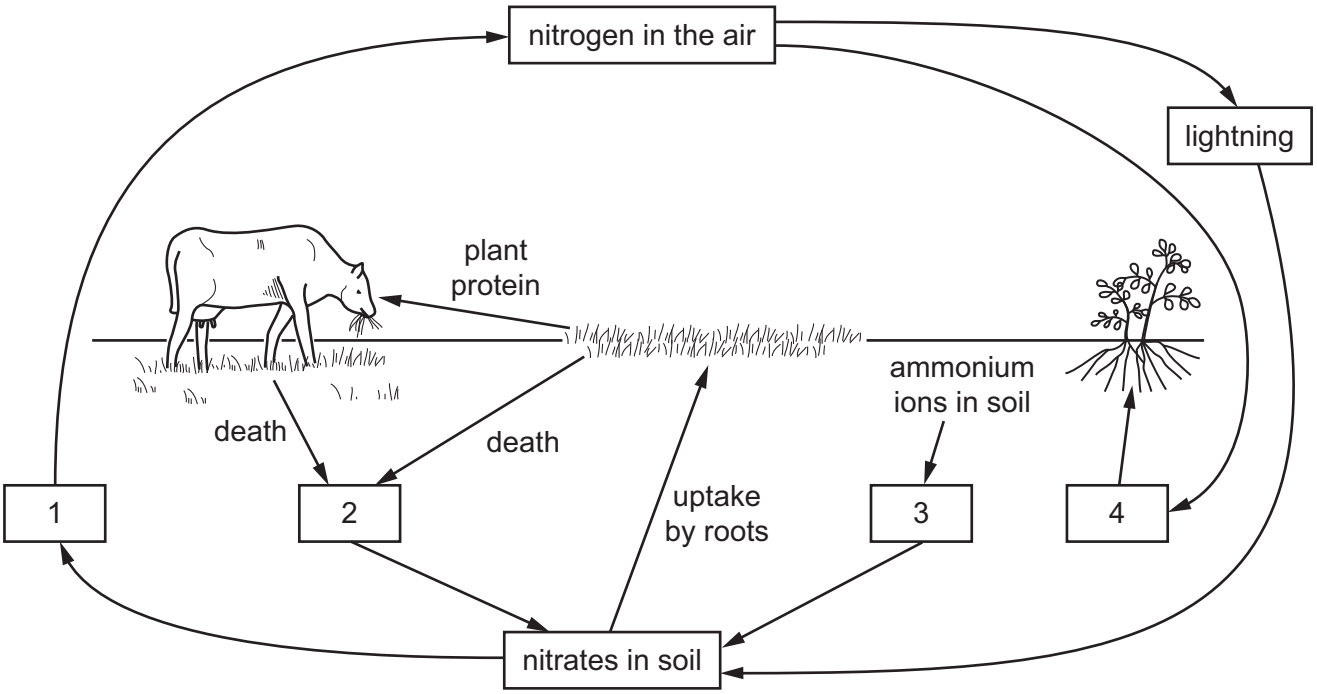
A decomposers

B herbivores

C producers

D the Sun

35 The diagram shows part of the nitrogen cycle.



Which numbers represent decomposing bacteria and nitrifying bacteria?

	decomposing bacteria	nitrifying bacteria
A	1	3
B	1	4
C	2	3
D	2	4

36 What is a description of biodiversity?

A the number of different animal species that live in an area

B the number of different plant species that live in an area

C the number of different species that live in an area

D the number of individuals of a particular species that live in an area

37 A list of different stages that occur in the process of eutrophication is given.

1 reduction in dissolved oxygen
2 increase in nitrate ions
3 death of organisms requiring dissolved oxygen
4 growth of producers
5 increased aerobic respiration by decomposers
6 death of producers followed by their decomposition

What is the correct order in which these processes occur during eutrophication?

A $1 \rightarrow 3 \rightarrow 5 \rightarrow 2 \rightarrow 6 \rightarrow 4$

B $2 \rightarrow 4 \rightarrow 1 \rightarrow 6 \rightarrow 5 \rightarrow 3$

C $2 \rightarrow 4 \rightarrow 6 \rightarrow 5 \rightarrow 1 \rightarrow 3$

D $5 \rightarrow 1 \rightarrow 3 \rightarrow 6 \rightarrow 2 \rightarrow 4$

38 Lignin is used to make a sustainable resource known as bioplastic.

Why is bioplastic a sustainable resource?

A Lignin can be produced as rapidly as it is removed from the environment.

B Lignin is found in xylem tissue.

C Lignin is strong.

D Lignin is waterproof.

39 Which bacterial cell structure is useful in genetic modification?

A cell membrane

B cell wall

C cytoplasm

D plasmid

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40 A crop plant has been genetically modified to make it resistant to herbicides.

What is a possible disadvantage of introducing this new crop plant?

A The loss of weeds reduces competition.

B Some of the weeds might become resistant to the herbicide.

C The crop plant is unharmed and produces a higher yield.

D The new gene will appear in new generations of the crop plant.

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