Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/23**

Paper 2 Multiple Choice (Extended) **October/November 2019**

45 minutes

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

* 6 6 3 5 9 2 4 7 8 3 *

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, glue or correction fluid.
Write your name, centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.
DO **NOT** WRITE IN ANY BARCODES.

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 separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

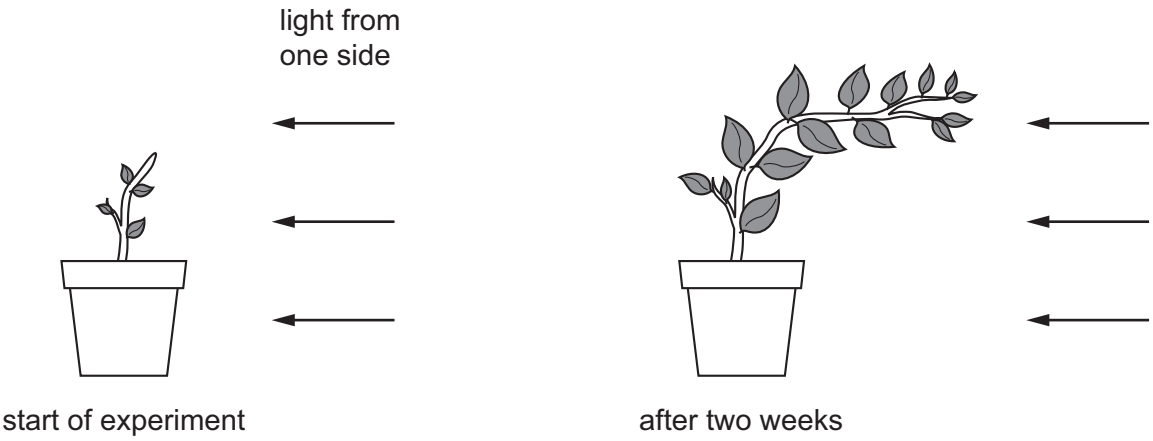
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
Electronic calculators may be used.

This syllabus is regulated for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **16** printed pages.

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1 The diagrams show a plant at the start of an experiment, and the same plant two weeks later.



Which characteristics of living organisms are demonstrated by this experiment?

A excretion, growth, movement

B excretion, movement, reproduction

C growth, movement, sensitivity

D sensitivity, growth, respiration

2 Donkeys and zebras are different species. They can breed to produce an animal called a zedonk.

Zedonks are not fertile.

Which statement is correct?

A Zedonks and donkeys are the same species.

B Zedonks and zebras are the same species.

C Zedonks are a species.

D Zedonks are not a species.

3 Which feature is characteristic only of birds?

A hair and wings

B hard-shelled eggs and feathers

C scales and soft-shelled eggs

D wings and soft-shelled eggs

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4 Which features do animal cells share with plant cells?

	chloroplast	cytoplasm	nucleus
A	✓	✓	✓
B	✓	✗	✓
C	✗	✓	✓
D	✗	✗	✗

key
✓ = yes
✗ = no

5 A bacterium is 0.5 μm long.

A student makes a drawing of the bacterium. The student's drawing is 100 mm long.

What is the magnification of the student's drawing?

A ×0.005 **B** ×50 **C** ×200 **D** ×200 000

6 Red blood cells were placed in pure water.

Movement of water across the cell membrane caused a change in their appearance.

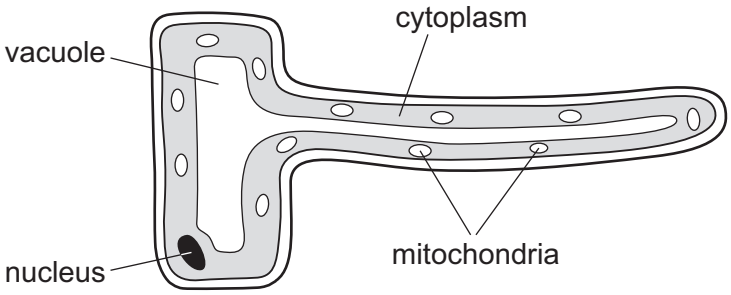
What caused this change in appearance?

	direction of water movement	from higher to lower water potential	from lower to higher water potential
A	into cells	yes	no
B	into cells	no	yes
C	out of cells	yes	no
D	out of cells	no	yes

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[Turn over

7 The diagram shows a root hair cell.



Why does a root hair cell contain a large number of mitochondria?

A to provide energy for the absorption of water from the soil

B to provide energy for the diffusion of mineral ions from the soil

C to provide energy for osmosis

D to provide energy for the active transport of mineral ions from the soil

8 Which identifies the chemical elements found in proteins?

	carbon	hydrogen	oxygen	nitrogen
A	✓	✓	✓	✓
B	✓	✓	✓	✗
C	✓	✗	✓	✗
D	✗	✓	✗	✓

key

✓ = present

✗ = absent

9 Enzyme X digests protein in the stomach.

Four test-tubes were set up, each contained the same amounts of protein and enzyme X. The test-tubes are kept at different levels of pH and temperature, as shown in the table.

In which test-tube will protein digestion be quickest?

	pH	temperature / °C
A	2	20
B	2	35
C	7	20
D	7	35

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10 Which substance is used up in photosynthesis?

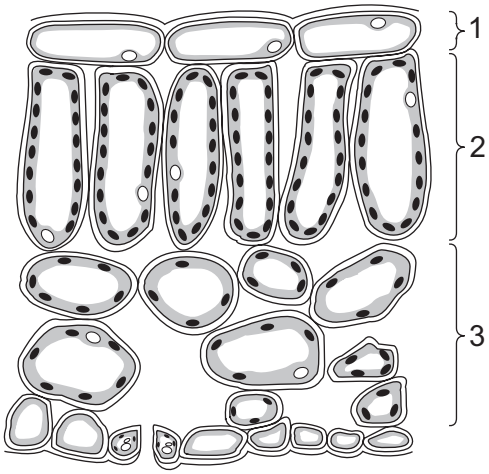
A chlorophyll

B light

C oxygen

D water

11 The diagram shows a leaf as seen in cross-section under the microscope.

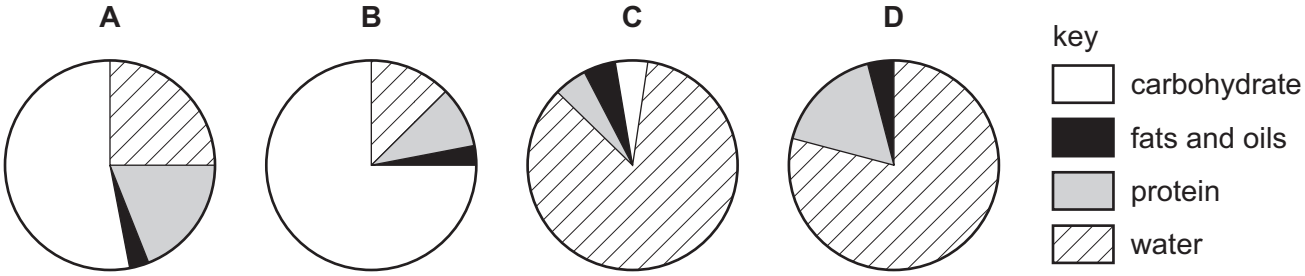


What are tissues 1, 2 and 3?

	1	2	3
A	epidermis	palisade mesophyll	spongy mesophyll
B	epidermis	spongy mesophyll	palisade mesophyll
C	palisade mesophyll	epidermis	spongy mesophyll
D	spongy mesophyll	palisade mesophyll	epidermis

12 The pie charts show the composition of 100 g of four different foods.

Which food provides the most energy?



13 Cholera is a disease caused by a bacterium called *Vibrio cholerae* which produces a toxin in the infected person's gut.

What is the effect of this toxin?

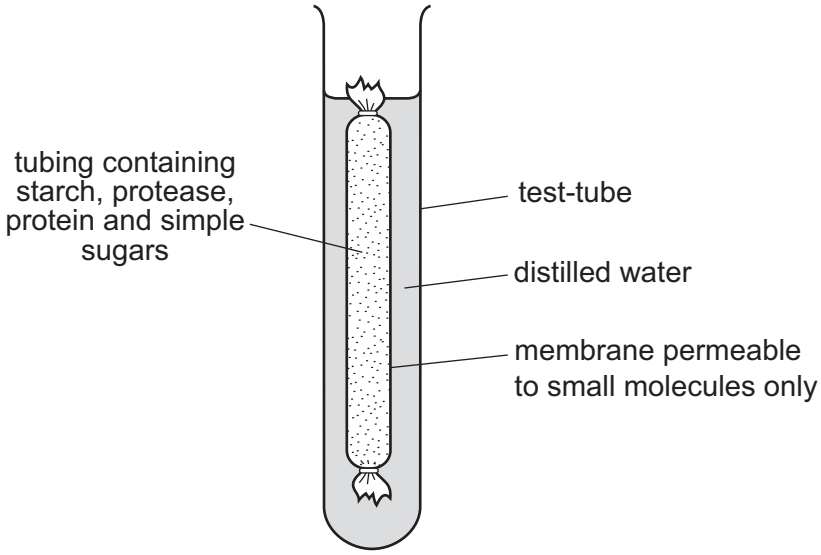
A It causes loss of water from the gut into the blood.

B It causes loss of water from the gall bladder into the blood.

C It causes water to enter the gut from the blood.

D It causes water to enter the gall bladder from the blood.

14 The diagram shows an experiment kept at room temperature.



What is present in the water surrounding the membrane after 45 minutes?

A amino acids and simple sugars

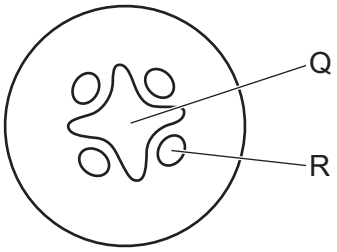
B protein and amino acids

C protein and simple sugars

D starch and simple sugars

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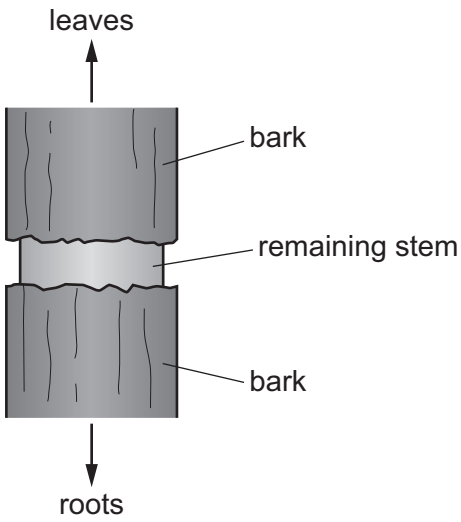
15 The diagram shows a cross-section through a plant root.



What is found at Q and R?

	Q	R
A	palisade mesophyll	spongy mesophyll
B	phloem	xylem
C	spongy mesophyll	palisade mesophyll
D	xylem	phloem

16 Rabbits can damage trees by eating the bark and phloem.



If the damage goes all the way around the stem, what will happen in the tree?

A Sugars cannot move from the leaves to the roots causing swelling above the ring.

B Sugars cannot move from the leaves to the roots causing swelling below the ring.

C Water cannot move from the leaves to the roots causing swelling above the ring.

D Water cannot move from the leaves to the roots causing swelling below the ring.

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17 The table shows the concentration of red blood cells, white blood cells and platelets in the blood of four patients.

Which patient is most likely to have a deficiency of iron in their diet **and** will find it difficult to form a blood clot?

	red blood cells / cells per mm^3	white blood cells / cells per mm^3	platelets / cells per mm^3
A	2 525 000	643	296 000
B	2 275 000	756	27 500
C	7 250 000	650	275 000
D	7 325 000	405	25 000

18 Which row describes the features of passive immunity?

	antibodies made	involves memory cells	effective period
A	no	no	short term
B	no	yes	short term
C	yes	no	long term
D	yes	yes	long term

19 What is the sequence of structures through which a molecule of oxygen passes from the air to the blood of a person?

1 bronchiole

2 capillary

3 alveolus wall

4 larynx

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

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

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

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

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20 How do green plants and mammals obtain their energy?

	green plants	mammals
A	from the soil	from sleeping and resting
B	from the air around the plant	from the air they breathe
C	from the Sun	from digested and absorbed food
D	from water and carbon dioxide	from water and oxygen

21 Lactic acid builds up in the muscles during vigorous exercise.

During recovery, how is this lactic acid removed?

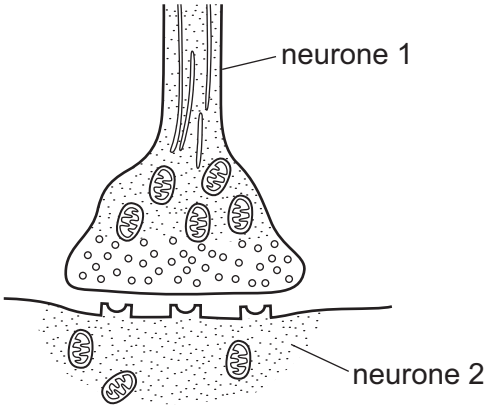
A aerobic respiration of lactic acid in the liver

B anaerobic respiration of lactic acid in the muscles

C excretion of lactic acid by the lungs

D removal of lactic acid by the alimentary canal

22 The diagram shows a synapse.



Heroin is a drug that can bind with receptors in a synapse.

What is the **most** likely effect heroin will have on the synapse?

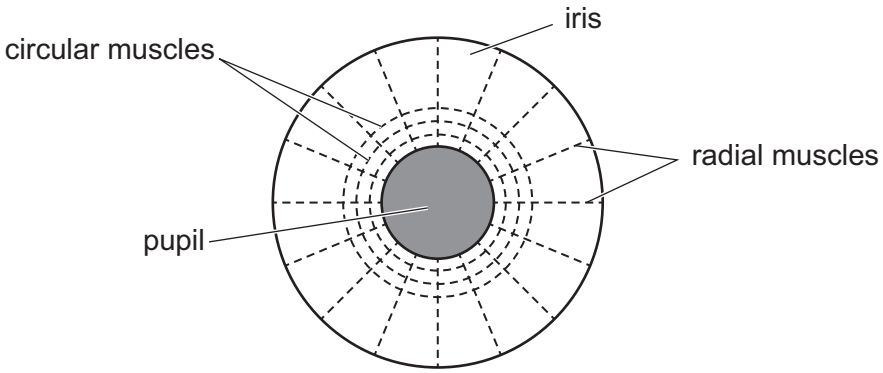
A cause the impulse to travel back along neurone 1

B prevent neurotransmitter binding with receptors on neurone 2

C stop the impulse being generated in neurone 1

D transfer the impulse to a different neurone other than neurone 2

23 The diagram shows the muscles that control the size of the pupil in an eye.



How do the muscles make the pupil smaller?

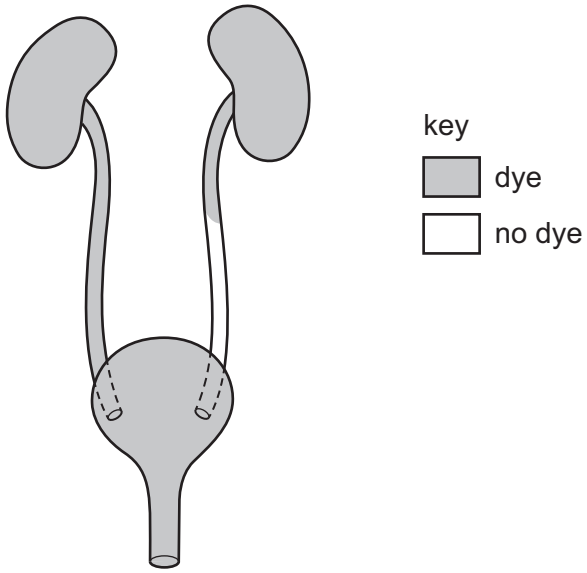
	circular muscles	radial muscles
A	contract	contract
B	contract	relax
C	relax	contract
D	relax	relax

24 In a plant shoot, where is auxin made and what is its effect?

	where made	effect
A	leaves	promotes cell division
B	leaves	promotes cell elongation
C	shoot tip	promotes cell division
D	shoot tip	promotes cell elongation

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25 A patient has dye injected into the blood supply to his kidneys. The dye appears in his excretory system as shown.



Which part is blocked?

A the kidney

B the ureter

C the bladder

D the urethra

26 Which statement about antibiotics is correct?

A Antibiotics are used to treat all transmissible diseases.

B Antibiotics are used to treat diseases caused by viruses.

C Antibiotic resistance can be stopped by increasing their use.

D Antibiotics are used to treat diseases caused by bacteria.

27 Which substance in tobacco smoke directly reduces the oxygenation of blood?

A carbon dioxide

B carbon monoxide

C nicotine

D tar

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28 The concentrations of LH and oestrogen are measured during part of a menstrual cycle.

On which day does ovulation occur?

	day from start of menstrual cycle	concentration of LH / arbitrary units	concentration of oestrogen / arbitrary units
A	7	10	30
B	10	12	135
C	13	120	130
D	16	20	25

29 Where are oestrogen and progesterone produced during the menstrual cycle in a woman who is **not** pregnant?

	oestrogen	progesterone
A	adrenal gland	ovary
B	ovary	ovary
C	ovary	placenta
D	placenta	pancreas

30 A haploid nucleus is defined as one that contains

A one chromosome.

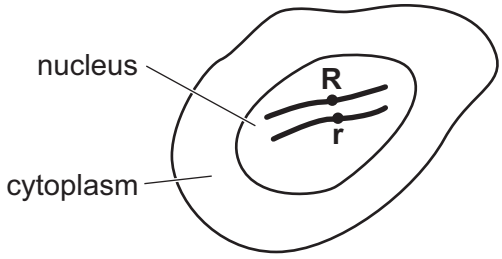
B one set of unpaired chromosomes.

C two chromosomes.

D two sets of chromosomes.

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31 The diagram shows a diploid cell and alleles **R** and **r** on one pair of chromosomes.



When this cell divides by mitosis, which daughter cells will be produced?

	chromosome number	genotype
A	diploid	heterozygous
B	diploid	homozygous
C	haploid	heterozygous
D	haploid	homozygous

32 Sickle-cell anaemia is caused by a mutation in the haemoglobin gene.

The normal base sequence is shown in 1, and the sickle-cell base sequence is shown in 2.

1 TGA GGA CTC CTC

2 TGA GGA CAC CTC

What causes the change in the DNA?

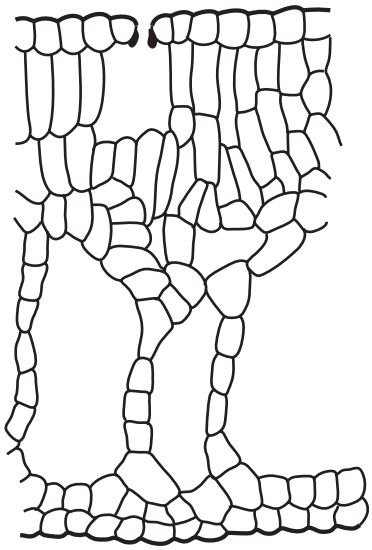
A the addition of one base

B the addition of two bases

C the change of one base for another

D the deletion of one base

33 The diagram shows part of a section through the leaf of a water lily.



Their leaves are adapted to help them to live on the surface of the water.

How is the leaf of this plant adapted to being a hydrophyte?

A It does not have a cuticle.

B It has a palisade layer.

C It has an epidermis.

D It has stomata on upper surface.

34 What could be responsible for the conversion of nitrogen in the atmosphere to nitrates in the soil?

A decomposers

B denitrifying bacteria

C lightning

D nitrifying bacteria

35 Which statement describes the effect of a disease which kills members of a population?

A It causes an exponential (log) increase in the population size.

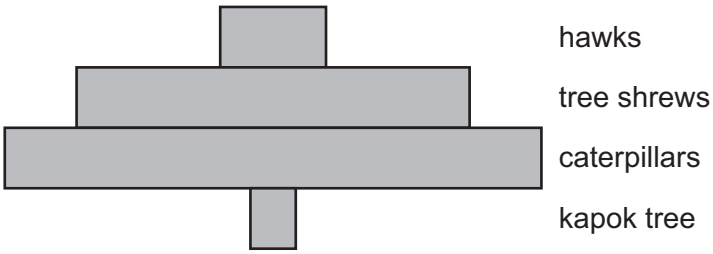
B It decreases the rate of growth of the population.

C It decreases the food supply available to the population.

D It reduces the lag phase of the population.

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36 The diagram shows a pyramid of numbers in a food chain.



What type of organism is the tree shrew?

A producer

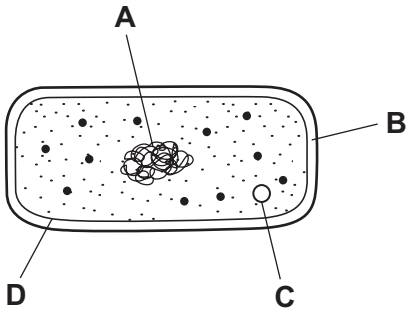
B primary consumer

C secondary consumer

D tertiary consumer

37 The diagram shows a bacterium.

Which structure is used in genetic engineering?



38 Penicillin is made in a fermenter by growing organisms.

Which type of organism is used in the production of penicillin?

A bacterium

B fungus

C protoctist

D virus

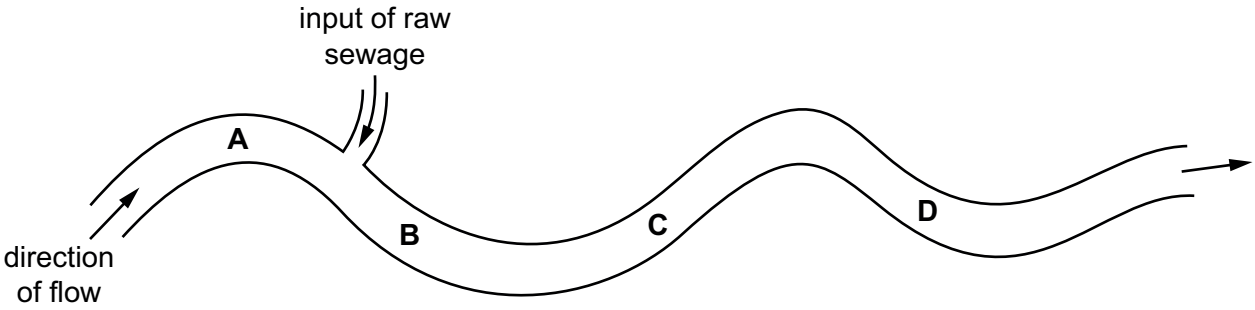
39 What are the possible effects of deforestation?

	loss of soil	flooding	decrease in atmospheric carbon dioxide
A	yes	yes	no
B	yes	no	yes
C	no	yes	no
D	no	no	yes

40 The bloodworm is an organism that is found in heavily polluted water.

The diagram shows where raw sewage flows into a river.

Where would there be fewest bloodworms?



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