Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/22**

Paper 2 Multiple Choice (Extended) **October/November 2017**

45 minutes

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

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.

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

This document consists of **14** printed pages and **2** blank pages.

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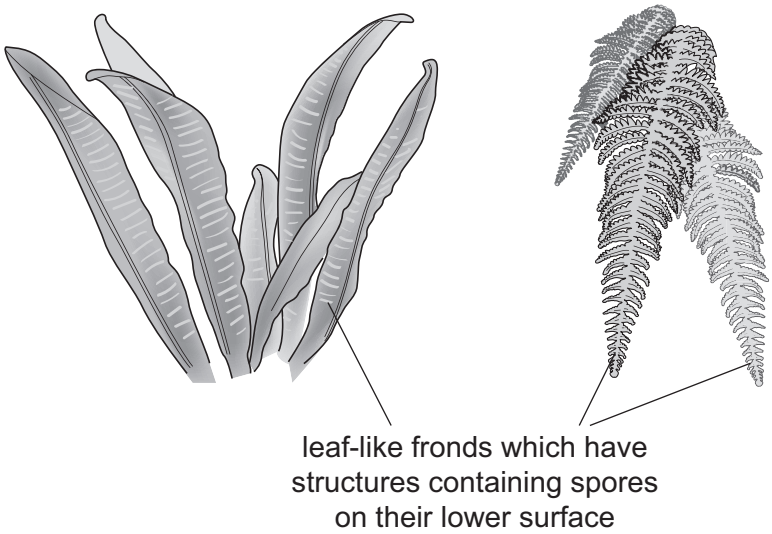
1 To which group do **both** the organisms shown in the diagram belong?



A dicotyledons

B ferns

C fungi

D monocotyledons

2 The diagram shows a section of DNA from a chimpanzee.

A	G	C	T	A	C	A	G	A	G

Which diagram shows a section of DNA from the organism that is most closely related to the chimpanzee?

A

A	G	C	T	A	C	A	G	A	T

B

A	G	C	T	A	C	A	G	T	T

C

A	T	C	A	A	C	A	G	T	T

D

A	T	C	T	A	C	A	G	T	T

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3 What is a leaf?

A a cell

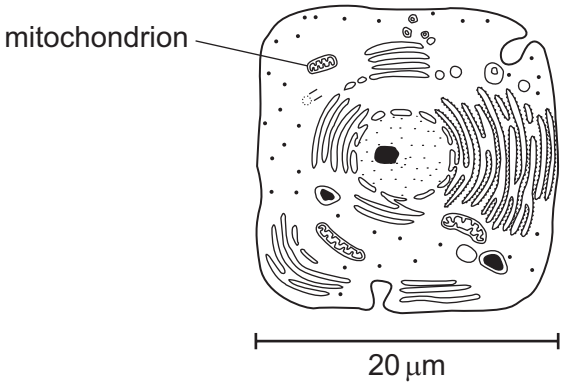
B an organ

C an organ system

D a tissue

4 The diagram shows a magnified image of a human liver cell with a mitochondrion labelled. The actual size of the liver cell is 20 μm.

The image size of the liver cell is 40 mm and the image size of the mitochondrion is 4 mm.



What is the actual size of the mitochondrion shown in the diagram?

A 0.002 mm **B** 0.02 mm **C** 0.2 mm **D** 2 mm

5 What would increase the rate of diffusion of oxygen into an animal cell?

A decreasing the concentration gradient between the inside of the cell and the outside

B decreasing the temperature of the cell and its surroundings

C increasing the distance that the oxygen molecules have to travel

D increasing the surface area of the cell membrane

6 A red blood cell and a palisade mesophyll cell are placed in a solution which has a higher water potential than the cells.

What will happen to each cell?

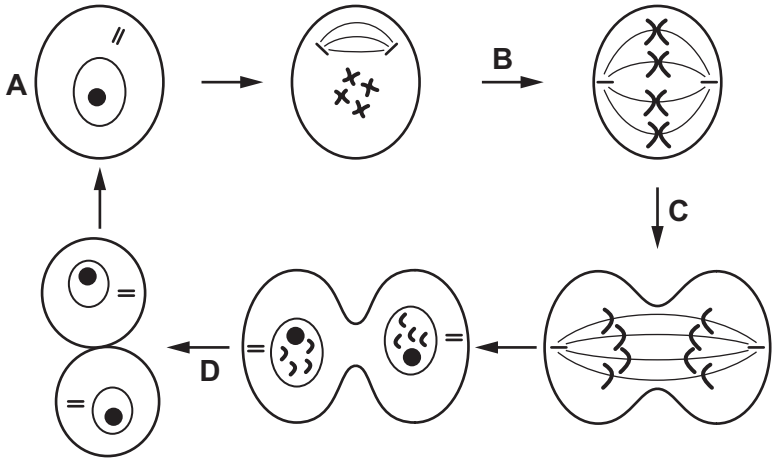
	red blood cell	palisade mesophyll cell
A	bursts	bursts
B	bursts	gains mass
C	loses mass	gains mass
D	loses mass	loses mass

7 Where in the alimentary canal is the enzyme trypsin found and what are the products of the reaction it catalyses?

	where trypsin is found	products
A	duodenum	amino acids
B	duodenum	fatty acids
C	ileum	proteins
D	stomach	amino acids

8 The diagram shows a cell before and during mitosis.

At which stage are the chromosomes copied?



9 Why does excessive heat decrease enzyme activity?

A It changes the shape of the active site.

B It changes the shape of the substrate and product molecules.

C It increases the force of collisions between substrate and product molecules.

D It increases the kinetic energy of the substrate molecules.

10 Four test-tubes were set up as shown in the table.

In which test-tube would starch be broken down the fastest?

	2 cm^3 starch suspension added	1 cm^3 of amylase added	1 cm^3 of boiled amylase added	temperature / °C
A	✓	✓	✗	5
B	✓	✓	✗	35
C	✓	✗	✓	5
D	✓	✗	✓	35

key
✓ = present
✗ = absent

11 The average number of chloroplasts in four different types of cell taken from a plant is shown.

Which is a root hair cell?

A 0 **B** 47 **C** 370 **D** 920

12 What must be increased in the diet of a person suffering from constipation?

A fats

B fibre

C iron

D protein

13 Which stage of nutrition takes place when food molecules become part of a body cell?

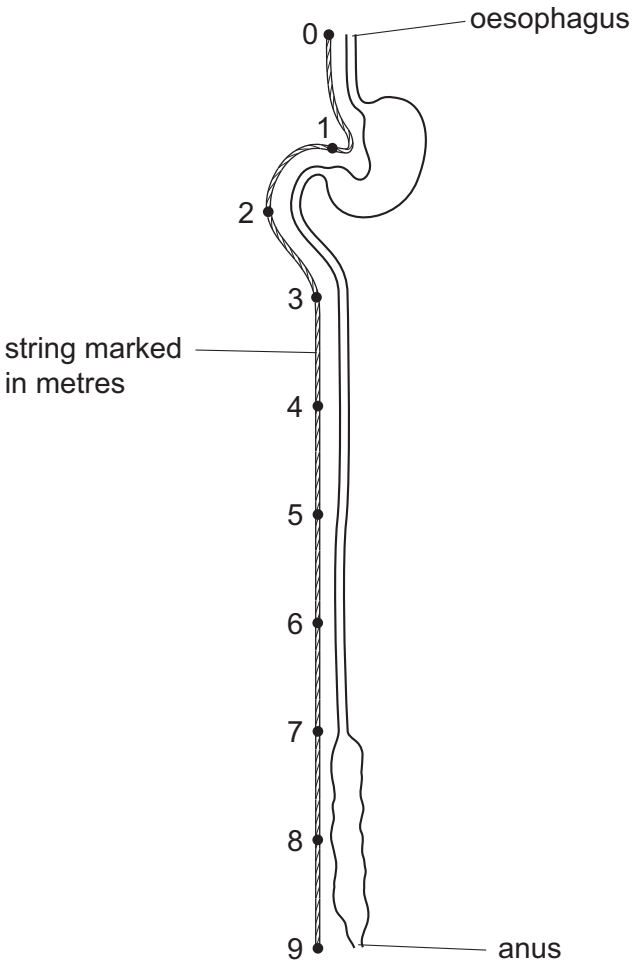
A absorption

B assimilation

C digestion

D ingestion

14 The diagram shows the human alimentary canal, with a string marked in metres beside it.



How long is the small intestine?

A 2 m **B** 6 m **C** 8 m **D** 9 m

15 What is the function of translocation?

A to move leaves towards the light for photosynthesis

B to move water into leaves for photosynthesis

C to transport amino acids for the growth of new leaves

D to transport starch to all parts of a plant

16 What is a description of transpiration?

A exchange of gases between the leaf and the atmosphere

B loss of water vapour from the leaves and stems of a plant

C movement of water from the roots to the leaves

D movement of water through the cells of the leaf

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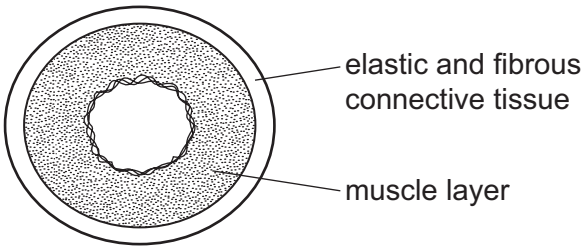
17 What happens as the blood flows from the atria into the ventricles of the heart?

	atrioventricular valves	muscle wall of the atria	muscle wall of the ventricles	semi-lunar valves
A	close	relax	contract	open
B	close	relax	relax	open
C	open	contract	contract	close
D	open	contract	relax	close

18 The diagram shows a cross-section through a human blood vessel.



Which type of blood vessel does the diagram show?

A an artery

B a capillary

C a vein

D a ventricle

19 Which is a mechanical barrier to pathogens?

A acid in the stomach

B hairs in the nose

C mucus in the trachea

D phagocytosis in the blood

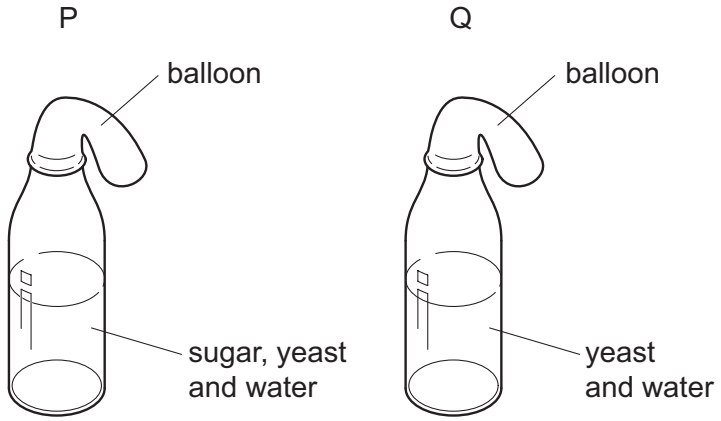
20 The table shows some of the changes that occur during breathing.

	from contracted to relaxed	from relaxed to contracted
diaphragm	P	X
external intercostals	Q	Y
internal intercostals	R	Z

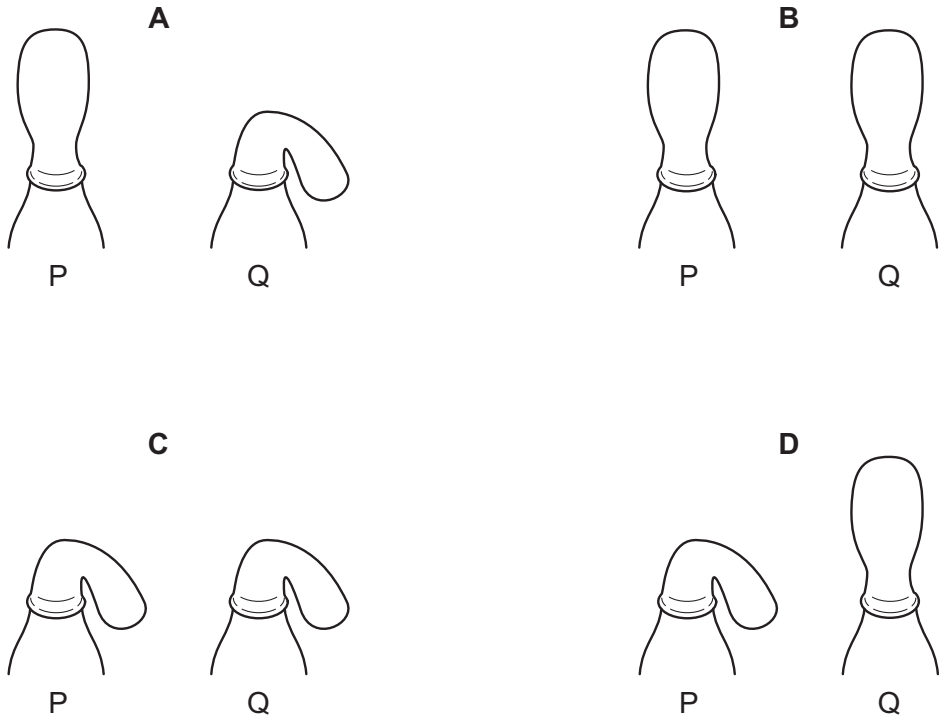
Which changes occur to cause inspiration?

A P, Q and Z **B** X, Q and R **C** X, Y and R **D** X, Y and Z

21 In an experiment to investigate anaerobic respiration, two bottles are set up in a warm room, as shown.



What would happen to each balloon after one day?



22 Vigorous exercise can cause an oxygen debt.

Which process removes the oxygen debt?

A aerobic respiration of lactic acid in the liver

B a decrease in breathing rate

C a decrease in heart rate

D an increase in blood supply to the skin

23 What is the most important function of sweating?

A to remove excess heat from the body

B to remove excess salts from the body

C to remove excess urea from the body

D to remove excess water from the body

24 Which row shows the function of rod cells?

	have greater sensitivity to light	give colour vision
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

25 The diagram shows a person sweating in hot weather.

What part is played by sweat glands during the process of sweating?

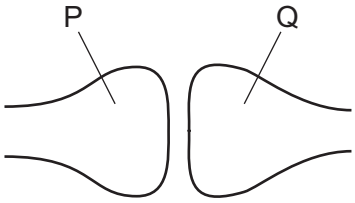
A effector

B receptor

C sense organ

D stimulus

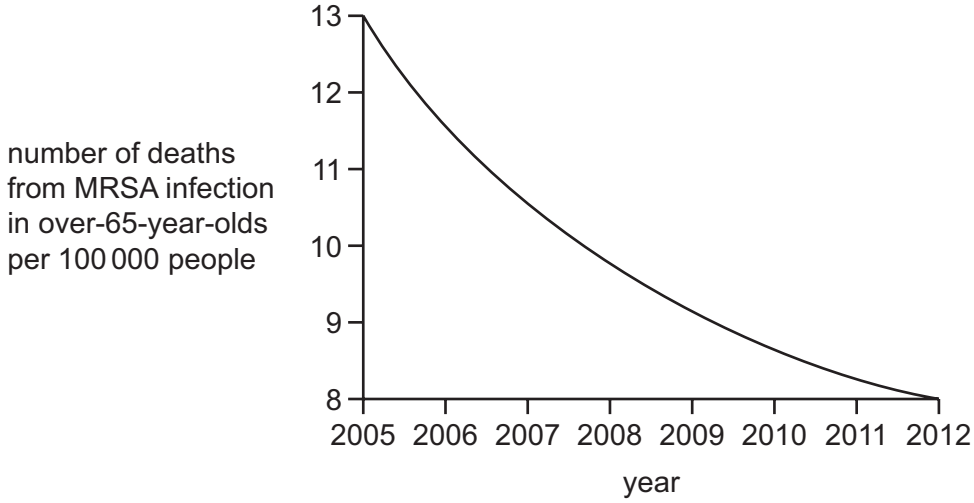
26 The diagram shows a synapse in a reflex arc.



What are the identities of the two neurones and in which direction does the neurotransmitter pass?

	neurone P	neurone Q	direction of passage of neurotransmitter
A	motor	relay	P → Q
B	motor	sensory	P → Q
C	relay	motor	Q → P
D	relay	sensory	Q → P

27 The graph shows the number of deaths from MRSA infection per 100 000 people in a population of over-65-year-olds from 2005 to 2012.



What is a possible explanation for the changes shown in the graph?

A a decrease in the size of the population of over-65-year-olds

B antibiotics do not affect viruses

C more effective antibiotics are being used to treat infected people

D over-65-year-olds are immune to MRSA infection

28 After fertilisation, how many chromosomes are in the zygote?

A half as many as in an ovum

B the same as in an ovum

C the same as in a sperm

D twice as many as in a sperm

29 Which environmental factor is **not** always a requirement for seed germination?

A light

B oxygen

C suitable temperature

D water

30 In some plants, H is the dominant allele for hairy stems and h is the recessive allele for smooth stems.

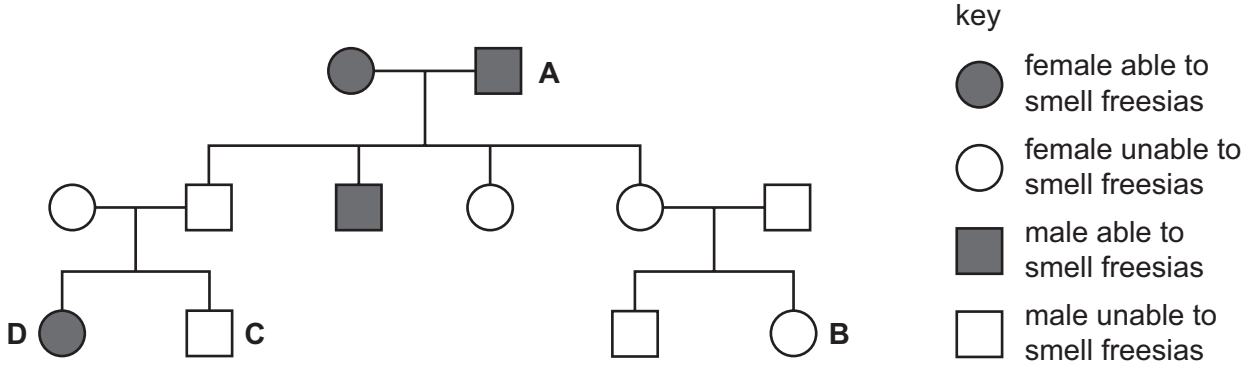
A pair of these plants produce 37 offspring, 18 with hairy stems and 19 with smooth stems.

What are the most likely genotypes of the parents?

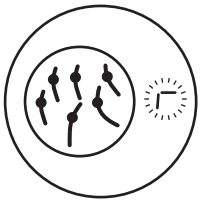
A HH × HH **B** Hh × Hh **C** Hh × hh **D** hh × hh

31 The family tree shows the inheritance of the ability to smell flowers called freesias. The allele for the ability to smell freesias is dominant.

Which individual's symbol is **not** correct?



32 The diagram shows a cell from an organism at the end of meiosis.



What is the diploid number for cells from this organism?

A 3 **B** 6 **C** 12 **D** 24

33 When growing millet, farmers choose seeds from high-yielding plants.

Which biological practice is this an example of?

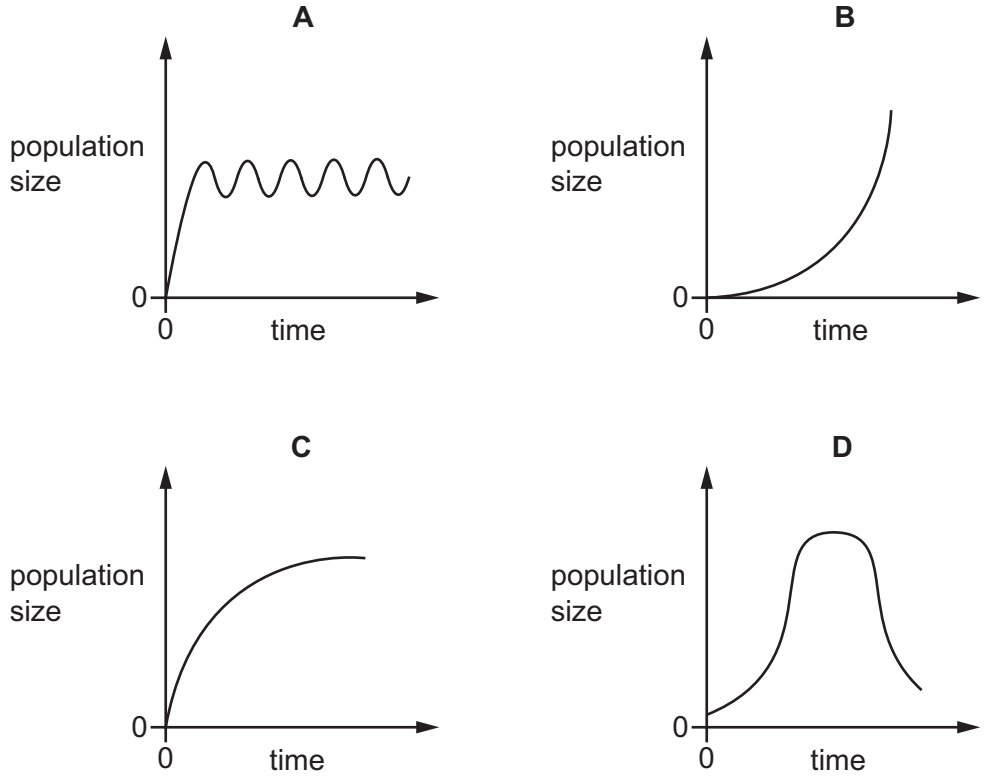
A adaptation

B artificial selection

C evolution

D natural selection

34 Which graph shows the growth of a population where there are no limiting factors?



35 What is defined as ‘all of the populations of different species in an ecosystem’?

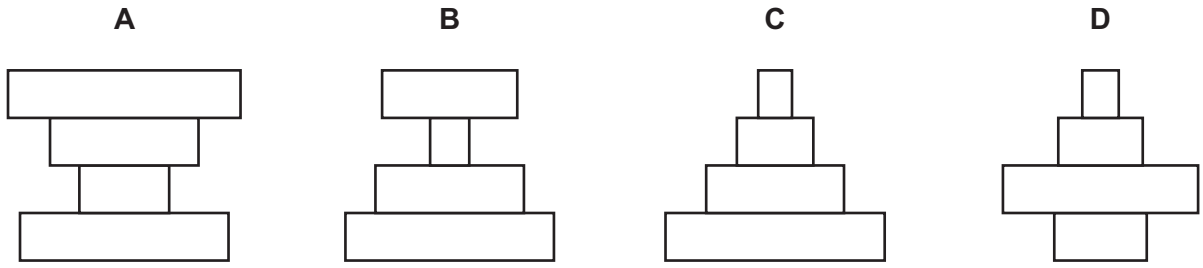
A community

B environment

C habitat

D trophic level

36 Which pyramid of numbers has more herbivores than producers?



37 Why are bacteria useful in biotechnology and genetic engineering?

A Bacteria do not have cell vacuoles.

B Bacteria do not have mitochondria.

C Bacteria have cell walls.

D Bacteria share their genetic code with all other organisms.

38 Ligase enzymes are used in genetic engineering to

A cut open plasmid DNA.

B insert plasmids into bacteria.

C isolate the DNA making up a human gene.

D join human DNA to plasmid DNA.

39 The action of which type of bacteria would cause soil to be lacking in nitrates?

A aerobic

B denitrifying

C nitrifying

D nitrogen fixing

40 What is used to help sustain fish stocks?

	education	legal quotas	eating more fish	restocking
A	✓	✓	✓	✗
B	✓	✓	✗	✓
C	✓	✗	✓	✓
D	✗	✓	✓	✓

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