Surname		Other Names	
Centre Number			Candidate Number				
Candidate Signature									

General Certificate of Secondary Education
Winter 2004

AQA
ASSESSMENT and QUALIFICATIONS ALLIANCE

BIOLOGY A (MODULAR) 346019
Moving and Feeding (Module 19)

Thursday 18 November 2004 Morning Session

In addition to this paper you will require:
- a black ball-point pen;
- an answer sheet.

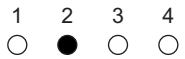
You may use a calculator.

Time allowed: 30 minutes

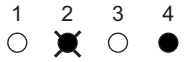
Instructions
- Fill in the boxes at the top of this page.
- Check that your name, candidate number and centre number are printed on the separate answer sheet.
- Check that the separate answer sheet has the title "Moving and Feeding" printed on it.
- Attempt **one Tier only**, **either** the Foundation Tier **or** the Higher Tier.
- Make sure that you use the correct side of the separate answer sheet; the Foundation Tier is printed on one side and the Higher Tier on the other.
- Answer **all** the questions for the Tier you are attempting.
- Record your answers on the separate answer sheet only. Rough work may be done on the question paper.

Instructions for recording answers

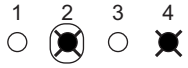
- Use a **black ball-point pen**.
- For each answer **completely fill in the circle** as shown:



- Do **not** extend beyond the circles.
- If you want to change your answer, **you must** cross out your original answer, as shown:



- If you change your mind about an answer you have crossed out and now want to choose it, draw a ring around the cross as shown:



Information
- The maximum mark for this paper is 36.

Advice
- Do **not** choose more responses than you are asked to. You will lose marks if you do.
- Make sure that you hand in both your answer sheet and this question paper at the end of the test.
- If you start to answer on the wrong side of the answer sheet by mistake, make sure that you cross out **completely** the work that is not to be marked.

You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.

The Higher Tier starts on page 14 of this booklet.

FOUNDATION TIER

SECTION A

Questions **ONE** to **FIVE**.

In these questions match the words in the list with the numbers.

Use **each** answer only **once**.

Mark your choices on the answer sheet.

QUESTION ONE

The diagram shows a section through the shoulder joint.

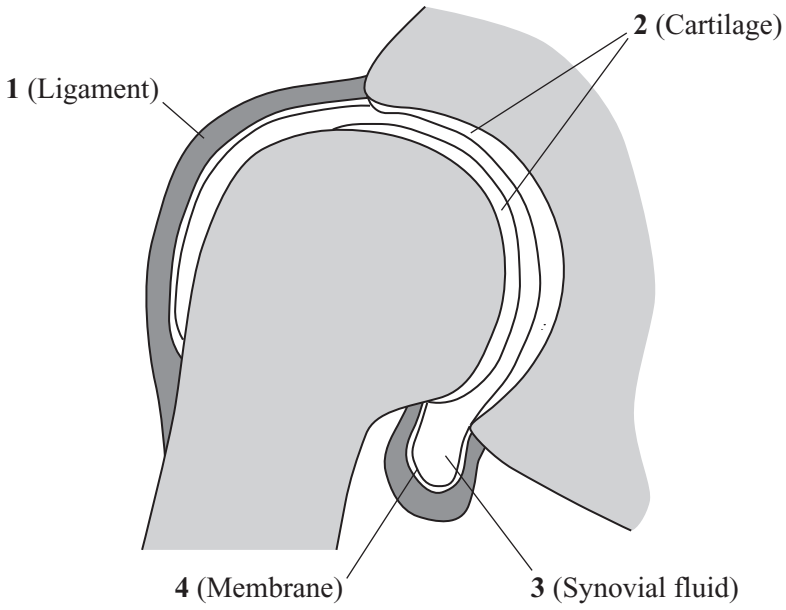
Match words from the list with the labels **1–4** in the diagram.

holds the bones together

makes surfaces slippery

secretes a fluid

stops bones rubbing together



QUESTION TWO

Match words from the list with the numbers **1–4** in the sentences.

cilia

gills

mouth

plankton

Mussels are a type of shellfish that live attached to rocks.

Mussels move water through their bodies using hair-like . . . . . **1** . . . . . .

They feed on . . . . . **2** . . . . . from the water.

The mussels filter food from the water with their . . . . . **3** . . . . . .

Other hairs then take the food to the mussel's . . . . . **4** . . . . . .

QUESTION THREE

The diagram shows teeth in the lower jaw of a human.

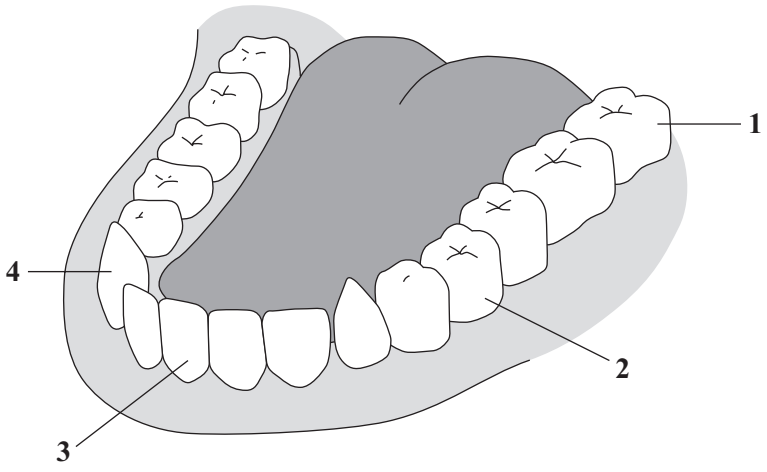
Match words from the list with the teeth labelled **1–4** on the diagram.

canine tooth

incisor tooth

molar tooth

premolar tooth



QUESTION FOUR

The table is about things which help fish to swim.

Match words from the list with the numbers **1– 4** in the table.

backwards push in the water

streamlined shape

tail fin

zig-zag arrangement of muscles

	How it helps the fish to swim
1	provides a large surface area
2	produces forward movement
3	produces wave-like movements
4	reduces water resistance

QUESTION FIVE

The drawing shows the muscles attached to the bones of a human leg.

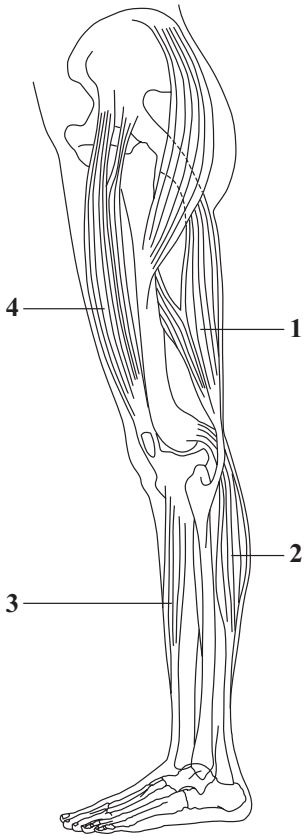
Match words from the list with the muscles labelled **1–4** on the drawing.

lifts the toes

pulls the lower leg backwards

pulls the toes downwards

straightens the leg at the knee



TURN OVER FOR THE NEXT QUESTION

SECTION B

Questions **SIX** and **SEVEN**.

In these questions choose the best **two** answers.

Do **not** choose more than two.

Mark your choices on the answer sheet.

QUESTION SIX

Butterflies and mosquitoes suck up their food through a proboscis. Butterflies feed on sugar solutions from the base of flowers.

Which **two** of the following structures are likely to be found in mosquitoes but **not** in butterflies?

hollow proboscis

muscles to suck up food

pointed proboscis

saliva containing a substance that stops blood clotting

stomach to digest food

QUESTION SEVEN

The drawing shows the skull of an animal which eats grass.

Which **two** of the following features are **not** present in the upper jaw of this animal?

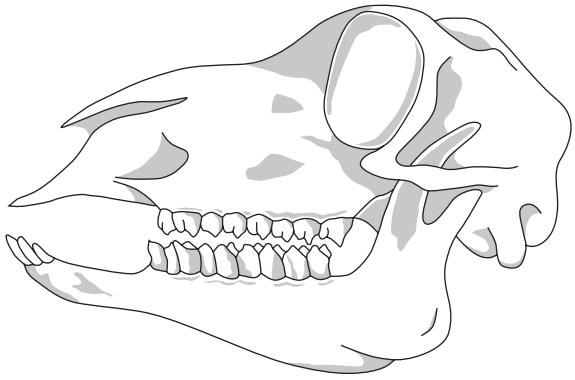
canine teeth

grinding teeth

incisor teeth

molar teeth

premolar teeth



TURN OVER FOR THE NEXT QUESTION

SECTION C

Questions **EIGHT** to **TEN**.

Each of these questions has four parts.

In each part choose only **one** answer.

Mark your choices on the answer sheet.

QUESTION EIGHT

The tables show the effect of a three month training programme on a student.

Table 1 shows the effect of the training programme on the volume of blood flowing to parts of the body.

Table 2 shows the effect of the training programme on the amount of oxygen taken into the blood.

	Volume of blood in litres per minute	
	Flowing to muscles	Flowing to rest of body
At rest (before the training programme)	6.0	5.5
Exercising (at the start of the training programme)	20.0	5.0
Exercising (at the end of the training programme)	30.0	4.5

Table 1

	Maximum oxygen uptake in cm^3 per minute
Exercising (at the start of the training programme)	2200
Exercising (at the end of the training programme)	2970

Table 2

8.1 What is the effect of the training programme on blood flow to the muscles when exercising?

A Blood flow decreases by 0.5 litres per minute

B Blood flow remains the same

C Blood flow increases by 10 litres per minute

D Blood flow increases by 14 litres per minute

8.2 The change in maximum oxygen uptake as a result of the training programme is . . . . .

A less than 800 cm^3 per minute.

B 970 cm^3 per minute.

C between 2200 cm^3 and 2970 cm^3 per minute.

D more than 2970 cm^3 per minute.

8.3 The oxygen is used by muscle tissue to . . . . .

A keep the muscles warm.

B react with glucose to release energy.

C speed up the removal of heat.

D stop muscles becoming toned.

8.4 Which of the following best explains the figures in **Table 1** for the student before he started the training programme?

A The amount of blood flowing to the lungs decreases during exercise, to allow more blood to flow to the muscles

B The blood flow to the rest of the body stops during exercise

C The heart beats more often during exercise, to send more blood per minute to the muscles

D The total amount of blood in the body increases during exercise

TURN OVER FOR THE NEXT QUESTION

QUESTION NINE

Birds have features which help them to fly.

9.1 The streamlined shape of a bird . . . . .

A increases stability.

B increases the surface area.

C reduces resistance from the air.

D reduces weight.

9.2 The flight feathers of a bird . . . . .

A are thin and weak to reduce weight.

B increase strength.

C provide a large surface area.

D reduce lift.

9.3 Bird bones are honey-combed to . . . . .

A allow air to pass through them.

B help them to bend.

C increase speed.

D make them light but strong.

9.4 Birds push down their wings when they are flying. This . . . . .

A increases the surface area.

B provides lift.

C pushes the bird down.

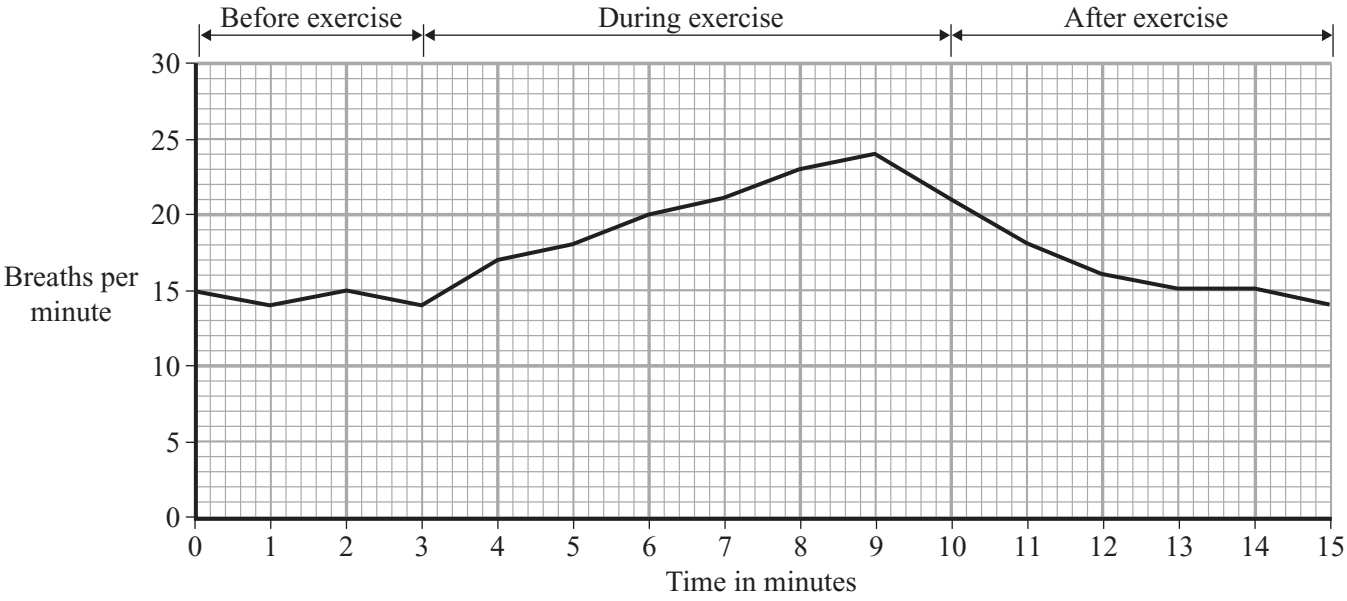
D reduces the surface area.

NO QUESTIONS APPEAR ON THIS PAGE

TURN OVER FOR THE NEXT QUESTION

QUESTION TEN

The graph shows the breathing rate of a student before, during and after a period of exercise.



10.1 The breathing rate is the same at . . . . .

A 1 minute before the start of the exercise and 5 minutes after the end of the exercise.

B the start of the exercise and 2 minutes after the end of the exercise.

C 1 minute after the start of the exercise and 1 minute after the end of the exercise.

D 2 minutes after the start of the exercise and 1 minute after the end of the exercise.

10.2 What was the increase in the breathing rate between 3 and 8 minutes?

A 2 breaths per minute

B 9 breaths per minute

C 10 breaths per minute

D 24 breaths per minute

10.3 The breathing rate increases during exercise in order to . . . . .

A allow blood to flow to the muscles more quickly.

B provide the muscles with more carbon dioxide.

C slow down the rate of respiration.

D supply the blood with more oxygen.

10.4 During exercise, the muscle tissues involved . . . . .

A become permanently contracted.

B develop muscle tension.

C may become dislocated.

D relax and contract.

END OF TEST

You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.

The Foundation Tier is earlier in this booklet.

HIGHER TIER

SECTION A

Questions **ONE** and **TWO**.

In these questions match the words in the list with the numbers.

Use **each** answer only **once**.

Mark your choices on the answer sheet.

QUESTION ONE

The drawing shows the muscles attached to the bones of a human leg.

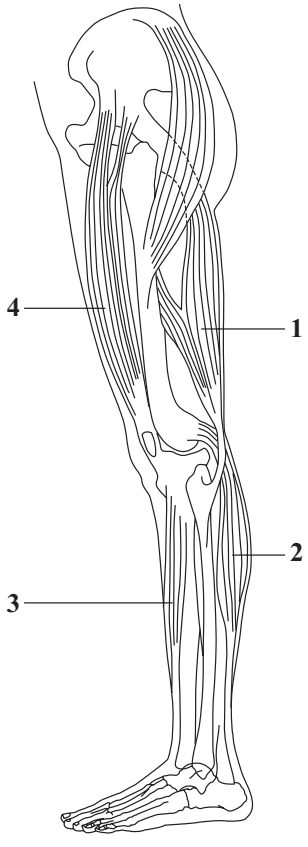
Match words from the list with the muscles labelled **1– 4** on the drawing.

lifts the toes

pulls the lower leg backwards

pulls the toes downwards

straightens the leg at the knee



QUESTION TWO

The table is about animal feeding.

Match words from the list with the numbers **1–4** in the table.

carnivore

herbivore

mutualism

parasite

	Description
1	an animal which eats only plants
2	an animal which eats other animals
3	an organism living in or on another and causing harm
4	when two organisms receive benefit by living together

TURN OVER FOR THE NEXT QUESTION

SECTION B

Questions **THREE** and **FOUR**.

In these questions choose the best **two** answers.

Do **not** choose more than two.

Mark your choices on the answer sheet.

QUESTION THREE

The drawing shows the skull of an animal which eats grass.

Which **two** of the following features are **not** present in the upper jaw of this animal?

canine teeth

grinding teeth

incisor teeth

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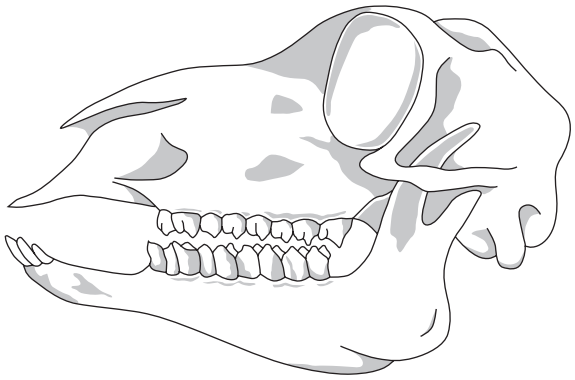

QUESTION FOUR

Bones have a number of properties which allow them to resist forces and support the body.

Which **two** of the following are properties of bones?

protein in bones makes them very hard

the presence of living cells prevents brittleness

they are flexible

they can be compressed

they contain deposits of calcium phosphate

TURN OVER FOR THE NEXT QUESTION

SECTION C

Questions **FIVE** to **TEN**.

Each of these questions has four parts.

In each part choose only **one** answer.

Mark your choices on the answer sheet.

QUESTION FIVE

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Table 1

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Table 2

5.1 What is the effect of the training programme on blood flow to the muscles when exercising?

A Blood flow decreases by 0.5 litres per minute

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5.2 The change in maximum oxygen uptake as a result of the training programme is . . . . .

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TURN OVER FOR THE NEXT QUESTION

QUESTION SIX

Birds have features which help them to fly.

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C reduces resistance from the air.

D reduces weight.

6.2 The flight feathers of a bird . . . . .

A are thin and weak to reduce weight.

B increase strength.

C provide a large surface area.

D reduce lift.

6.3 Bird bones are honey-combed to . . . . .

A allow air to pass through them.

B help them to bend.

C increase speed.

D make them light but strong.

6.4 Birds push down their wings when they are flying. This . . . . .

A increases the surface area.

B provides lift.

C pushes the bird down.

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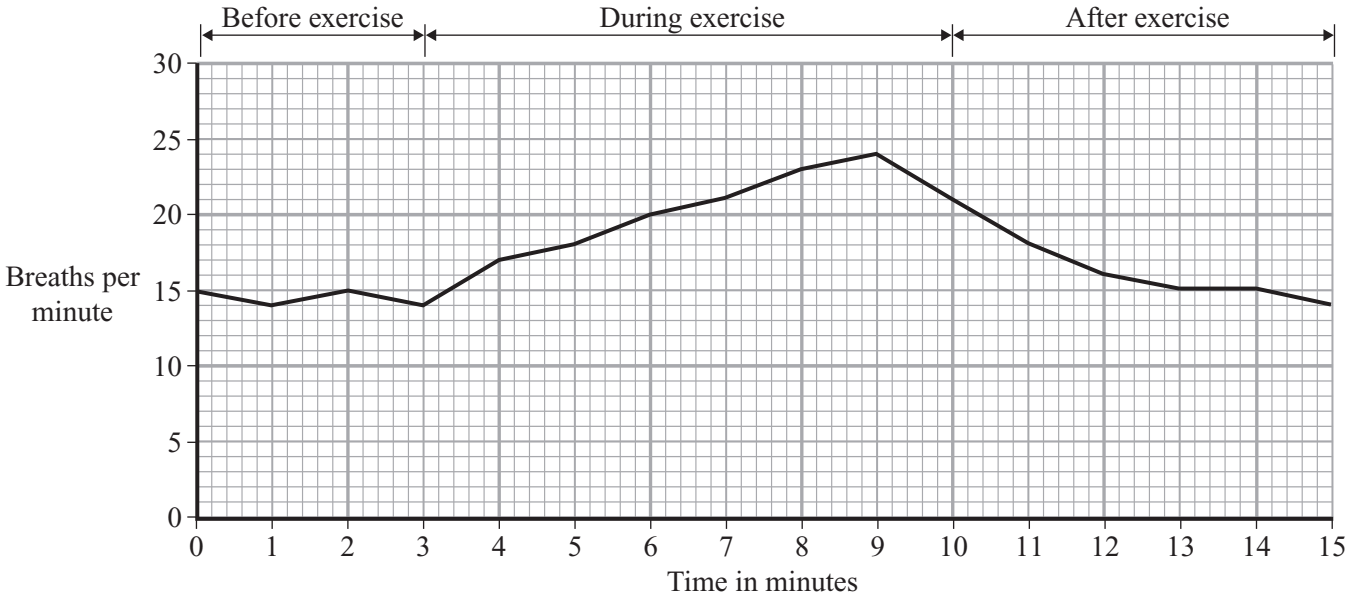
NO QUESTIONS APPEAR ON THIS PAGE

TURN OVER FOR THE NEXT QUESTION

QUESTION SEVEN

The graph shows the breathing rate of a student before, during and after a period of exercise.



7.1 The breathing rate is the same at . . . . .

A 1 minute before the start of the exercise and 5 minutes after the end of the exercise.

B the start of the exercise and 2 minutes after the end of the exercise.

C 1 minute after the start of the exercise and 1 minute after the end of the exercise.

D 2 minutes after the start of the exercise and 1 minute after the end of the exercise.

7.2 What was the increase in the breathing rate between 3 and 8 minutes?

A 2 breaths per minute

B 9 breaths per minute

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D 24 breaths per minute

7.3 The breathing rate increases during exercise in order to . . . . .

A allow blood to flow to the muscles more quickly.

B provide the muscles with more carbon dioxide.

C slow down the rate of respiration.

D supply the blood with more oxygen.

7.4 During exercise, the muscle tissues involved . . . . .

A become permanently contracted.

B develop muscle tension.

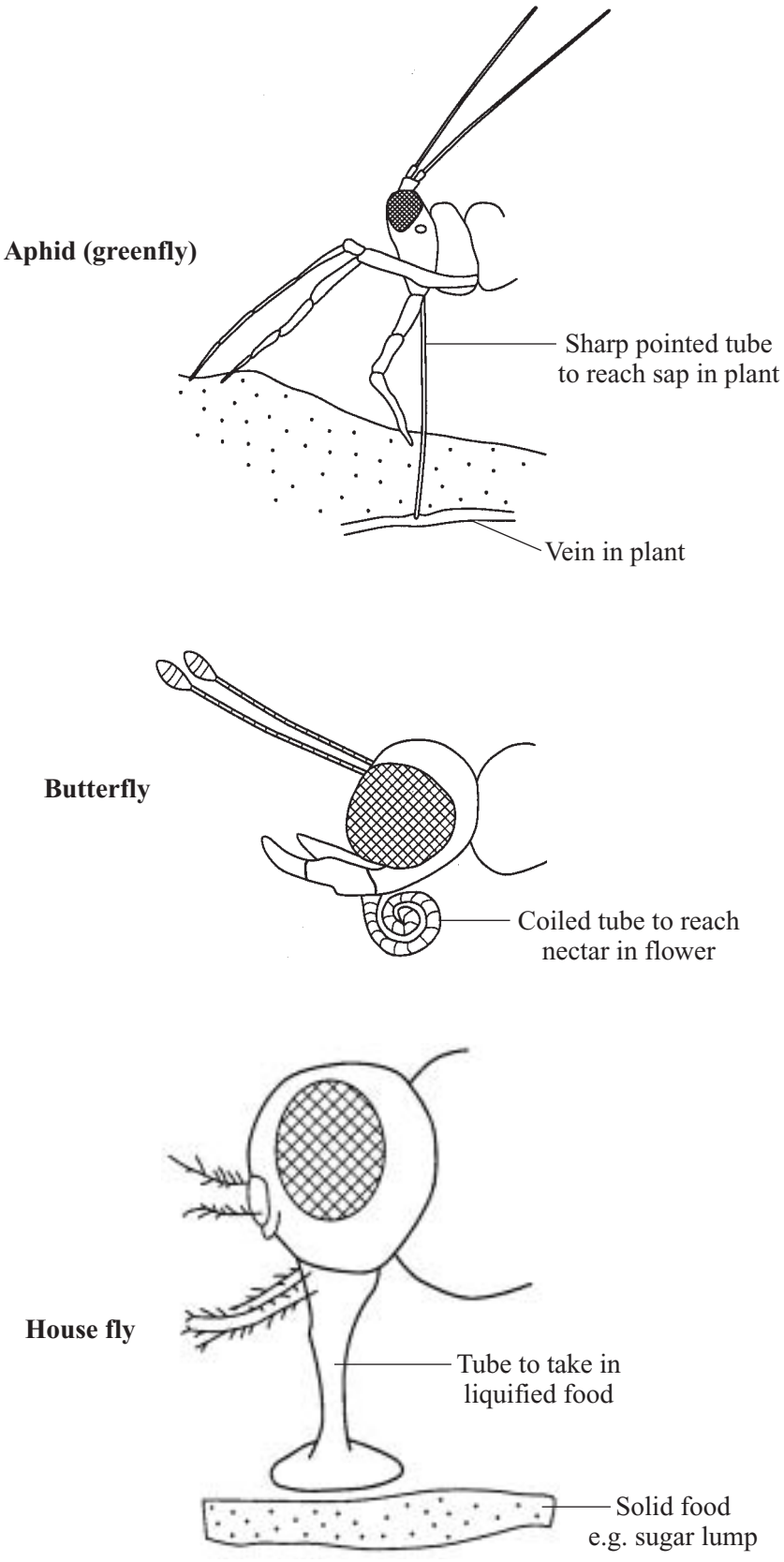
C may become dislocated.

D relax and contract.

TURN OVER FOR THE NEXT QUESTION

QUESTION EIGHT

The diagram shows a side view of the head and mouth parts of three insects.



8.1 Which method of feeding is used by all three insects?

A Carnivorous

B Filter feeding

C Parasitic

D Sucking fluids

8.2 Which insect listed below has mouth parts that penetrate plant stems?

A Aphid

B Butterfly

C Housefly

D Mosquito

8.3 Which insect listed below is most likely to secrete digestive enzymes onto its food before it ingests it?

A Aphid

B Butterfly

C Housefly

D Mosquito

8.4 Which insect listed below transmits parasites directly into the human body?

A Aphid

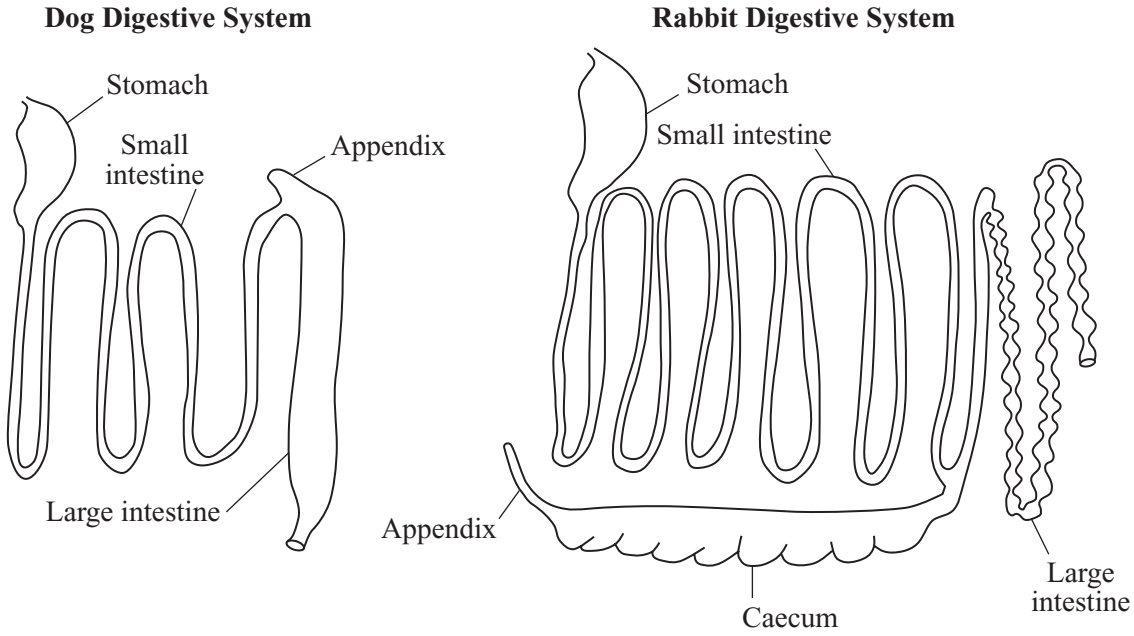
B Butterfly

C Housefly

D Mosquito

QUESTION NINE

The diagram shows the digestive systems of a small dog and a rabbit. They are drawn to the same scale.



9.1 Compared with the rabbit, the dog . . . . .

A has a shorter small intestine but a larger stomach.

B lacks a caecum.

C has a longer appendix.

D has a longer large intestine.

9.2 The rabbit's caecum contains cellulose-digesting bacteria. Digestion of cellulose produces . . . . .

A amino acids.

B fats.

C proteins.

D sugars.

9.3 In cows, cellulose-digesting bacteria are found in . . . . .

A the stomach.

B the large intestine.

C the rumen.

D the appendix.

9.4 To absorb all the food which is digested in the caecum, rabbits must . . . . .

A eat their own faeces.

B leave food in the stomach for a long time.

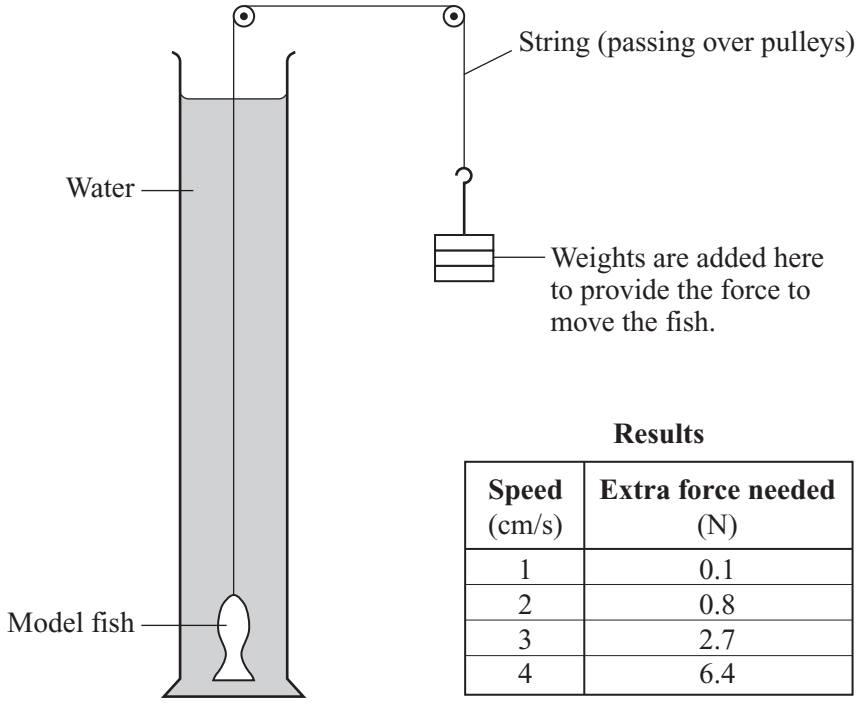
C pass food from the caecum to the small intestine.

D pass food from the stomach back to the mouth.

TURN OVER FOR THE NEXT QUESTION

QUESTION TEN

Some students investigated the force needed to move a model fish through water at different speeds.



Results

Speed (cm/s)	**Extra force needed** (N)
1	0.1
2	0.8
3	2.7
4	6.4

10.1 The force needed to move the model fish . . . . .

A is independent of the speed.

B is proportional to the speed.

C is proportional to the square of the speed.

D is proportional to the cube of the speed.

10.2 The drag coefficient of the model fish in water can be calculated as: $\frac{a}{b}$

where a = force needed to move a model fish at a certain speed
b = force needed to move a flat disc with the same cross-sectional area at the same speed

The students want to find the drag coefficient of the model fish shown on the opposite page.
They make a disc, with the same cross-sectional area and the same mass as the fish, move through water at 2 cm/s.
This needs a force of 2.5 N.

What is the drag coefficient of the model fish?

A 0.25

B 0.32

C 1.25

D 2.5

10.3 For a model fish to have a smaller drag coefficient, it must . . . . .

A have a larger area of muscle.

B have a larger tail fin.

C have a more streamlined shape.

D have fins like a real fish.

10.4 The force needed to move a fish through water is generated by . . . . .

A contraction of the muscles.

B rapid movement of the paired fins.

C the swim bladder.

D the zig-zag movement of the fish.

END OF TEST