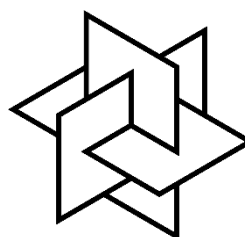


First name	
Last name	
School	

CE AT 13+

SCIENCE



ISEB
Independent Schools
Examinations Board

CORE BIOLOGY

Specimen Paper

Date

Time allowed: 40 minutes

Instructions

Answer **all** the questions.

Information

You may use a calculator.

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1. Underline the word or phrase which best completes the following:

(a) The chemical used to stain the nuclei of cheek cells is

glucose iodine methylene blue water

(b) Osteoporosis causes weak bones. It is caused by a lack of

calcium iron magnesium vitamin C

(c) The structure formed after fertilisation is

a baby an egg a fetus a sperm

(d) When people breathe in, air is drawn into their

esophagus intestines heart lungs

(e) In plants, water is transported from the roots to the leaves for

photosynthesis reproduction movement respiration

(f) In plants, light is absorbed by

carbohydrates chlorophyll fats protein

(g) The photograph below is *Euglena*, which lives in freshwater ponds. It is an example of



a multicellular organism an organ an organelle a unicellular organism

(h) When estimating the total number of plants in a field, you should

avoid places where there are no plants growing

place quadrats at regular intervals in the field


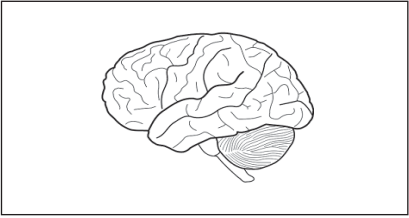

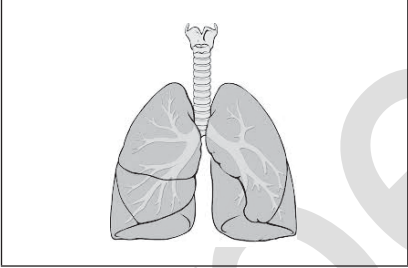
place quadrats randomly in the field

place quadrats where there are the greatest number of plants

[8]

Specimen

2. Identify each of the pictures below as a cell, organ, organ system or organism. Draw a straight line from each picture to the correct box.

picture	description
	<div>cell</div>
	<div>organ</div>
	<div>organ system</div>
	<div>organism</div>

[3]

3. The picture below shows an insect collecting pollen from a flower.



Below is a list of words which identify important parts of a flower.

Use these words in your answers to the following questions.

anther	male nucleus	ovule	pollen	pollen tube	stigma
---------------	---------------------	--------------	---------------	--------------------	---------------

- (a) Name the part of the flower which makes pollen.

..... [1]

The insect pollinates a flower.

- (b) Describe how the insect pollinates a flower.

.....

..... [2]

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4. People show variation in many characteristics such as eye colour, hair colour, height, body mass and blood groups.



- (a) For the characteristics identified above, list those which show continuous variation and those which show discontinuous variation.

continuous variation: [1]

discontinuous variation:

..... [2]

The height and body mass of a group of five boys were recorded.

The results are shown below.

boy	height, in cm	body mass, in kg
Jack	164	52
Billy	152	49
Adam	156	45
Aran	110	43
Toby	100	40
mean		

- (b) (i) Complete the table by calculating the mean height and mass for these students.
(Give your answers to one decimal place.) [2]

- (ii) Calculate the range of height in this group of boys.

..... cm [1]

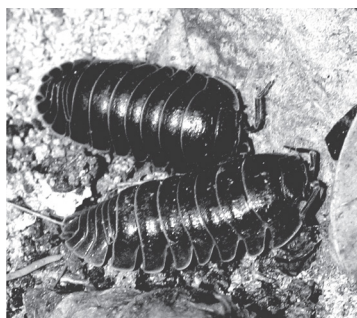
The mean height of five-year-old boys in London increased by 7.5 cm between the years 1900 and 1966.

- (c) Suggest **one** reason for this large increase in the mean height of five-year-old boys in London.

..... [1]

5. A science class is investigating the behaviour of woodlice

The photograph below shows woodlice.



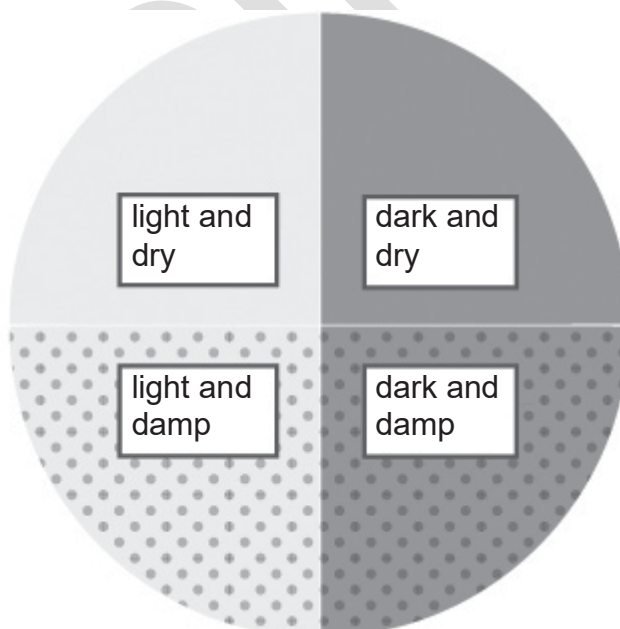
Woodlice are arthropods.

(a) Give **two** characteristics of an arthropod.

1: [1]

2: [1]

60 woodlice were put into a choice chamber with four different environments.



After 15 minutes, the number of woodlice in each chamber was counted.

The class repeated the experiment four times.

The results for each of the four experiments are shown in the table opposite.

experiment number	numbers of woodlice in each environment			
	light and dry	light and damp	dark and dry	dark and damp
1	0	0	4	56
2	1	4	8	47
3	2	2	7	49
4	1	2	5	52
total		8		204
mean	1	2	6	51

(b) Calculate the missing totals to complete the table.

[1]

(c) Describe the results of the experiment.

.....

.....

.....

.....

.....

.....

.....

[4]

(d) Suggest why it was helpful to repeat the experiment four times.

.....

.....

[2]

6. In wine-growing regions, warm temperatures cause high rates of photosynthesis in the plants that produce the grapes which make wine.

Wine contains alcohol.



- (a) (i) Name **one** other factor which increases the rate of photosynthesis.

..... [1]

- (ii) Suggest why it is an advantage to wine growers to have high rates of photosynthesis in the plants which make grapes.

.....
.....
.....
.....
..... [2]

Alcohol is made during fermentation.

(b) (i) Name the organism which is used to make alcohol in fermentation.

..... [1]

(ii) Name the kingdom to which this organism belongs.

..... [1]

(iii) Complete the word equation for fermentation.

glucose \longrightarrow + + some energy [2]

(c) Explain why it is not a good idea to drink too much alcohol.

..... [1]

(d) Apart from not drinking too much alcohol, explain **two** other lifestyle choices a person can make in order to be healthy.

1:

2: [2]

7. The photograph below shows a polar bear living in the Arctic region.



(a) Suggest **two** ways in which the polar bear has adapted to living in the Arctic region.

1:

2: [2]

In the summer months, the icecaps are melting at an increasing rate.

Polar bears need the ice to enable them to hunt seals.

If the ice melts too early in the summer, then hunting becomes more difficult as they have to travel further to hunt.

(b) Suggest how melting ice may affect the survival of polar bears.

.....

..... [2]

As well as seals, polar bears will eat other foods such as berries, eggs and plants.

Seals eat cod fish.

Cod eat smaller fish, which feed on microscopic plants.

(c) (i) Use this information to draw a food chain for the Arctic.

[2]

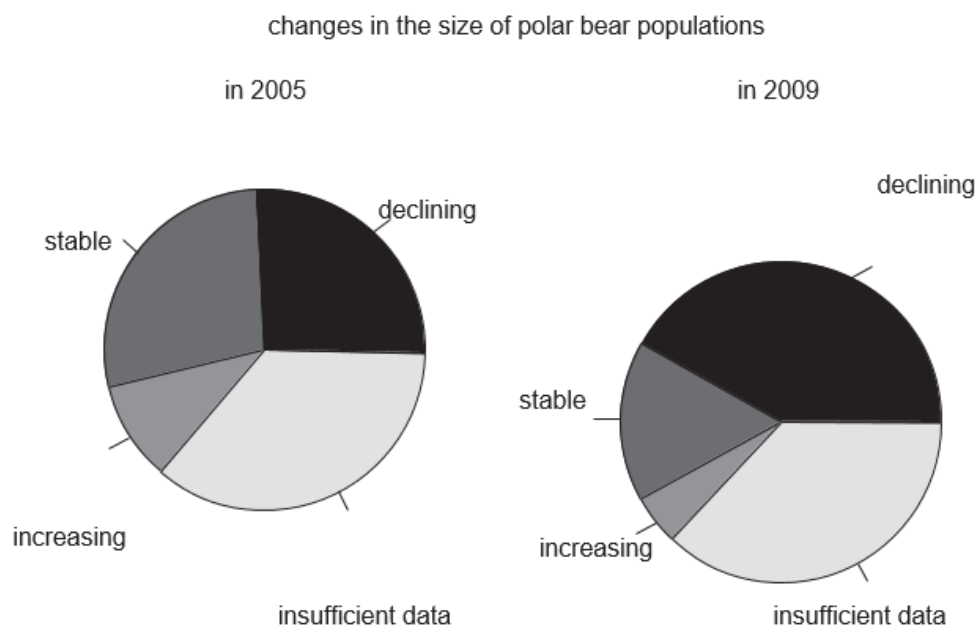
(ii) Name the source of energy for this food chain.

..... [1]

There are a number of different populations of polar bears distributed through the Arctic region.

Changes in sizes of the populations of polar bears in the Arctic were estimated in 2005 and again in 2009.

The results are shown below.



- (d) Explain how these results support the hypothesis that the population of polar bears is under threat.

.....

.....

..... [2]

Hungry polar bears sometimes visit towns in the Arctic, looking for food.

They are often hunted and shot dead.

- (e) Suggest why local residents might hunt and shoot polar bears which visit their towns.

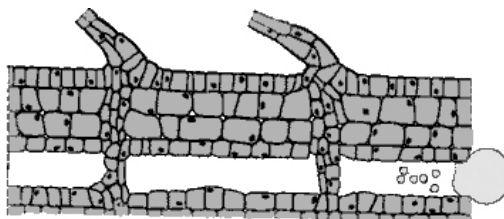
.....

.....

..... [2]

8. When light shines onto a piece of Canadian pondweed, bubbles of gas are given off. This is shown in the diagram below, which represents a section through the stem of a piece of Canadian pondweed.

(The leaves have been removed.)



These gas bubbles contain a mixture of gases, as shown in the table below.

gas	percentage of gas (%)	
	bubbles from Canadian pondweed	air bubble
oxygen	50.00	20.00
carbon dioxide	6.00	0.03
nitrogen	44.00	79.97

- (a) (i) Describe and explain the difference in the concentration of oxygen in the bubbles between Canadian pondweed and air.

.....

.....

..... [2]

- (ii) Describe the evidence which suggests that Canadian pondweed is respiring.

.....

.....

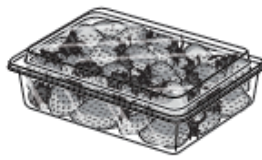
..... [2]

- (b) Explain why green plants, such as Canadian pondweed, are important organisms in river ecosystems.

.....

..... [2]

9. Serena and Tom want to find the best way to keep strawberries fresh. They put fresh strawberries in three types of container, as shown below.



A: plastic box, with lid



B: sealed plastic bag



C: on a tray, open to air

Serena and Tom keep the strawberries in a warm room.

They observe the strawberries every day, to see when the strawberries become soft and wet (soggy) or covered in white mould caused by a fungus (mouldy).

Their observations are shown below.

type of package	number of days until the strawberries became soggy or covered in white mould	observations
A: plastic box, with lid	4	soggy and mouldy
B: sealed plastic bag	5	soggy, but not mouldy
C: on tray, open to air	2	soggy and mouldy

- a) Name the independent variable in this experiment.

..... [1]

- b) Write a conclusion from these results.

.....

 [2]

(Total marks: 60)

Specimen