

Name _____ Class _____ Date _____

- 1 a Draw a line to connect each organ system with its function. One has been done for you.

Organ system	Function
circulatory system	removes poisonous waste from the body
urinary system	detects changes in the surroundings
locomotor system	carries oxygen and nutrients around the body
nervous system	moves air in and out of the body
breathing system	supports the body and allows movement

(2)

- b Name the system that has this function.

breaks down food and takes nutrients from it into the blood

(1)

(Total for Question 1 = 3 marks)

- 2 A farmer wants to breed cows that will produce more milk. He chooses the cows that produce most milk. Only these cows will mate with a male.

What is this an example of? Tick *one* box.

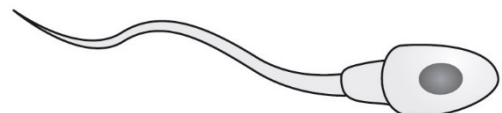
- ☐ A asexual reproduction
- ☐ B selective breeding
- ☐ C natural selection
- ☐ D survival of the fittest

(1)

(Total for Question 2 = 1 mark)

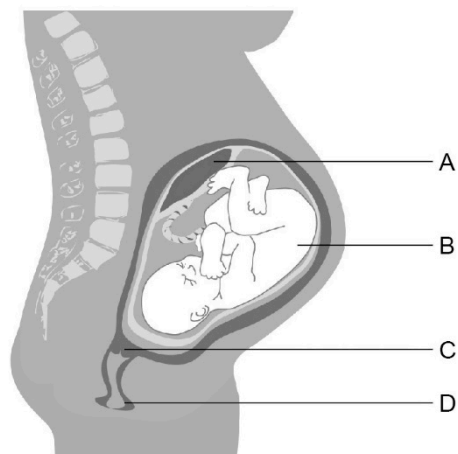
- 3 The diagram shows a human sperm cell.

- a Describe how a sperm cell is adapted to allow it to reach the egg cell when it is inside a female's body.



(2)

- b** The diagram shows a pregnant woman and her unborn baby.



- i** Which letter on the diagram shows the placenta?

- ☐ A
- ☐ B
- ☐ C
- ☐ D

(1)

- ii** Some substances pass from the mother to her baby across the placenta.
Other substances pass from the baby to the mother across the placenta.
Four of the substances are shown in the box below.

oxygen	carbon dioxide	drugs	nutrients
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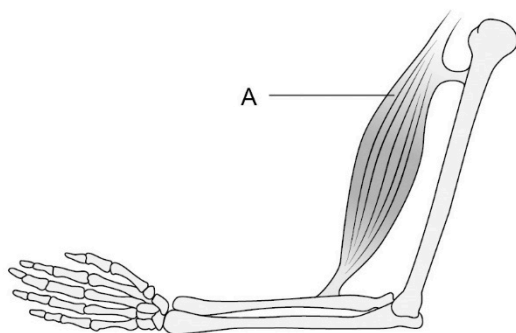
Write each substance in the correct column of the table.

Mainly passes from mother to baby	Mainly passes from baby to mother

(2)

(Total for Question 3 = 5 marks)

- 4 The diagram shows the bones of the human arm with one of the muscles attached, labelled A.



- a i On the diagram, draw the muscle that would straighten the arm. Label it B.

(1)

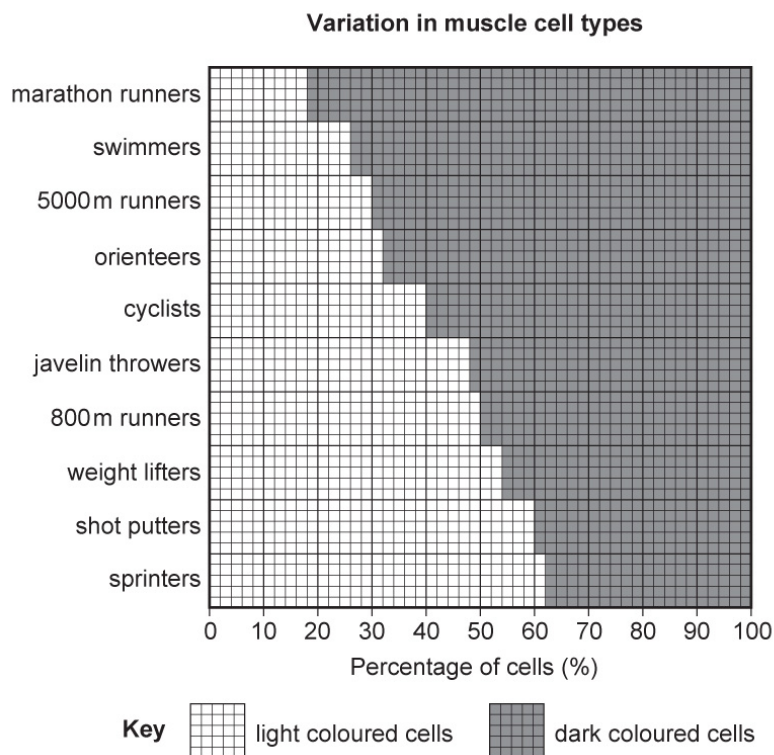
- ii Which statement describes what happens when the arm straightens? Tick *one* box.

- ☐ A Muscle A contracts and muscle B relaxes.
- ☐ B Muscle A contracts and muscle B contracts.
- ☐ C Muscle A relaxes and muscle B relaxes.
- ☐ D Muscle A relaxes and muscle B contracts.

(1)

- b Muscles contain dark coloured cells and light coloured cells.

The graph below shows the percentage of each type of cell found in the muscles of different athletes.



Compare the percentages of light and dark muscle cells in athletes who run different distances.

(3)

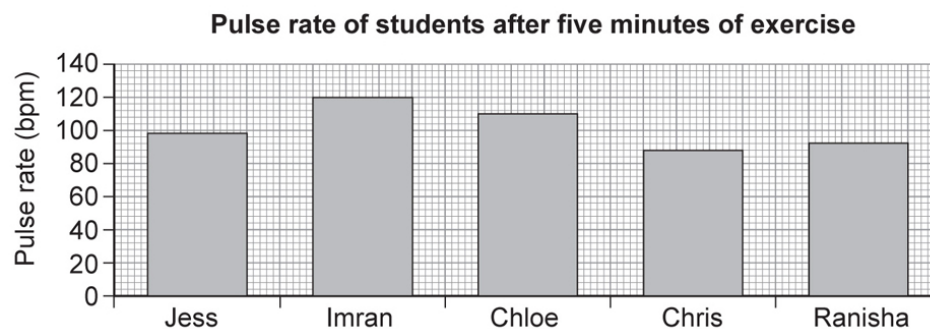
(Total for Question 4 = 5 marks)

- 5** Five students of equal fitness investigate the effect of exercise on their pulse rate.

They have the same resting pulse rate of 65 beats per minute.

The students do five minutes of exercise before measuring their pulse rates again.

Their results are shown in the bar chart.



- a** Calculate the increase in Chloe's pulse rate after the five minutes of exercise.

(2)

- b** Describe the effect of the exercise on the students' pulse rates.

(1)

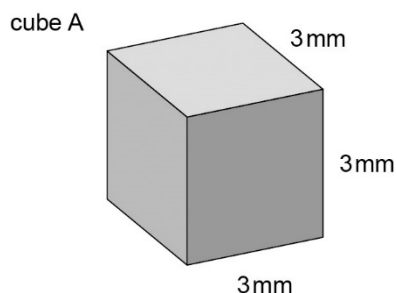
- c** Fitness level and exercise intensity will affect pulse rate.

Give *two* other variables that could affect the pulse rate of the students after exercise.

(2)

(Total for Question 5 = 5 marks)

- 6 a The diagram shows cube A, with sides of 3 mm.



- i Calculate the volume of cube A.

volume = _____ mm³
(1)

- ii Calculate the surface area of cube A.

surface area = _____ mm²
(1)

- b Cube B has sides of 6 mm. The surface area : volume ratio of cube B is 1 : 1.

Compare the surface area : volume ratio of cube B with the surface area : volume ratio of cube A.

(2)

- c Describe how the alveoli of the lungs are adapted to their function.

(3)

(Total for Question 6 = 7 marks)

- 7 a Some drugs are listed in the box below.

caffeine	ecstasy	cocaine	cannabis
heroin	alcohol	nicotine	paracetamol

Write the name of *one* drug from the list in *each* answer box below.

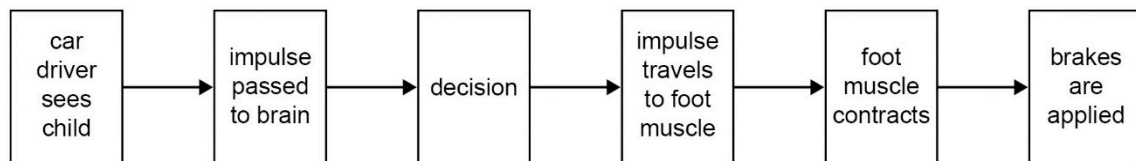
Three legal recreational drugs are:

(2)

- b Explain why it is difficult to stop using addictive drugs.

(2)

- c The flowchart below shows the sequence of events when a child runs out in front of a moving car.



Explain why a driver who has consumed alcohol is more likely to injure the child than a driver who has not consumed alcohol.

(3)

(Total for Question 7 = 7 marks)

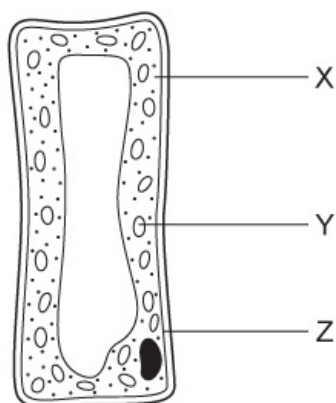
- 8 a Alejandro is looking at some cells using a microscope.

He starts by using a $\times 5$ eyepiece lens and a $\times 10$ objective lens.

Calculate the total magnification he is using.

(1)

- b** The diagram below shows a drawing of a plant leaf cell seen using a microscope.



- i** Name parts X, Y and Z of the leaf cell in the diagram.

X is _____

Y is _____

Z is _____

(3)

- ii** In which part of a cell does aerobic respiration take place? Tick *one* box.

☐ A nucleus

☐ B mitochondria

☐ C vacuole

☐ D none of these

(1)

- c** Write a word equation for aerobic respiration.

(2)

- d** Explain how the cell in the diagram above is adapted to its function.

(2)

e Which statement about photosynthesis and respiration is correct? Tick *one* box.

- ☐ A Plants photosynthesise and respire during daylight hours only.
- ☐ B Plants use oxygen for respiration.
- ☐ C Plants respire in the dark only.
- ☐ D Plants use carbon dioxide for both photosynthesis and respiration.

(1)

(Total for Question 8 = 10 marks)

9 Water fleas are tiny organisms that live in water. You can see a water flea's heart beating if you look at it under a microscope.

In an investigation, Sofia (student A) puts some water fleas into five beakers of water. She keeps the water in each beaker at a different temperature.

She puts some microscope slides in each beaker so that they reach the same temperature as the water fleas in that beaker.

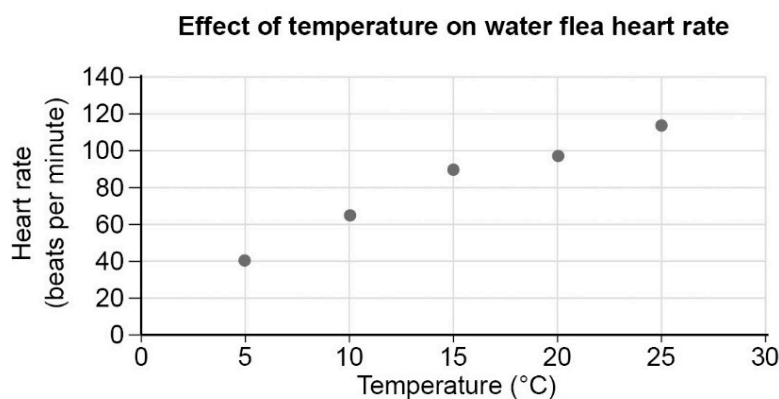
Sofia places one water flea from each beaker on a microscope slide. She counts the number of heartbeats for one minute. The table shows the results.

Student A results	
Temperature (°C)	Heart rate (beats per minute)
5	40
10	65
15	90
20	98
25	115

a Describe what this investigation is testing.

(1)

This graph shows the results.



- b i** Describe the pattern shown in the results.

(1)

- ii** Sofia concludes that a water flea's heart rate is highest at 25 °C.

Give *two* reasons why she cannot be certain of this conclusion.

(2)

- c** Matthias (student B) repeats the investigation. The table shows his results.

Student B results	
Temperature (°C)	Heart rate (beats per minute)
5	70
10	100
15	137
20	198
25	270

- i** Compare the results recorded by students A and B.

(2)

- ii** Give *two* reasons why the two students' results could be different.

(2)

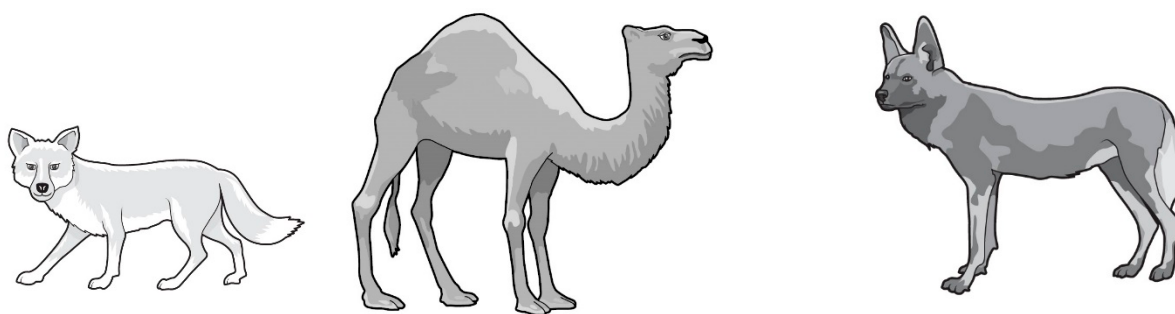
- d Alcohol is a depressant that affects heart rate.

Devise a plan for an experiment that you could use to determine the effect of alcohol on the heart rate of water fleas.

(3)

(Total for Question 9 = 11 marks)

- 10 Animals are adapted to live in many different habitats. Some habitats are very cold. Other habitats are hot and dry.



Use the diagrams above and your own knowledge to describe and compare the adaptations that animals have for living in habitats that are:

- very cold
- very hot and dry.

(6)

(Total for Question 10 = 6 marks)

TOTAL FOR TEST = 60 MARKS