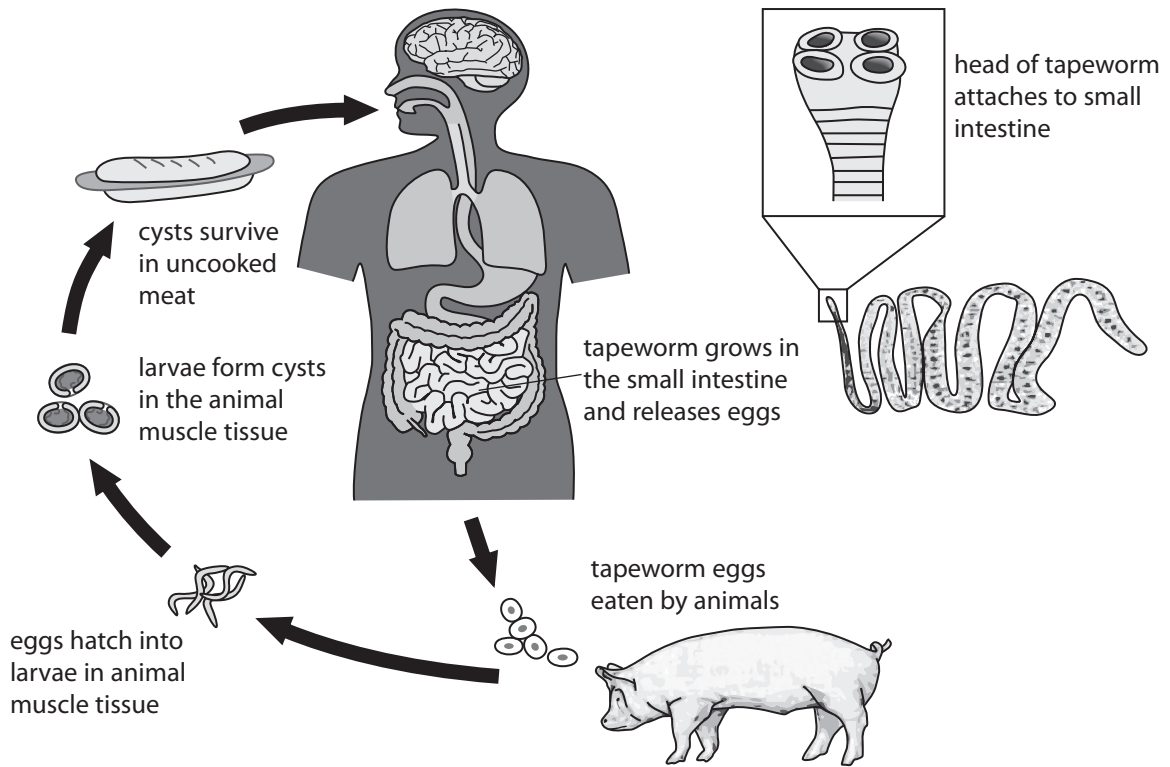


1 (a) The diagram shows the life cycle of the human tapeworm.



(i) The tapeworm absorbs food in the human intestine.

Complete the sentence by putting a cross (☒) in the box next to your answer.

A tapeworm is an example of a

(1)

- A living indicator
- B mutualist
- C parasite
- D producer

(ii) Use information in the diagram to describe how an adaptation of the tapeworm enables it to live in the human intestine.

(2)

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(iii) Using information in the diagram, suggest how humans could avoid becoming infected with tapeworms.

(2)

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(b) The photograph shows another type of worm.

These are tube worms that live near hydrothermal vents.



Explain the relationship between these tube worms and chemosynthetic bacteria.

(3)

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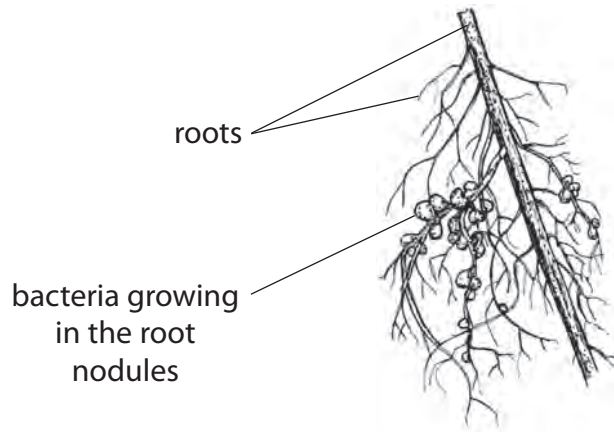
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(Total for Question 1 = 8 marks)

(b) Leguminous plants such as beans and peas have bacteria growing inside nodules on their roots.

The diagram shows some nodules on a root.



Explain the relationship between this bean plant and the bacteria growing in the root nodules.

(3)

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(Total for Question 2 = 10 marks)

3 The photograph shows a lake which has been polluted by excess nutrients.



(a) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

The build-up of nutrients in an aquatic environment is known as

(1)

- A decomposing
- B eutrophication
- C mutualism
- D parasitism

(ii) Suggest how farming can lead to a build-up of nutrients in the lake.

(2)

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(iii) State the effects of nitrates on plant growth.

(1)

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(b) (i) Nitrates can be produced by soil bacteria.

Explain how soil bacteria produce nitrates.

(3)

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(ii) Name **one** type of bacteria that reduce the nitrate content of soil.

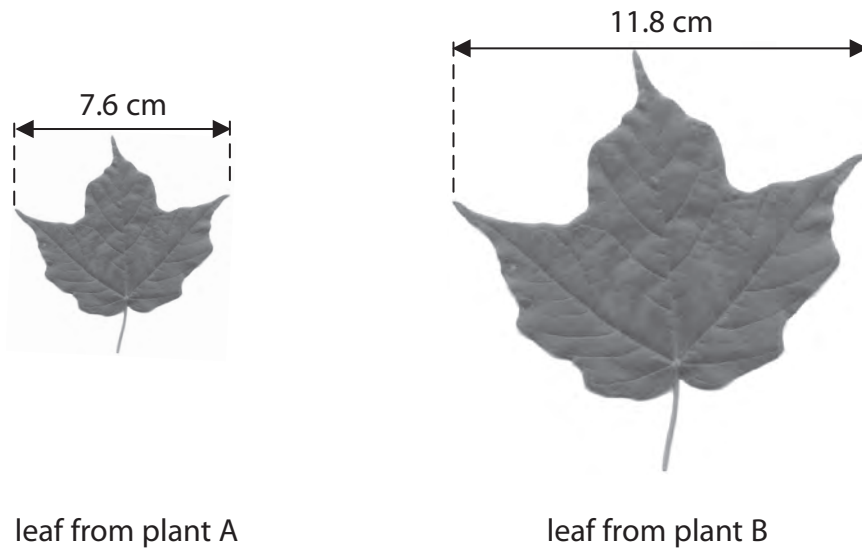
(1)

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(Total for Question 3 = 8 marks)

- 4 (a) Plant A was grown in soil with a low concentration of nitrates.
 Plant B was grown in soil with a high concentration of nitrates.

Andrew measured the width of a leaf from each of the plants.



- (i) Andrew removed two more of the leaves from each of the plants and measured their width.

The results are shown in the table.

plant	leaf width / cm			
	1	2	3	mean
A	7.6	7.3	7.0	7.3
B	11.8	10.3	11.2	

Calculate the mean leaf width for plant B.

(2)

answer =cm

(ii) Explain the differences in the mean width of the leaves from plant A and plant B.

(2)

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(b) Complete the sentence by putting a cross (☒) in the box next to your answer.

Plants use nitrates to make

(1)

- A** carbohydrates
- B** fats
- C** phosphates
- D** proteins

(c) Explain how different types of bacteria act to increase nitrate concentration in the soil.

(4)

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(d) Name the process by which bacteria release carbon dioxide into the atmosphere.

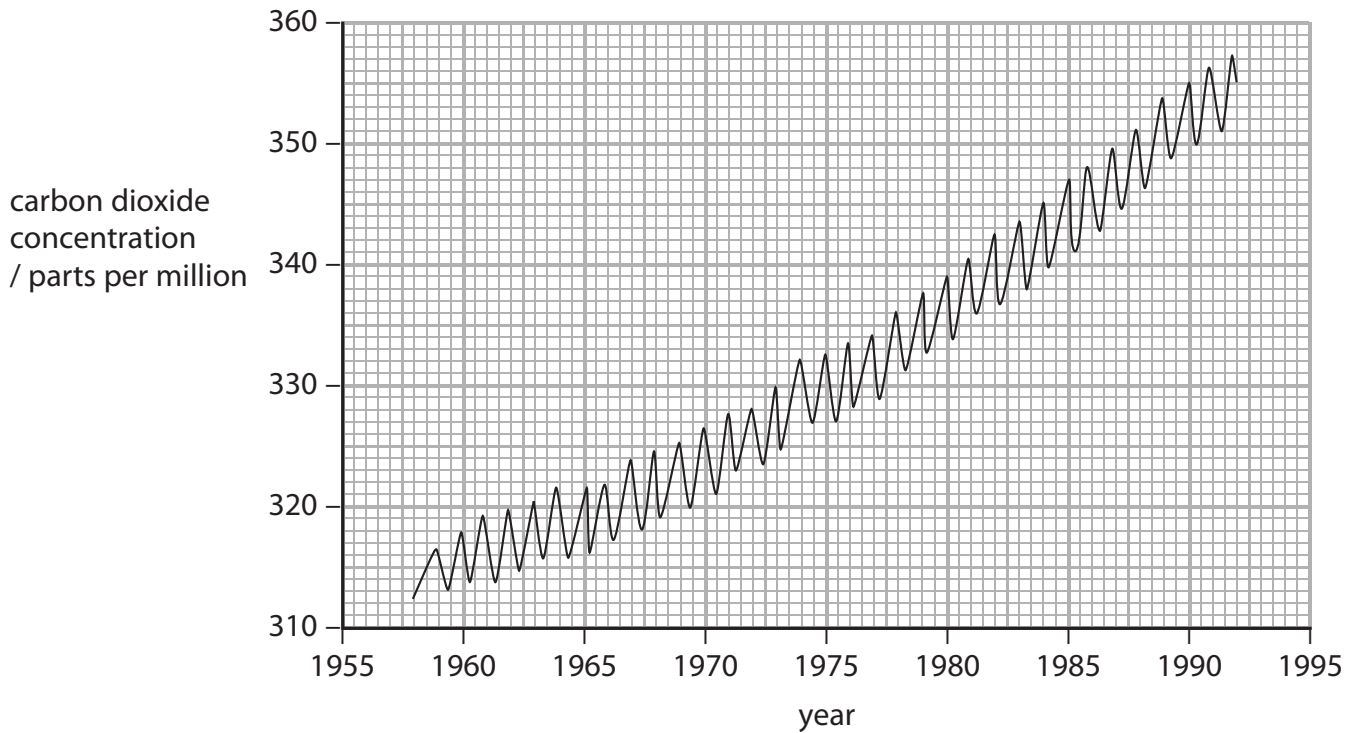
(1)

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(Total for Question 4 = 10 marks)

- 5 Carbon dioxide concentration in the air is thought to be changing as a result of human population increase.

The graph shows how the concentration of carbon dioxide in the atmosphere has changed in Europe between 1958 and 1992.



- (a) (i) Describe the main trend shown in the graph.

(1)

- (ii) Calculate the difference in atmospheric carbon dioxide concentration in Europe between 1980 and 1990.

(2)

answer = parts per million

(iii) The carbon dioxide concentration changes during each year.

Suggest why the carbon dioxide concentration changes during a year.

(3)

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*(b) Carbon is present in a wide variety of compounds in the carbon cycle.

Describe how carbon is cycled in the environment.

(6)

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(Total for Question 5 = 12 marks)