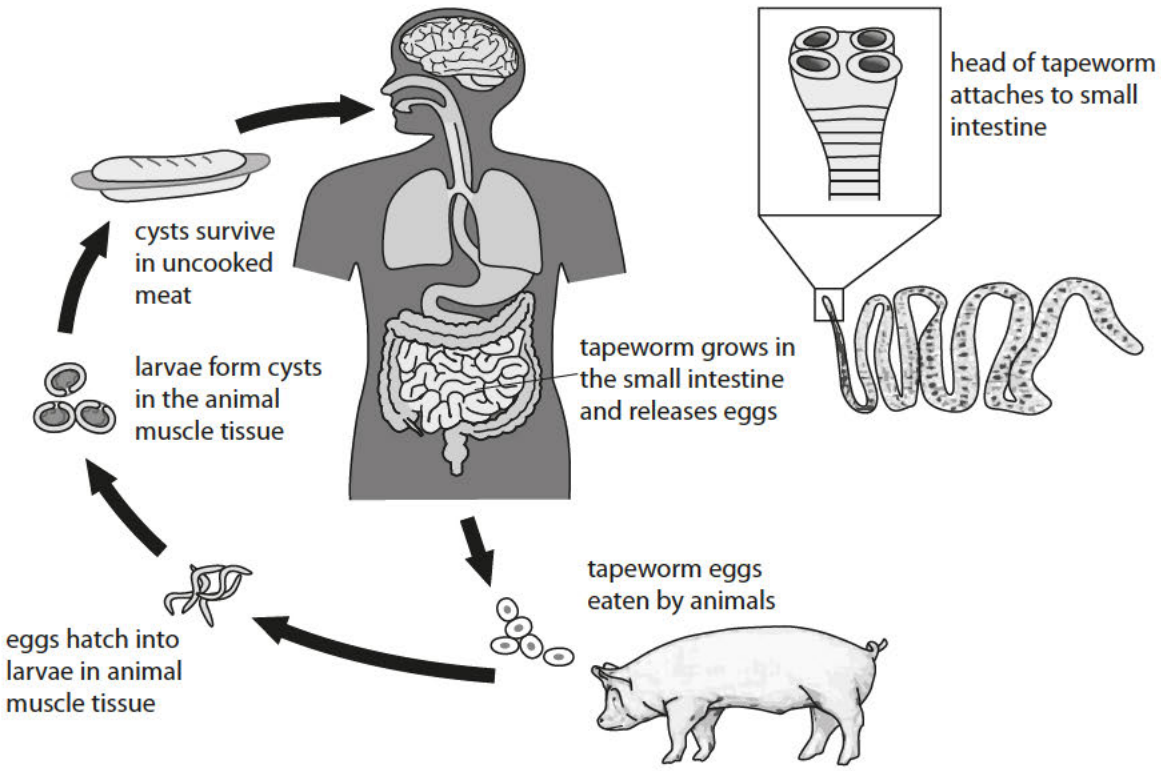
1 (a) The diagram shows the life cycle of the human tapeworm.



(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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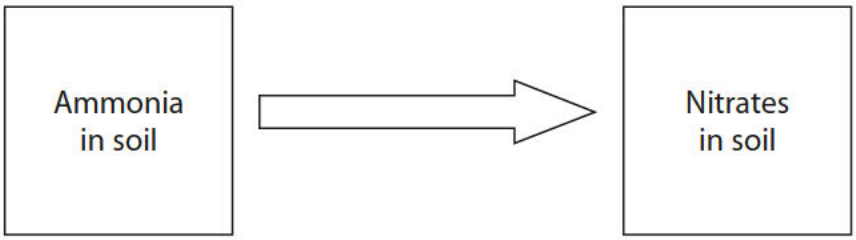
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(Total for Question 1 = 8 marks)

2 The diagram shows one of the stages of the nitrogen cycle.



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

The name of this stage is

(1)

- ☐ **A** decomposition
- ☐ **B** denitrification
- ☐ **C** nitrification
- ☐ **D** nitrogen fixation

(ii) Explain how plants use the nitrates from the soil.

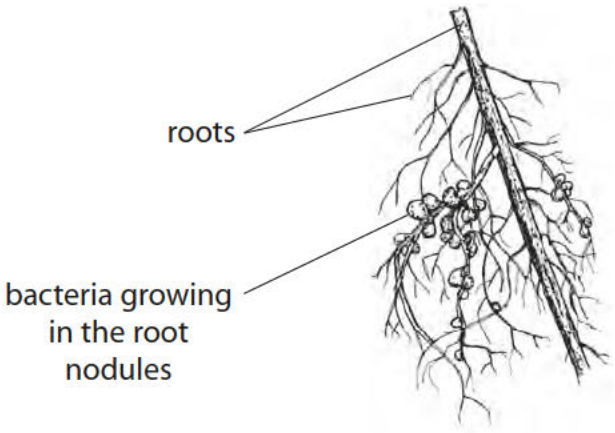
(2)

(iii) Describe how the over-use of nitrate fertilisers can cause eutrophication.

(4)

(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.

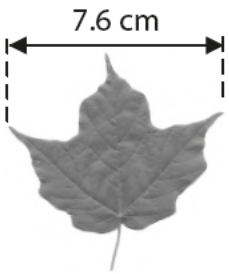
(1)

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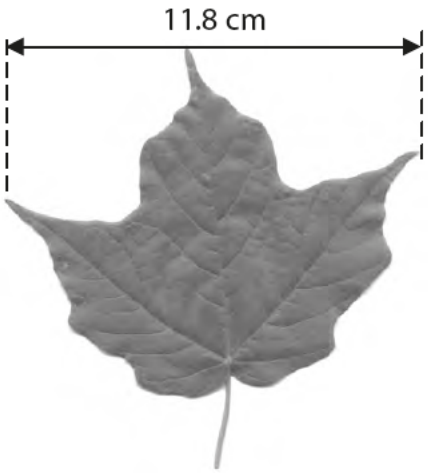
(Total for Question 3 = 8 marks)

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.



leaf from plant A



leaf from plant B

(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)

(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)

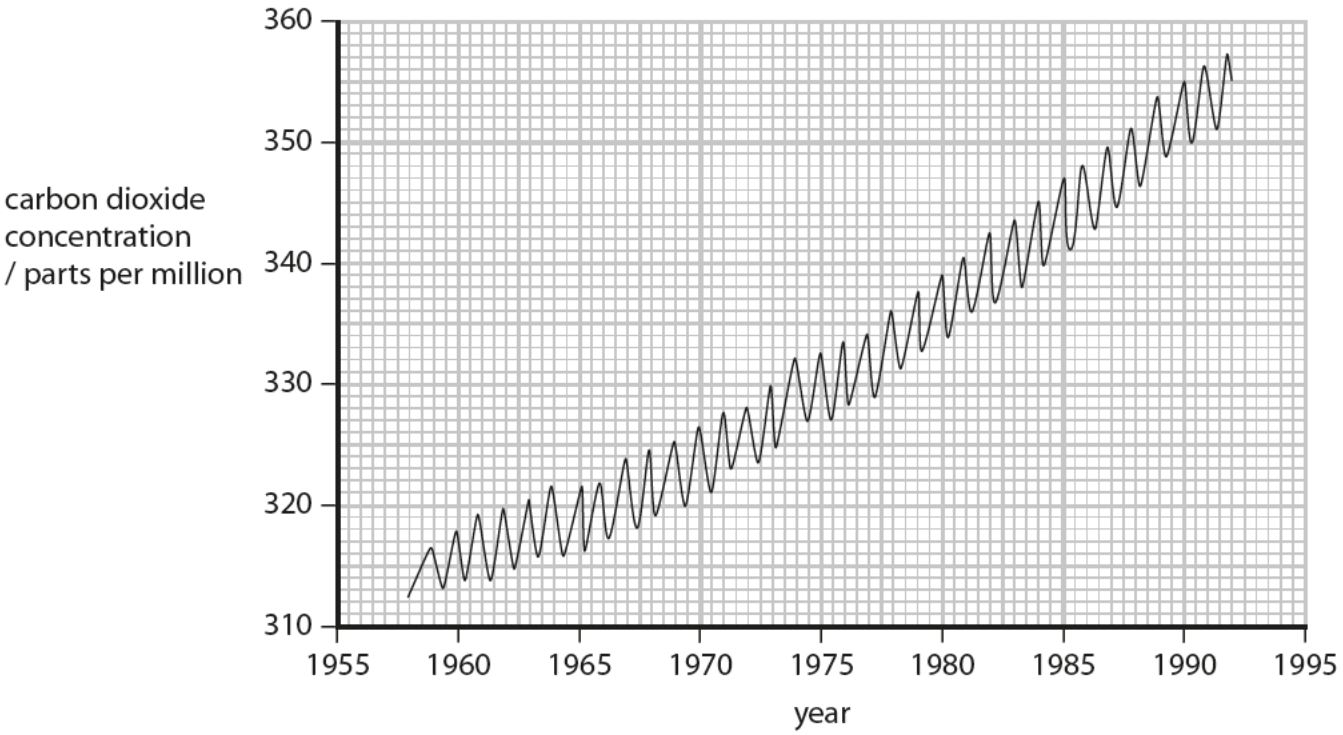
(d) Name the process by which bacteria release carbon dioxide into the atmosphere.

(1)

(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)

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

Describe how carbon is cycled in the environment.

(6)

(Total for Question 5 = 12 marks)