OCR GCSE GATEWAY BIOLOGY A · J247

BIOLOGY



EXAM QUESTION PACK

B4.1 ECOSYSTEMS

SCORE	PERCENTAGE
/203	%

STEMUP

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Gateway Biology A (9-1)

Ecosystems

Please note that you may see slight differences between this paper and the original.

Candidates answer on the Question paper.

OCR supplied materials:
Additional resources may be supplied with this paper.

Other materials required:
- Pencil
- Ruler (cm/mm)

Duration: Not set

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions, unless your teacher tells you otherwise.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Where space is provided below the question, please write your answer there.
- You may use additional paper, or a specific Answer sheet if one is provided, but you must clearly show your candidate number, centre number and question number(s).

INFORMATION FOR CANDIDATES

- The quality of written communication is assessed in questions marked with either a pencil or an asterisk. In History and Geography a *Quality of extended response* question is marked with an asterisk, while a pencil is used for questions in which *Spelling, punctuation and grammar and the use of specialist terminology* is assessed.
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **203**.
- The total number of marks may take into account some 'either/or' question choices.

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1 Nitrogen is an important element found in living organisms.

Read this article about nitrogen and plants.

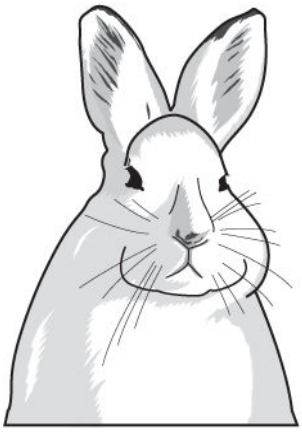
> **Nitrogen – the farmers' friend**
>
> Plants are surrounded by plenty of nitrogen gas in the air but cannot use it.
>
> The main way they get nitrogen is from the soil. Plants need nitrogen for growth.
>
> When farmers harvest their crops they dig the remains of the plant into the soil.
>
> This will help their crops grow next year.

Explain what happens to the dead plants that are dug into the soil and why this helps new crops grow.

--- [3]

2 Snowshoe hares live in parts of Canada.

They are preyed on by animals called lynx.



snowshoe hare



lynx

Where the lynx and hares live there is snow on the ground for long periods of time.

Scientists think that increasing levels of carbon dioxide pollution may make the weather in Canada warmer.

Warmer weather might affect the survival of snowshoe hares.

In 2015 the scientists collected data about the survival of the hares.

They also predicted how the hares will survive in the future if the weather gets warmer.

Their results are shown in the table.

Year	2015	2050	2080
percentage chance of a hare surviving one year	9.3	8.2	7.0

Write about how an increase in carbon dioxide levels can make the weather warmer.

How can warmer weather explain the predictions about the survival of the hares?

The quality of written communication will be assessed in your answer to this question.

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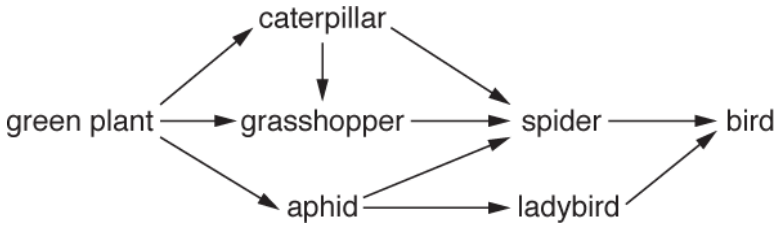
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[6]

3

The diagram shows a garden food web.



(i) What is the source of energy for this food web?

---

[1]

(ii) The grasshopper is **both** a primary and a secondary consumer.

Explain why it is both.

---

[2]

(iii) The people who own the garden buy a cat.

The cat spends a lot of time in the garden and frightens away birds.

Explain what might happen to the numbers of ladybirds in the garden.

---

[2]

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4 Nitrogen is an element found in living organisms.

Read this article about nitrogen and plants.

Nitrogen – the farmers' friend

Plants are surrounded by plenty of nitrogen gas in the air but cannot use it.

The main way they get nitrogen is from the soil.

Plants need nitrogen for growth.

When farmers harvest their crops they often dig the remains of the plant into the soil.

The decomposition of the plant remains will provide nitrates for next year's crop.

Explain how the decomposition of dead plants in the soil provides nitrates for next year's crop.

---

[3]

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5 Snowshoe hares live in northern Canada where there is snow on the ground for much of the year.

Scientists think that increasing levels of carbon dioxide pollution may affect the survival of snowshoe hares.

In 2015 the scientists collected data about the survival of the hares.

They have also predicted how the hares will survive in the future.

Their results are shown in the table.

Year	2015	2050	2080
percentage chance of a hare surviving one year	9.3	8.2	7.0

Write about how carbon dioxide pollution can change the hare's habitat and why the hares could become **extinct** if the scientists' predictions are correct.



The quality of written communication will be assessed in your answer to this question.

[6]

6 The scientists are studying the **population** of newts in the pond.

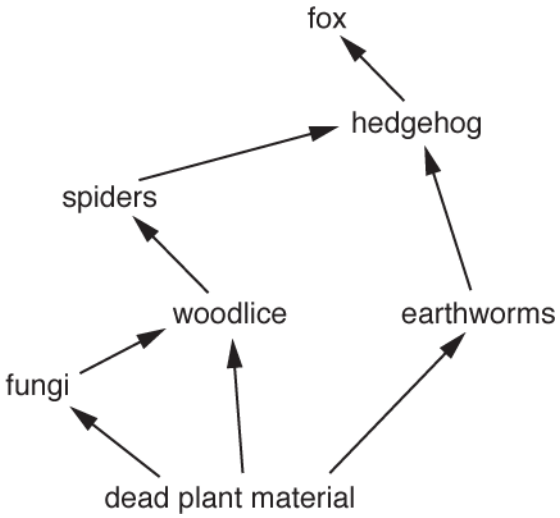
The newts are also part of a **community** living in the pond.

Explain the difference between the terms population and community.

---

[1]

7 The diagram shows organisms in a soil food web.



Write about the different organisms in **this** food web.

Include ideas about

- which organisms are detritivores, carnivores or decomposers
- how **earthworms** help improve the structure and fertility of the soil.

The quality of written communication will be assessed in your answer to this question.

---

[6]

8 Scientists are studying the population of newts in a pond.
The newts are also part of a **community** living in the pond.

Explain the difference between the terms population and community.

[1]

9(a) Many water companies release treated sewage back into rivers in places called sewage outfall.



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Most sewage outfalls are monitored for pollution by the environment agency.

In 1989 there were a number of outfalls not being monitored.

These outfalls were identified and named TDC outfalls.

Water companies have been told to reduce these TDC outfalls by allowing the environment agency to monitor them.

The table shows how the number of TDC outfalls has changed in some areas.

Water company progress in reducing TDCs		
	number of TDCs in 1989	number of TDCs in 2016
Anglian	328	328
Northumbrian	9	9
South West	62	46
Southern	29	29
Thames	1787	400
United Utilities	650	650
Wessex	152	84
Yorkshire	234	234

Which water company had made the **most** progress in reducing the number of TDCs?

---

[1]

(b) Why is it important to reduce the number of TDC outlets?

---

[2]

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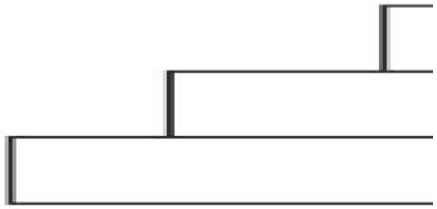
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10 Which process in the carbon cycle **takes in** carbon dioxide from the air?

A Combustion
B Decomposition
C Photosynthesis
D Respiration

Your answer [ ] [1]

11 The diagram shows a pyramid of biomass.



Which trophic level is **X**?

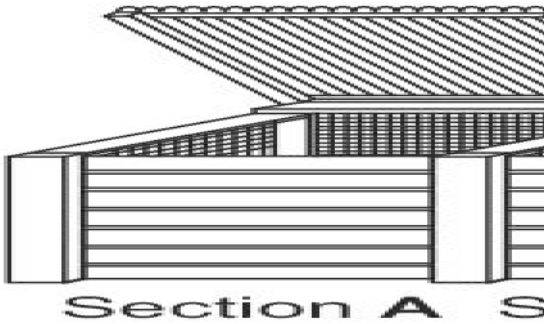
A Primary consumers
B Producers
C Secondary consumers
D Tertiary consumers

Your answer [ ] [1]

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12(a) A gardener buys a composter to decay plant material as quickly as possible.

The composter has three sections.



She designs an experiment to see if watering makes the plant material decay faster.
She waters:

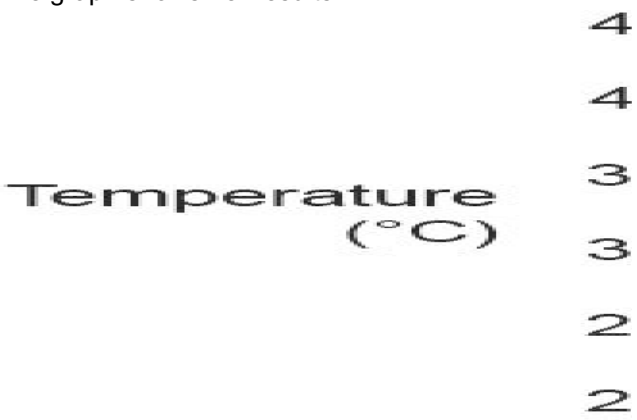
- Section **A** once a week
- Section **B** once a month
- Section **C** is not watered.

The gardener wants valid results. Explain **one** factor that the gardener should keep constant.

--- [2]

(b) The gardener measures the temperature in each section for five months.

She knows that heat is given off when plant material decays.
The graph shows her results.



(i) Write down **two** differences between the change in temperature in Section **A** and the change in temperature in Section **C**.

1 ----------

---

2 ----------

---

[2]

(ii) The gardener decides that she should water all sections every week.

Explain why she decides this.

---**[1]**

(c) Each section of the composter has holes in it to let oxygen in.

Explain why this helps the material to decay.

---

[2]

13 The diagram shows the flow of biomass through an agricultural food chain.



(i) Calculate how much biomass is lost between the plants and humans.

Answer = ---------- kg [1]

(ii) One way biomass is lost from the food chain is by insects eating the leaves of plants.

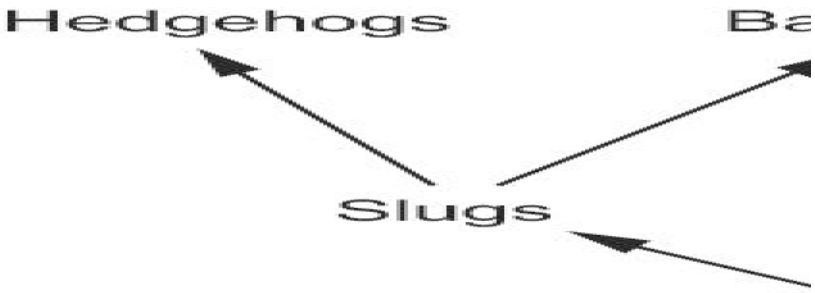
Write down **one** other way that biomass is lost from the food chain.

---

[1]

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14(a) The diagram shows part of a food web from a grassland.



How many secondary consumers are shown in this food web?

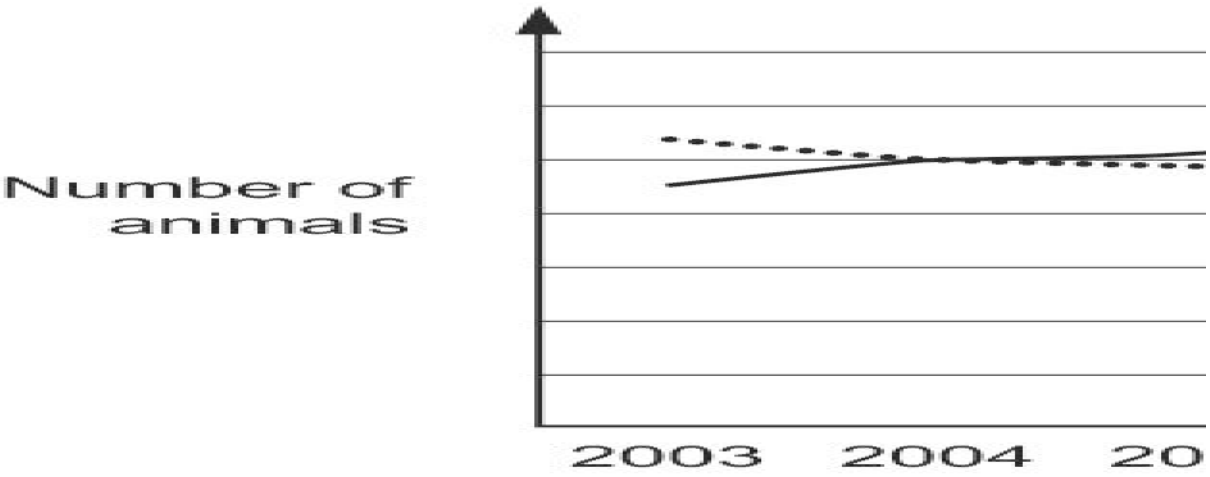
---

[1]

(b) A survey was set up to see if the number of badgers and hedgehogs has changed in the UK.

The number of badgers and hedgehogs were counted in different areas each year from 2003 to 2012.

The graph shows the results.

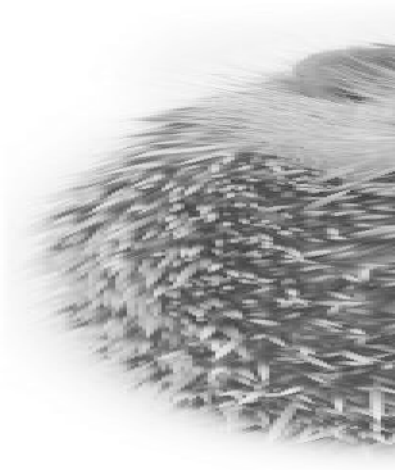


Use the food web to suggest an explanation for the change in the number of hedgehogs shown in the graph.

--- [2]

(c) Hedgehogs are covered in small spines.

When they are frightened they often roll up into a ball and keep still.



(i) In country areas, where badgers live, this is an advantage to the hedgehogs.

In cities, where there are many roads, this is a disadvantage.

Explain these two conclusions.

---

[2]

(ii) Scientists have noticed that a new type of hedgehog is increasing in numbers in cities.

These hedgehogs do not roll up. They run away when frightened. The scientists think that genes control this behaviour.

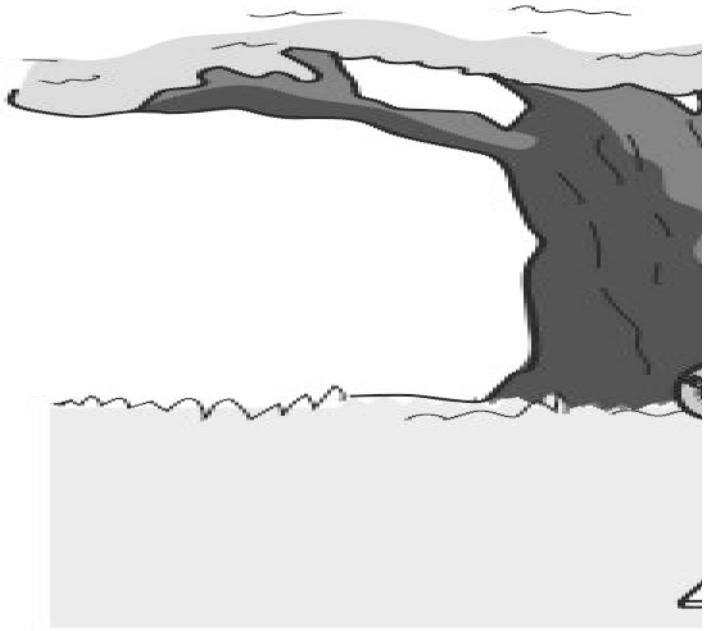
Explain how this type of hedgehog may become more common in cities.

Use ideas about natural selection.

---

[4]

15 A student investigates plants growing underneath a tree.



He lays out a tape measure on the ground, starting at the tree. He then places a quadrat on the ground.

He measures the percentage of the ground in the quadrat that is covered by plants. He repeats this every metre away from the tree.

The table shows his results.

Distance from the tree (m)	Percentage of ground covered by plants (%)
1	10
2	15
3	18
4	22
5	50
6	58
7	62
8	64

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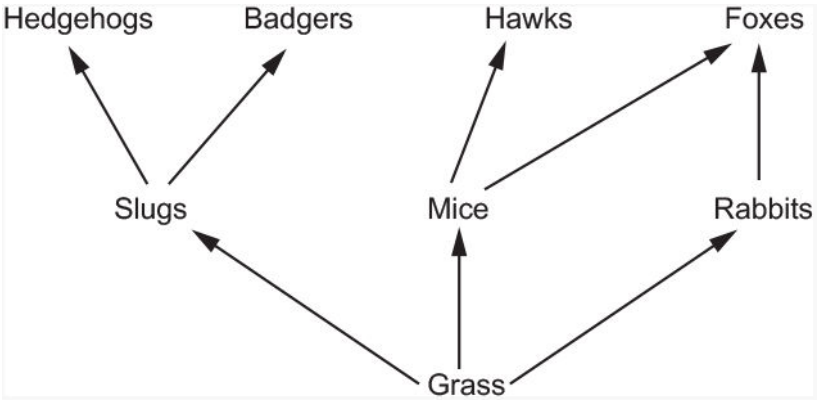
The student thinks that shade from the tree is affecting the plants.

Explain how the student's results show this.

---

[4]

16(a) The diagram shows part of a food web from a grassland.



How many secondary consumers are shown in this food web?

---

[1]

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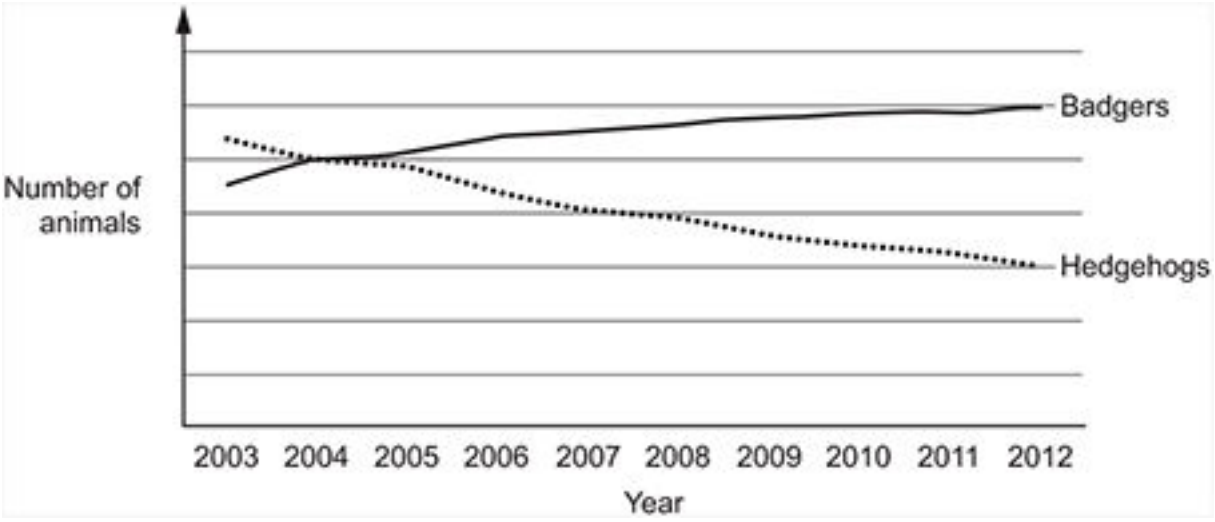
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(b) A survey was set up to see if the number of badgers and hedgehogs has changed in the UK.

The number of badgers and hedgehogs were counted in different areas each year from 2003 to 2012.

The graph shows the results.



Use the food web to suggest an explanation for the change in the number of hedgehogs shown in the graph.

---

[2]

(c) Hedgehogs are covered in small spines.

When they are frightened they often roll up into a ball and keep still.



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(i) In country areas, where badgers live, this is an advantage to the hedgehogs.

In cities, where there are many roads, this is a disadvantage.

Explain these two conclusions.

---

[2]

(ii) Scientists have noticed that a new type of hedgehog is increasing in numbers in cities.

These hedgehogs do not roll up. They run away when frightened. The scientists think that genes control this behaviour.

Explain how this type of hedgehog may become more common in cities.

Use ideas about natural selection.

---

[4]

17 A student investigates the plants growing underneath a tree.



He lays out a tape measure on the ground, starting at the tree. He then places a quadrat on the ground.

He measures the percentage of the ground in the quadrat that is covered by plants. He repeats this every metre away from the tree.

The table shows his results.

Distance from the tree (m)	Percentage of ground covered by plants (%)
1	10
2	15
3	18
4	22
5	50
6	58
7	62
8	64

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The student thinks that shade from the tree is affecting the plants.

Explain how the student's results show this.

---

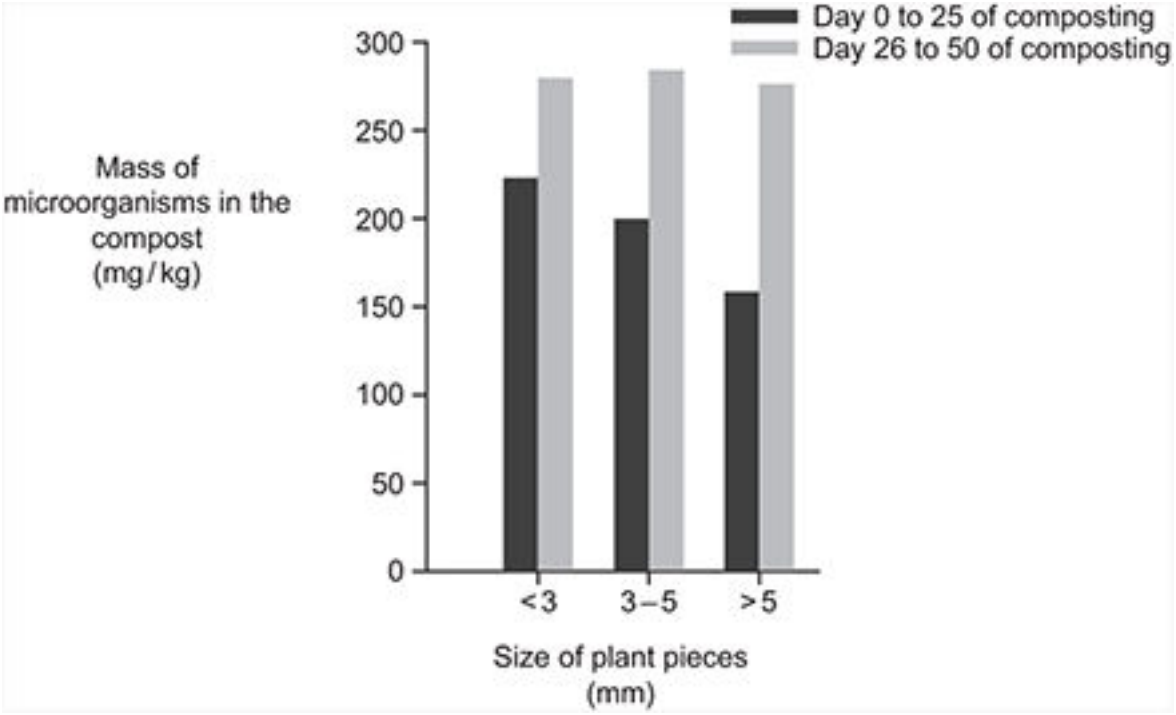
[4]

18(a) This machine helps shred plants for a compost heap.



The machine can shred plants into three different sizes.

This graph is in the instruction booklet for the machine.



Which size of plant pieces is best for making compost?

Explain your answer.

---

[3]

(b) The size of the plant pieces has an effect on the number of microorganisms in the compost.

Suggest why.

---

[2]

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(c) The decomposition of dead plants and animals is an important process for ecosystems.

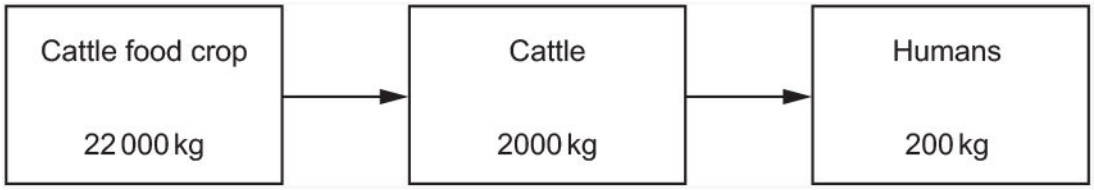
Explain why.

---

[3]

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19(a) The diagram shows the flow of biomass through an agricultural food chain.



(i) Calculate the percentage efficiency of transfer of biomass between the cattle food crop and humans.

Answer = ---------- % **[2]**

(ii) Write down **two** ways that biomass is lost from the food chain.

1 ----------

2 ----------

[2]

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(b) High levels of light intensity can damage plants. To prevent damage, plants have a protection mechanism.

When light intensity levels get **too high**, the protection mechanism switches on. This stops the plant absorbing too much light.

When the light intensity drops to safe levels, the protection mechanism switches off **slowly**.

Explain why this mechanism would **reduce** the biomass available to humans.

[6]

(c) Switching off the protection mechanism described in part **(b)** involves the plant making a **protein.**

Scientists have put extra copies of the gene for this protein into the plants. This makes the plant make more mRNA molecules.

(i) Explain why making more mRNA will switch off the mechanism faster.

---

[2]

(ii) Scientists have found that the genetically modified plants make 20% more biomass.

Use the agricultural food chain on page 21 to calculate the increase in biomass this would provide for humans.

Answer = ---------- kg **[2]**

(iii) Inserting extra copies of a plant's gene into a plant is a type of genetic modification (GM).

Another example of GM involves inserting a bacterial gene into a plant which makes the plant produce an insecticide.

Suggest reasons why.

---

[2]

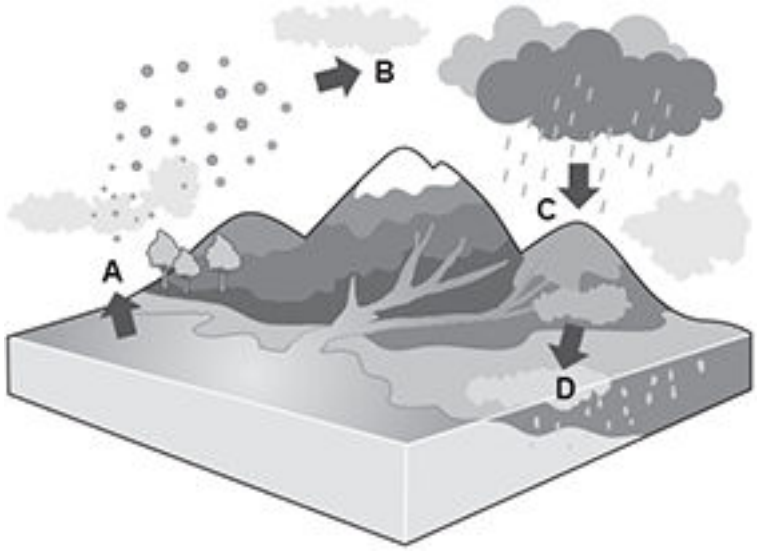
20 Which of these is an **abiotic** factor that can affect organisms?

A Food availability
B Light intensity
C Pathogens
D Predators

Your answer ☐ **[1]**

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21 The diagram shows the water cycle.



Which label, **A**, **B**, **C** or **D**, represents evaporation?

Your answer [1]

22 Which relationship describes an organism living on an animal and harming it?

A Decomposition
B Mutualism
C Parasitism
D Predation

Your answer [1]

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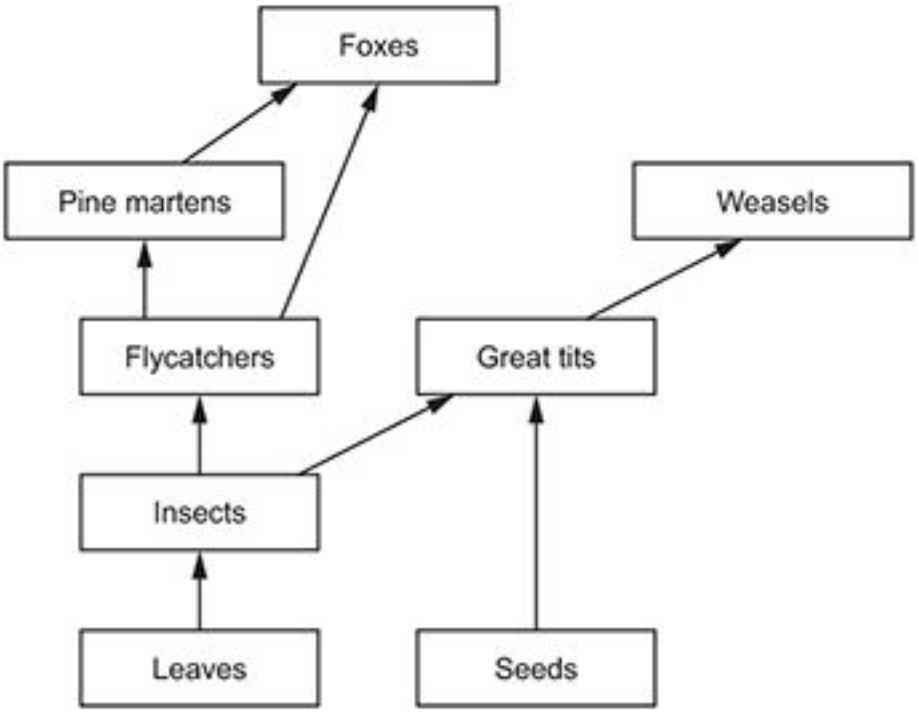
23 Most food chains only have a maximum of five trophic levels.

Explain why.

A Organisms always get larger at higher trophic levels.
B Energy is lost at each trophic level.
C It is more energy efficient to eat meat than plant material.
D The number of organisms feeding always increases at higher trophic levels.

Your answer ☐ [1]

24(a) The diagram shows part of a food web from a woodland.



(i) Great tits are described as both primary consumers and secondary consumers.

Explain why.

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---

[2]

(ii) Foxes are described as both predators and competitors of pine martens.

Explain why.

---

[2]

(iii) Which organism in the food web occupies the second trophic level?

---

[1]

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(b) Great tits and flycatchers are both birds.

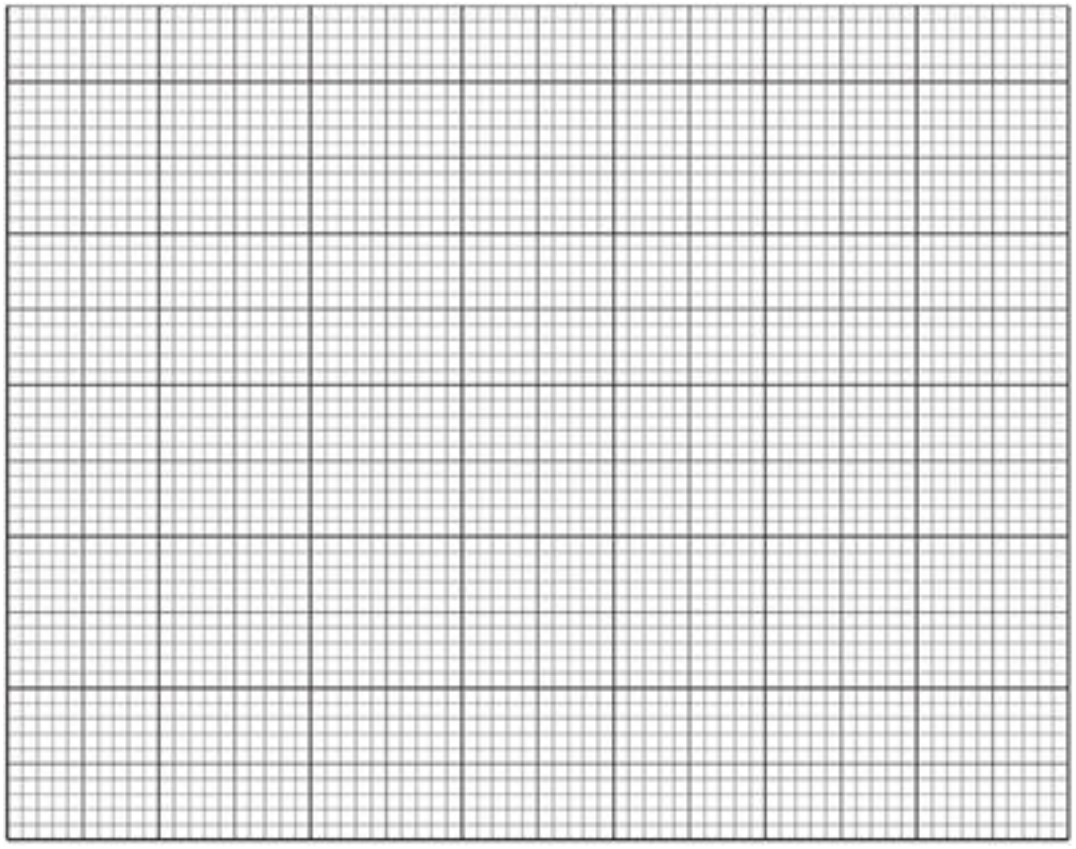
In a conservation project, scientists have built boxes for the birds to nest in. The scientists fixed the boxes on trees at different heights.

The table shows how many birds of each type used the boxes for nesting.

	Number of bird boxes used	
Height of bird box above the ground (m)	By great tits	By flycatchers
1	1	6
2	7	5
4	10	6

(i) Draw a **bar chart** on the graph paper to show the scientists' results.

The results for great tits and flycatchers should be on the same axis.



[4]

(ii) The food web shows:

- Weasels feed on great tits
- Pine martens feed on flycatchers.

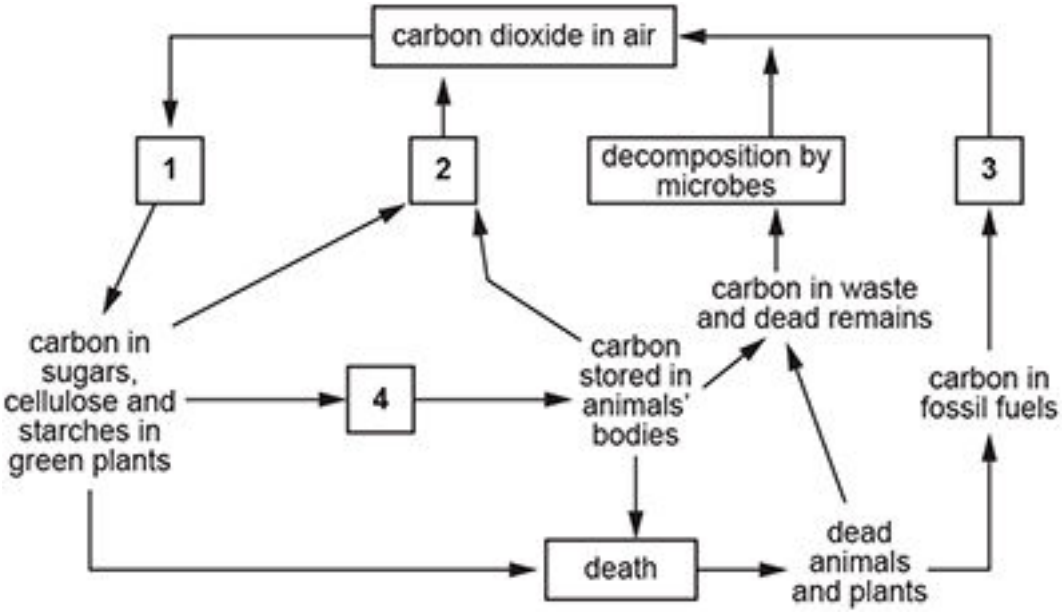
Weasels live on the ground but pine martens live in trees.

How can this be used to explain the results of the scientists' investigation?

[3]

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25(a) The diagram shows the carbon cycle.



Boxes **1-4** represent different processes in the carbon cycle.

Draw lines to link boxes 1-4 to the correct name for the process in the carbon cycle.

1	Combustion
2	Eating
3	Photosynthesis
4	Respiration

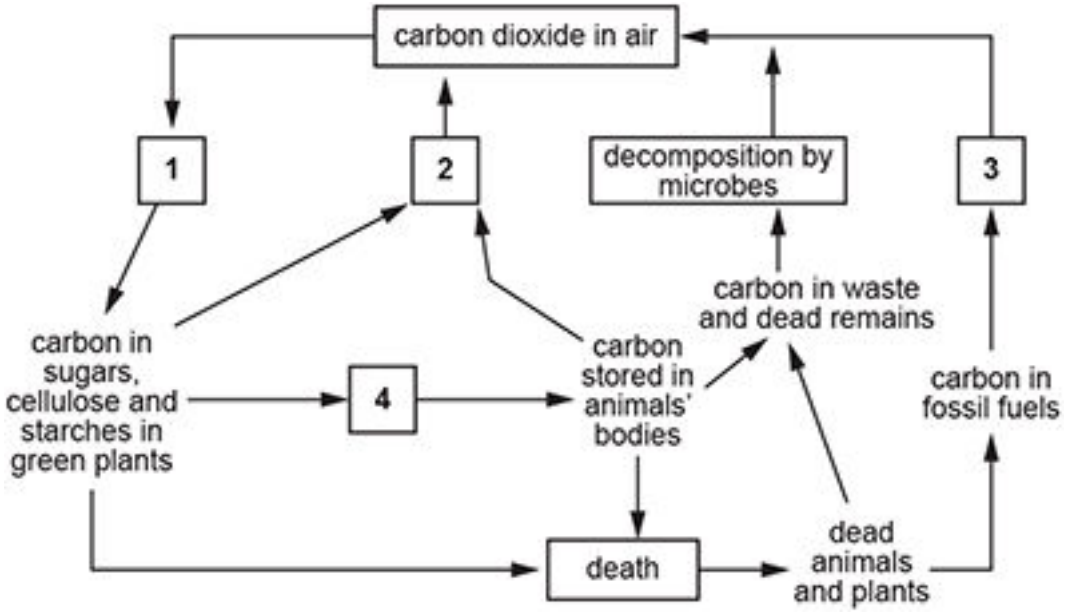
[2]

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(b) The diagram shows the carbon cycle.



Scientists investigated if crops can be grown on the planet Mars.

They used a soil that was similar to the soil found on Mars. The soil contained some minerals but no living organisms.

(i) The scientists managed to grow crops in the soil. However on Mars, the minerals in the soil would soon run out.

Explain why.

---

[2]

(ii) Living organisms could be added to the soil but there is no air on Mars. The plants would need to be grown in an enclosed structure.

At first, air would need to be added, but after a while the organisms in the soil and the plants would supply each other with the gases they need.

Explain how this would happen.

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[2]

---

26 A student estimates the number of snails in a pond.

Part of his method involves collecting snails and marking them.

What is the name of the method that he is using?

A Aseptic technique
B Capture-recapture
C Percentage increase
D Scaling-up

Your answer [1]

27 In food chains, biomass is lost between different trophic levels.

One reason for this is the release of undigested food from the body.

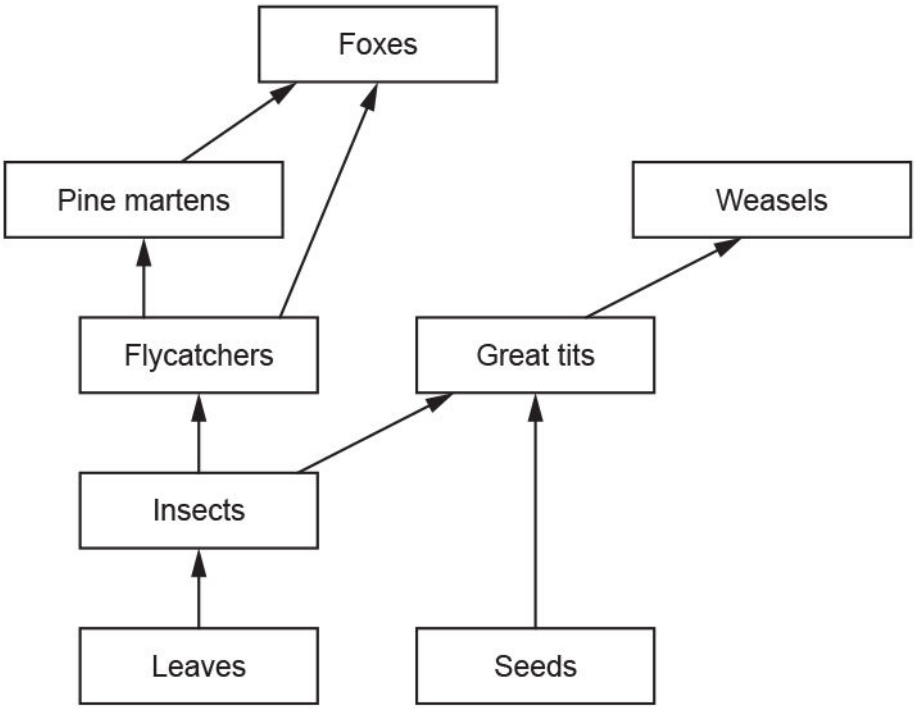
Which term is used to describe this release?

A Decomposition
B Egestion
C Excretion
D Peristalsis

Your answer [1]

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28(a) The diagram shows part of a food web from a woodland.



(i) Great tits are described as both primary consumers and secondary consumers.

Explain why.

---

[2]

(ii) Foxes are described as both predators and competitors of pine martens.

Explain why.

[2]

(iii) Which organism in the food web occupies the second trophic level?

[1]

(b) Great tits and flycatchers are both birds.

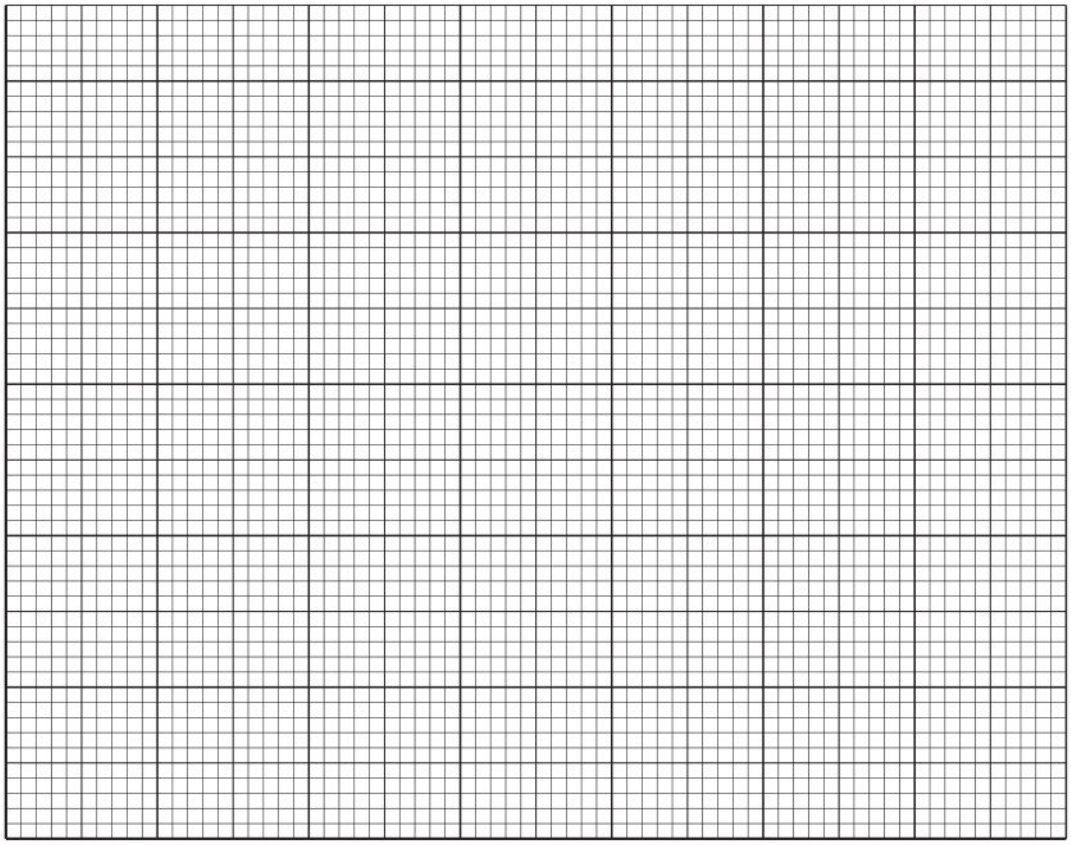
In a conservation project, scientists have built boxes for the birds to nest in. The scientists fixed the boxes on trees at different heights.

The table shows how many birds of each type used the boxes for nesting.

	Number of bird boxes used	
Height of bird box above the ground (m)	By great tits	By flycatchers
1	1	6
2	7	5
4	10	6

(i) Draw a **bar chart** on the graph paper to show the scientists' results.

The results for great tits and flycatchers should be on the same axis.



[4]

(ii) The food web shows:

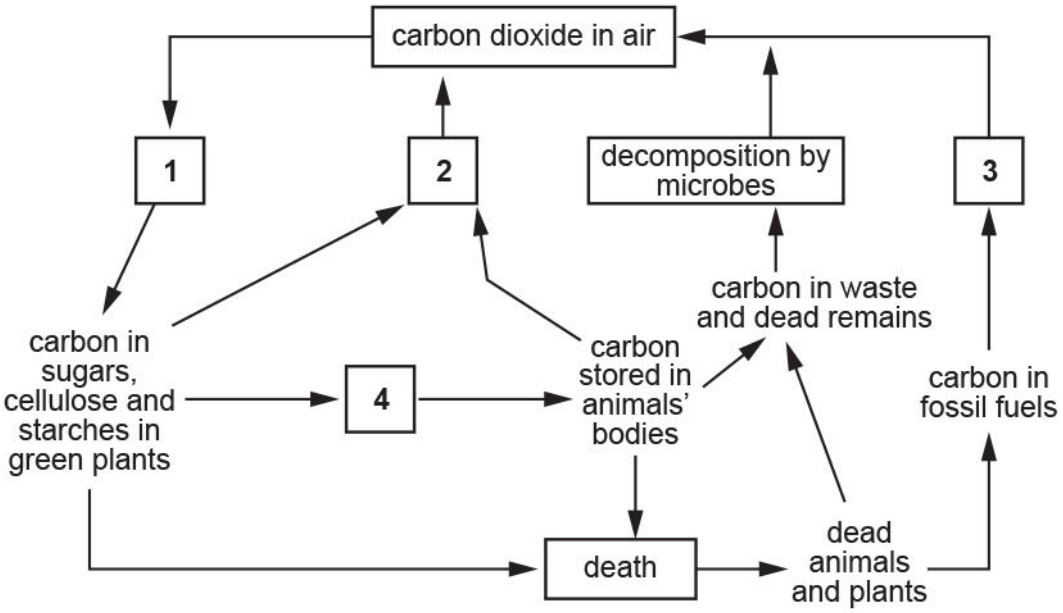
- Weasels feed on great tits
- Pine martens feed on flycatchers.

Weasels live on the ground but pine martens live in trees.

How can this be used to explain the results of the scientists' investigation?

[3]

29(a) The diagram shows the carbon cycle.



Boxes **1-4** represent different processes in the carbon cycle.

Draw lines to link boxes 1-4 to the correct name for the process in the carbon cycle.

1	**Combustion**
2	**Eating**
3	**Photosynthesis**
4	**Respiration**

[2]

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(b) Scientists investigated if crops could be grown on the planet Mars.

They used a soil that was similar to the soil found on Mars. The soil contained some minerals but no living organisms.

(i) The scientists managed to grow crops in the soil. However on Mars, the minerals in the soil would soon run out.

Explain why.

[2]

(ii) Living organisms could be added to the soil but there is no air on Mars. The plants would need to be grown in an enclosed structure.

At first, air would need to be added, but after a while the organisms in the soil and the plants would supply each other with the gases they need.

Explain how this would happen.

[2]

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30(a) A salt marsh is a large muddy area of land where a river joins the sea. This is a rare habitat and some plants grow on salt marshes but nowhere else.

When the tide comes in the salt marsh gets covered with seawater.

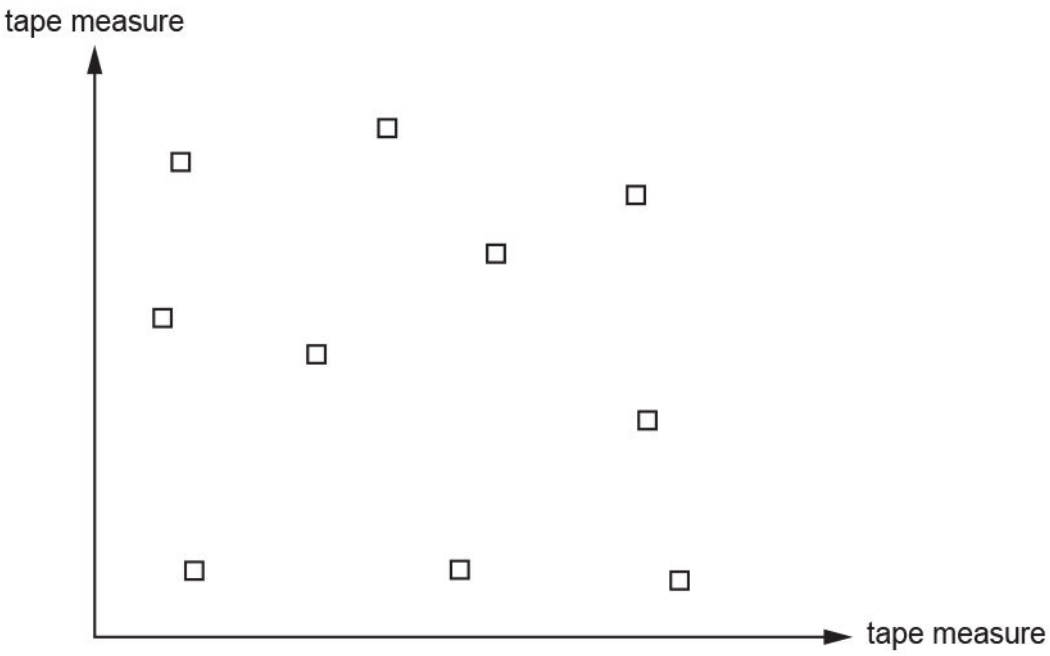
Explain the effects of salt water on plant cells.

[1]

(b) A student investigates the plants growing on a salt marsh. He uses a quadrat to sample the plants.

He puts down two long tape measures at right angles to each other across the salt marsh. He then picks numbers at random and uses them to decide where to place a quadrat.

The diagram shows the position of all his quadrats across the salt marsh.



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(i) The salt marsh measured 50 m x 50 m.

Each quadrat measured 0.5 m x 0.5 m.

Calculate the percentage of the whole salt marsh that was sampled by the student.

Percentage = ... % **[3]**

(ii) A second student sampled by placing five quadrats close together in the centre of the salt marsh.

Evaluate the sampling method of the second student compared to the method of the first student.

---

[3]

(iii) Suggest **one** factor that the students should consider in a risk assessment for their experiment.

---

[1]

(c) In some salt marshes large sand banks have been built. This stops tides from entering the salt marsh.

The level of soil on the salt marsh builds up and the marsh turns into dry land.

This dry land shows a greater biodiversity of plants than a salt marsh.

Explain why some scientists want to limit the building of sand banks, even though they increase biodiversity.

---

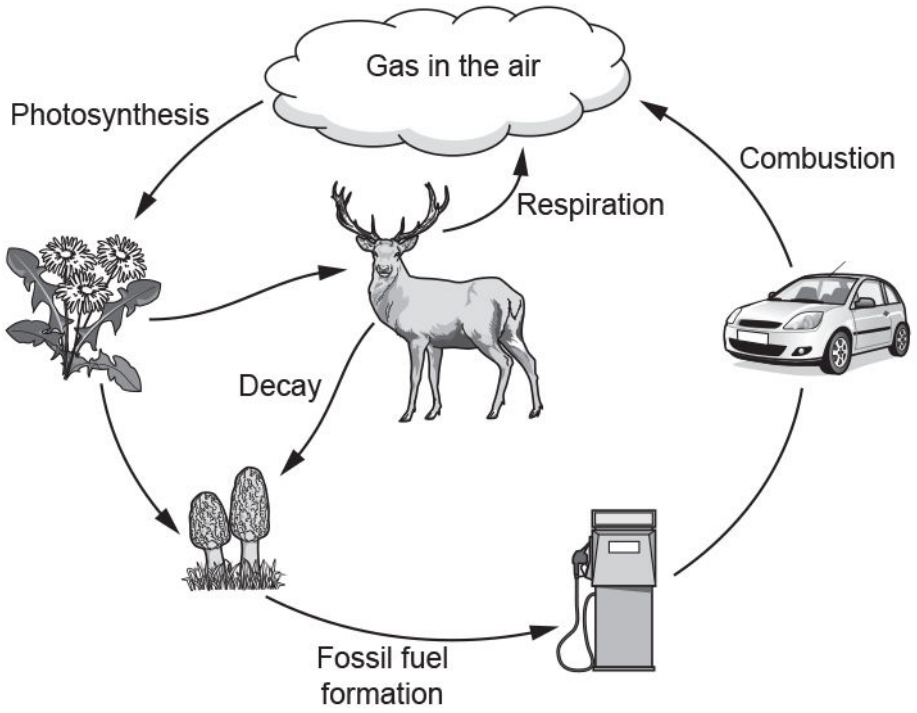
[2]

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31 The diagram shows part of a cycle in an ecosystem.



What is the name of the cycle shown in the diagram?

A Carbon cycle
B Hydrogen cycle
C Nitrogen cycle
D Sulfur cycle

Your answer ☐ [1]

32 Goldfish are a species of fish.

What name is given to all the goldfish living in a pond?

A A community
B An ecosystem
C A habitat
D A population

Your answer ☐ [1]

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33 Gardeners use dead plant material to make compost. They add this compost to soil where they are growing plants.

What do plant roots get from compost in the soil?

Put a ring around the correct answer.

carbon dioxide **minerals** **nitrogen gas** **oxygen gas**

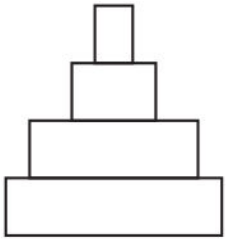
[1]

34 This is a food chain for organisms in a forest.

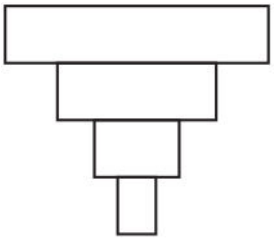
Oak tree → Greenfly → Ladybird → Blackbird

Which is the correct shape for a pyramid of **biomass** for this food chain?

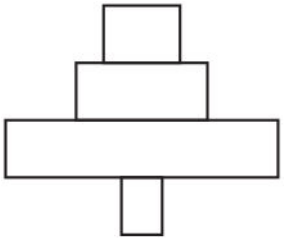
A



B



C

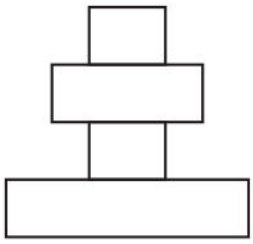


D

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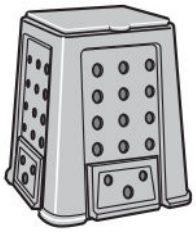
Your answer

[1]

35(a) Gardeners use dead plant material to make compost. They add this compost to soil where they are growing plants.

Compost can be made in a composting bin. In the bin **aerobic** bacteria turn dead plant material into compost.

The drawing shows a composting bin.



Explain why the composting bin needs holes in it.

[2]

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(b) A new way of making compost is called bokashi. In this process the compost is made **anaerobically** in a different type of composter.

Scientists compare the normal methods of making compost with bokashi.

This is their method:

- Take one large pile of dead plant material
- Divide the material into two samples of equal mass
- Place one sample into the normal composter and place one sample into the bokashi composter
- Measure the temperature in each composter every 10 days
- After 40 days, measure the mass of the compost.

Why did the scientists put the same mass of compost in each composter?

Tick (✓) **one** box.

To allow valid comparisons of the results. ☐

To decrease the temperature. ☐

To make the measurements more accurate. ☐

To make the results repeatable. ☐

[1]

(c) **Table 20.1** shows the scientists' temperature measurements.

	Temperature of the compost (°C)	
Time (days)	Normal compost	Bokashi compost
0	26	26
10	70	27
20	53	29
30	42	31
40	28	28

Table 20.1

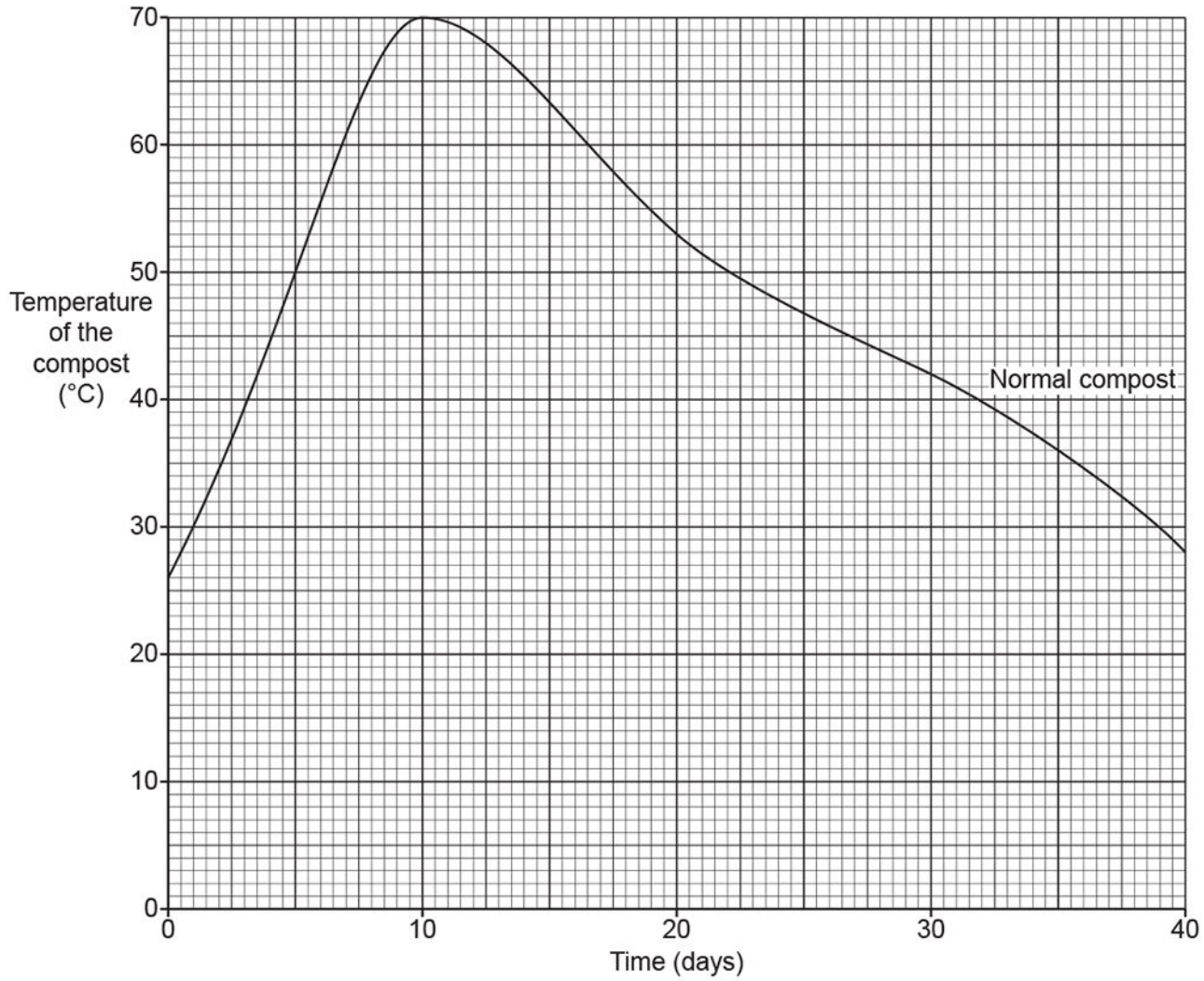
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(i) The scientists' results for the normal compost are plotted on the grid.

Complete the graph by plotting the results for the **bokashi** compost and draw a curve of best fit.



[3]

(ii) Describe the change in the temperature of the **normal** compost during the investigation.

---

[2]

(iii) Use data from **Table 20.1** to calculate the difference between the maximum temperature of the normal compost and the maximum temperature of the bokashi compost.

Difference = ... °C **[2]**

(iv) Which **two** statements explain this difference in temperature between the two types of compost?

Tick (✓) **two** boxes.

Both types of compost are made by aerobic respiration. ☐

Normal compost is made by aerobic respiration. ☐

Normal compost is made by anaerobic respiration. ☐

Aerobic respiration and anaerobic respiration release the same amount of energy. ☐

Aerobic respiration releases more energy than anaerobic respiration. ☐

Aerobic respiration releases less energy than anaerobic respiration. ☐

[2]

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(d) **Table 20.2** shows the scientists' results for the mass of the compost.

	Normal compost	Bokashi compost
Mass at start (kg)	1500	1500
Mass after 40 days (kg)	760	1200

Table 20.2

(i) The mass of the normal compost has decreased by 19 kg per day.

Calculate the decrease in mass of the bokashi compost per day.

Give your answer to the nearest **whole** number.

Decrease = ...kg per day **[3]**

(ii) Carbon dioxide is given off in the making of the compost. This causes most of the decrease in mass.

Scientists think that the bokashi method of composting might be better for the environment.

Use your answer from part **(i)** to justify the scientists' conclusion.

---

[1]

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36 Which is the correct definition of a parasite?

A An organism that is always at the top of a food chain.

B An organism that kills and eats another organism.

C An organism that lives on another living organism so that they both benefit.

D An organism that lives on or in another living organism causing it harm.

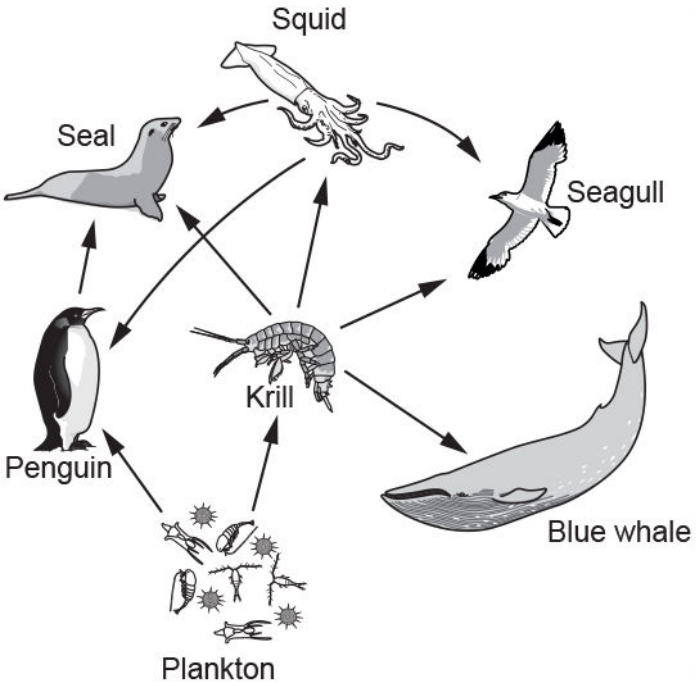
Your answer [ ] [1]

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37 The diagram shows a food web in the sea.



Not to scale

The number of penguins decreased in the area. This caused an increase in seal numbers.

What is a possible reason for the increase in seal numbers?

A Less seals were eaten.
B The krill numbers dropped.
C There were more plankton for the seals to eat.
D The seals had less competition for squid.

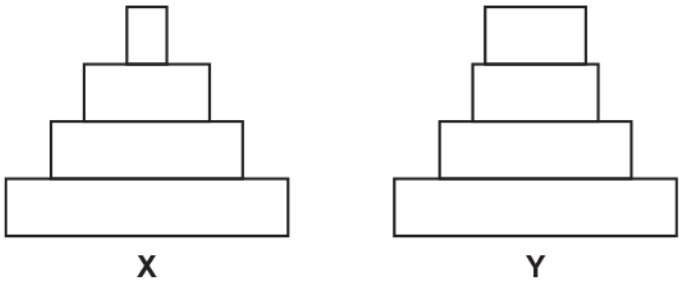
Your answer ☐ [1]

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38 The diagram shows pyramids of biomass for two food webs, X and Y.



Which statement explains the difference between the two pyramids?

A In food web X there is a greater efficiency of transfer between primary consumer and secondary consumer than in Y.

B In food web X there is a greater efficiency of transfer between secondary consumer and tertiary consumer than in Y.

C In food web X there is a lower efficiency of transfer between primary consumer and secondary consumer than in Y.

D In food web X there is a lower efficiency of transfer between secondary consumer and tertiary consumer than in Y.

Your answer ☐ [1]

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39(a) Gardeners often turn dead plant material from their garden into compost. They then add this compost to the soil where they are growing plants.

Why do gardeners add compost to their soil?

Tick (✓) **one** box.

Bacteria in the compost kill disease causing fungi. ☐

The compost is sterile and so is aseptic. ☐

The compost provides carbon dioxide for photosynthesis. ☐

The compost provides minerals for the plants. ☐

[1]

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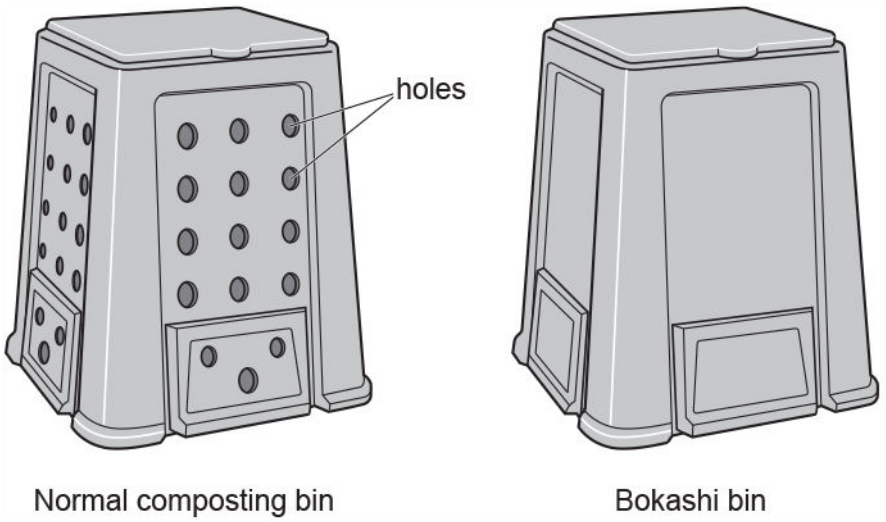
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(b) Compost can be made in a composting bin. In the bin **aerobic bacteria** turn dead plant material into compost.

Some people use a different way of making compost, called bokashi. In this process the compost is made **anaerobically.**

The drawings show a normal composting bin and a bokashi bin.



Explain the difference in the design of the two composting bins.

---

[2]

(c) Scientists investigate the two methods of making compost.

This is their method:

- Take one large pile of dead plant material
- Divide the material into two samples of equal mass
- Place one sample into the normal composter and place one sample into the bokashi composter
- Measure the temperature in each composter every 10 days
- After 40 days, measure the mass of the compost.

Write down **one** way that the scientists make sure that they can draw valid conclusions.

---

[1]

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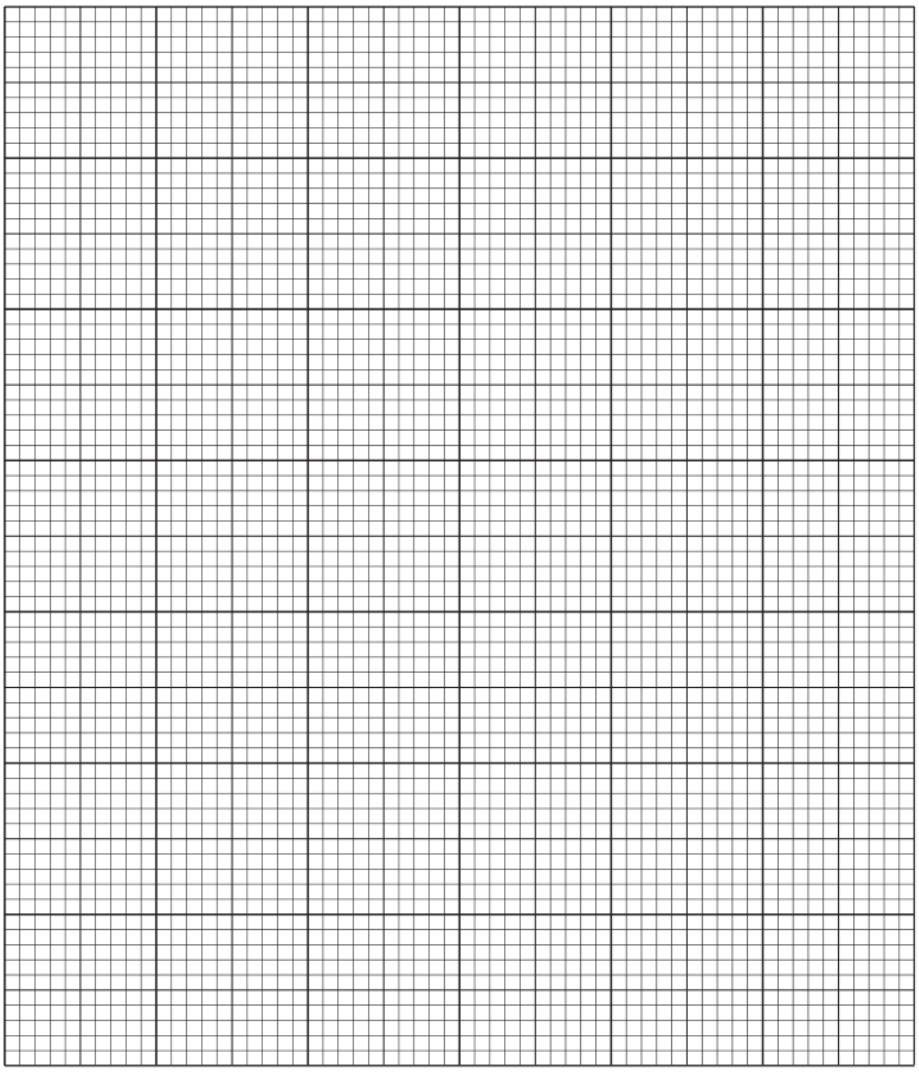
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(d) **Table 18.1** shows the scientists' temperature readings.

	Temperature of the compost (°C)	
Time (days)	normal compost	bokashi compost
0	26	26
10	70	27
20	53	29
30	42	31
40	28	28

Table 18.1

(i) Plot the scientists' results on the grid for normal and bokashi compost, and draw **two** curves of best fit.



[5]

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(ii) Explain why the temperature of the compost in the **normal** bin changed as shown in the graph.

[2]

(iii) Explain the difference in the temperature changes between the aerobic normal compost and the anaerobic bokashi compost.

[2]

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(e) **Table 18.2** shows the scientists' results for the mass of the compost.

	Normal compost	Bokashi compost
Mass at start (kg)	1500	1500
Mass after 40 days (kg)	750	1100

Table 18.2

A gas is given off in the formation of the compost. This causes most of the decrease in mass.

(i) The percentage decrease in the mass of the normal compost is 50%.

Calculate the percentage decrease in the mass of the bokashi compost.

Give your answer to **2** significant figures.

Percentage decrease = ... % **[3]**

(ii) The scientists concluded that the bokashi method of composting might be better for the environment.

Use your answer from part **(i)** to justify the scientists' conclusion.

---

[2]

40(a) **Fig. 16.1** shows a plant that grows in South America called stevia.



Fig. 16.1

(i) Write down the number of trophic levels in this food web.

[1]

(ii) What is the source of energy for this food web?

[1]

(iii) Septoria fungus is a parasite of stevia.

Explain what is meant by the term **parasite**.

[2]

(b) **Fig. 16.2** shows a food web containing stevia.

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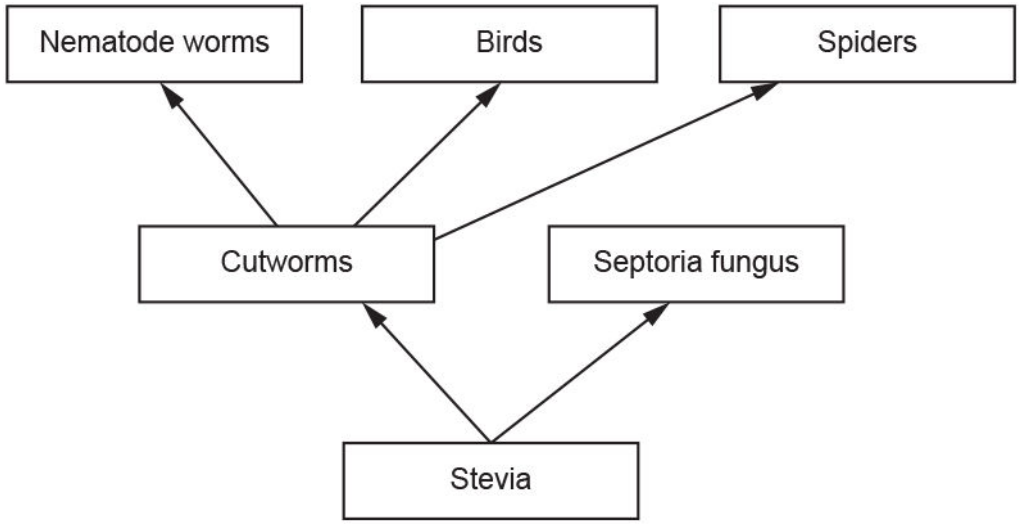


Fig. 16.2

The leaves of stevia taste very sweet. People are now trying to grow stevia as a crop.

Stevia farmers often add nematode worms to their fields.

Explain why farmers do this.

Use **Fig. 16.2** in your answer.

---

[3]

41(a) Fig. 22.1 shows the water cycle occurring in a lake.

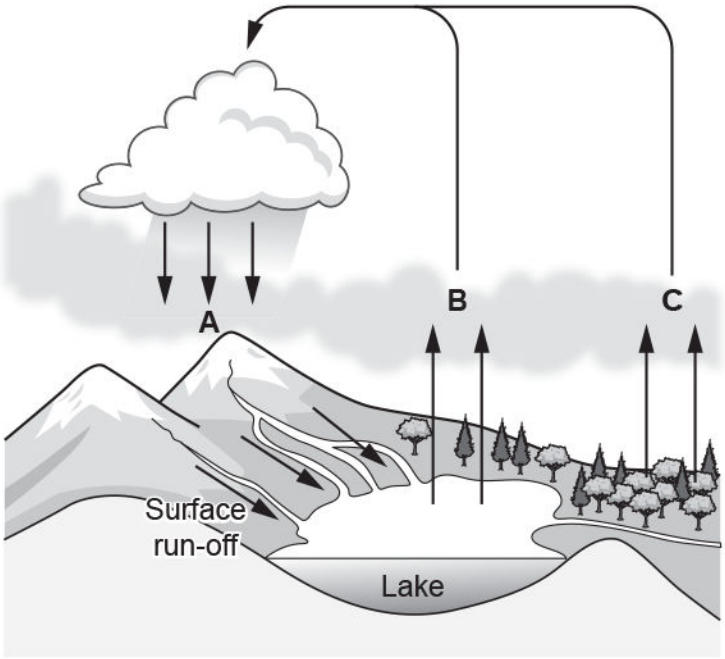


Fig. 22.1

Draw a line to the correct name for the three processes labelled **A**, **B** and **C** in **Fig. 22.1**.

A	Evaporation
	Photosynthesis
B	Precipitation
	Respiration
C	Translocation
	Transpiration

[3]

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(b) Surface run-off water passes through soil and back into the lake.

Write down **one** reason why surface run-off water is important to organisms living in the lake.

---

[1]

42(a) **Fig. 16.1** shows the water cycle occurring in a lake.

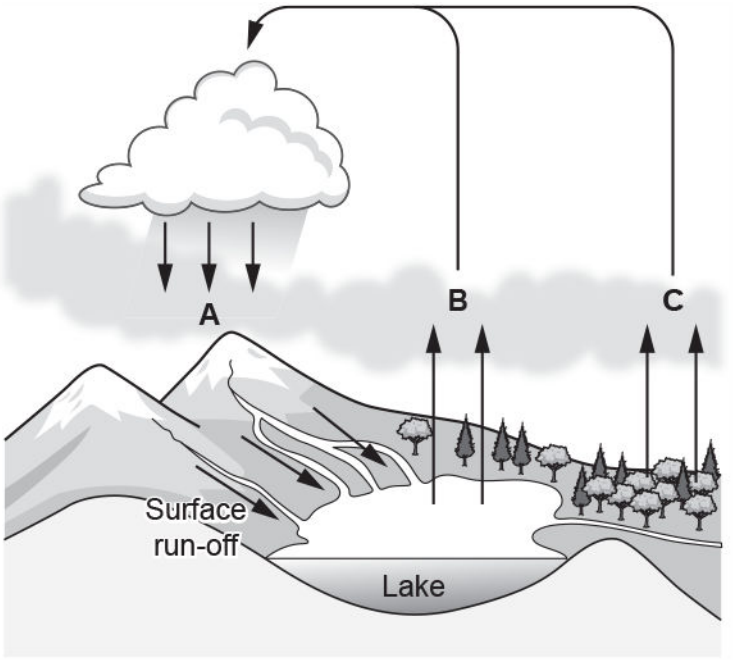
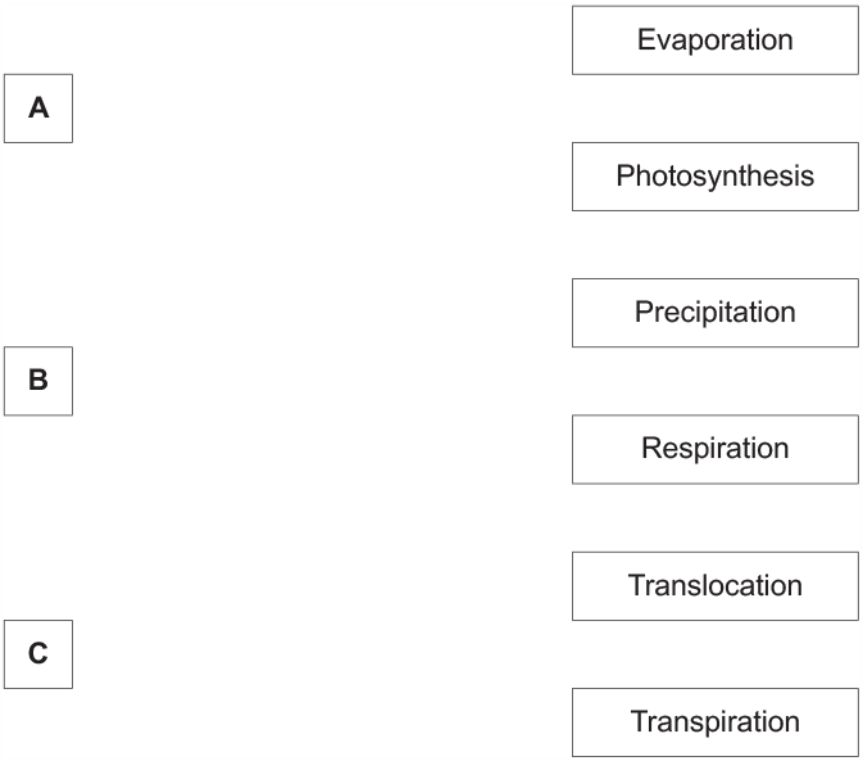


Fig. 16.1

Draw a line to the correct name for the three processes labelled **A, B** and **C** in **Fig. 16.1**.



[3]

(b) Surface run-off water passes through soil and back into the lake.

Write down one reason why surface run-off water is important to organisms living in the lake.

---

[1]

END OF QUESTION PAPER

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