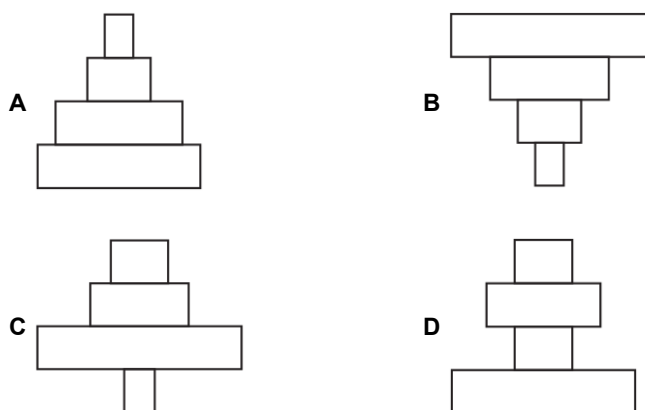


Ecosystems (F)

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

Oak tree → Greenfly → Ladybird → Blackbird

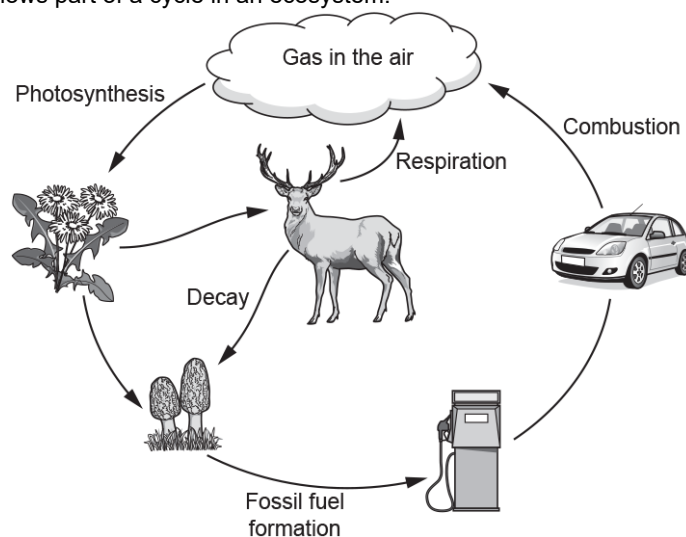
Which is the correct shape for a pyramid of **biomass** for this food chain?



Your answer

[1]

2. 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]

3. 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]

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

- A Decomposition
- B Mutualism
- C Parasitism
- D Predation

Your answer

[1]

5. 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]

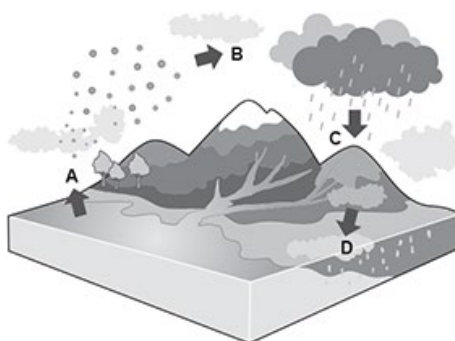
6. Which of these is an **abiotic** factor that can affect organisms?

- A Food availability
- B Light intensity
- C Pathogens
- D Predators

Your answer

[1]

7. The diagram shows the water cycle.



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

Your answer

[1]

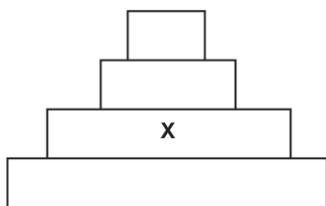
8. Which process in the carbon cycle **takes in** carbon dioxide from the air?

- A Combustion
- B Decomposition
- C Photosynthesis
- D Respiration

Your answer

[1]

9. 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]

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

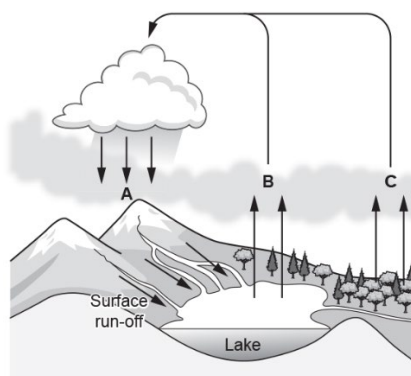


Fig. 22.1

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

A

Evaporation

Photosynthesis

Precipitation

B

Respiration

Translocation

C

Transpiration

[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]

11 (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.

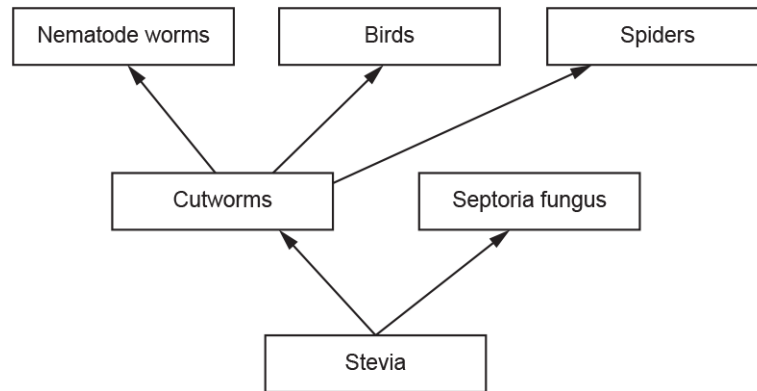


Fig. 16.2

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.

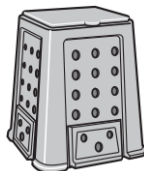
Use Fig. 16.2 in your answer.

[3]

12 (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]

(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]

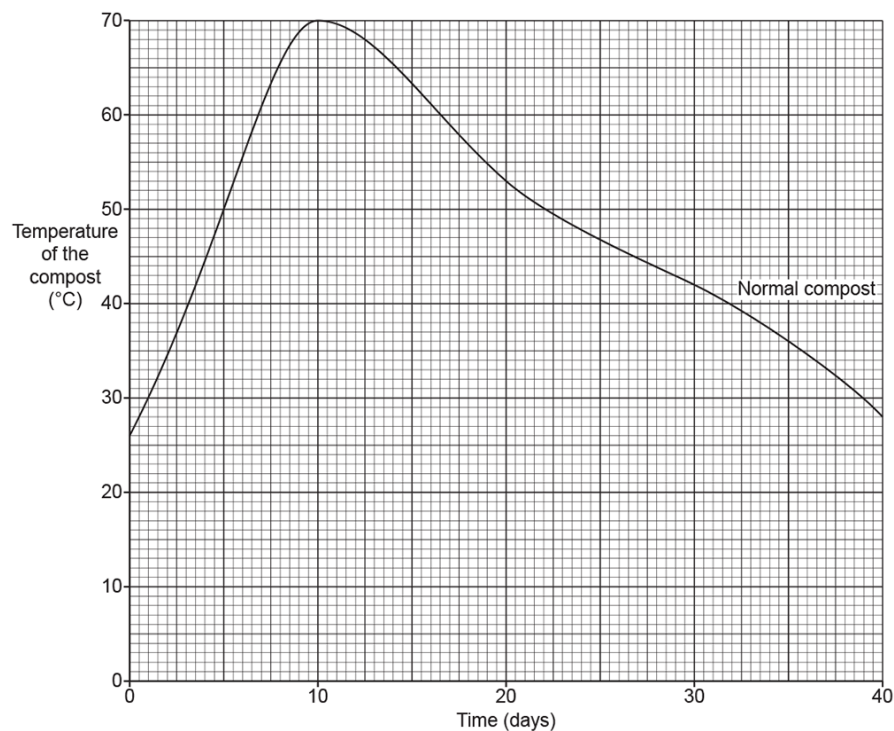
(c). Table 20.1 shows the scientists' temperature measurements.

Time (days)	Temperature of the compost ($^{\circ}\text{C}$)	
	Normal compost	Bokashi compost
0	26	26
10	70	27
20	53	29
30	42	31
40	28	28

Table 20.1

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]

- (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]

- (e). What do plant roots get from compost in the soil?

Put a ring around the correct answer.

carbon dioxide

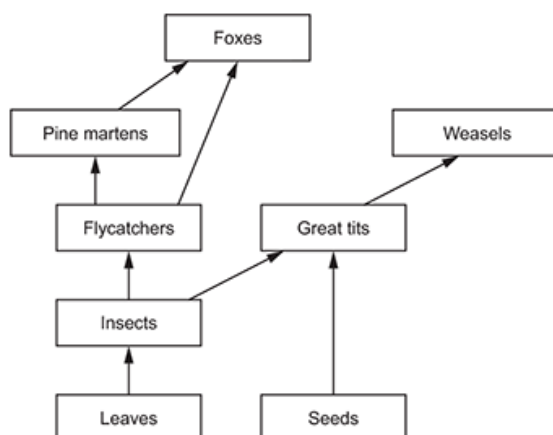
minerals

nitrogen gas

oxygen gas

[1]

13. The diagram shows part of a food web from a woodland.



Great tits and flycatchers are both birds.

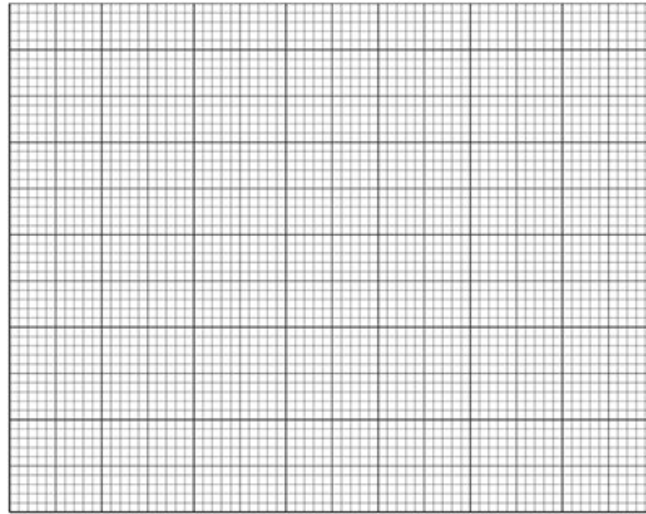
In a conservation project, scientists have built boxes for the birds to nest in. The scientists fixed the boxes on trees at different heights.

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

Height of bird box above the ground (m)	Number of bird boxes used	
	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:

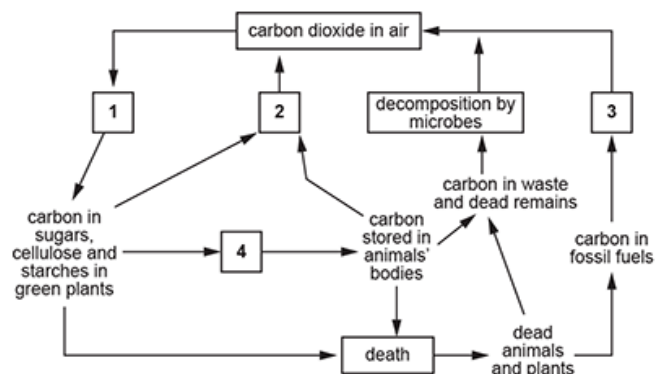
- Weasels feed on great tits
- Pine martens feed on flycatchers.

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]

14. The diagram shows the carbon cycle.



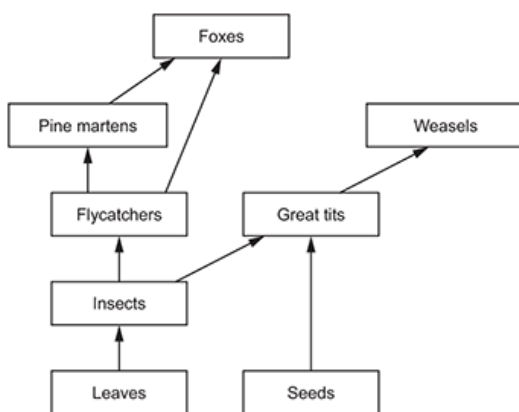
Boxes 1-4 represent different processes in the carbon cycle.

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]

15. 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]

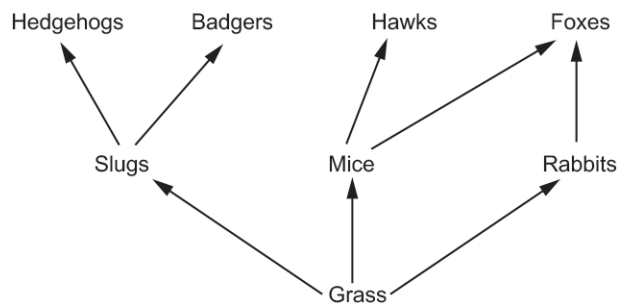
- ii. Foxes are described as both predators and competitors of pine martens.
Explain why.

[2]

- iii. Which organism in the food web occupies the second trophic level?

[1]

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



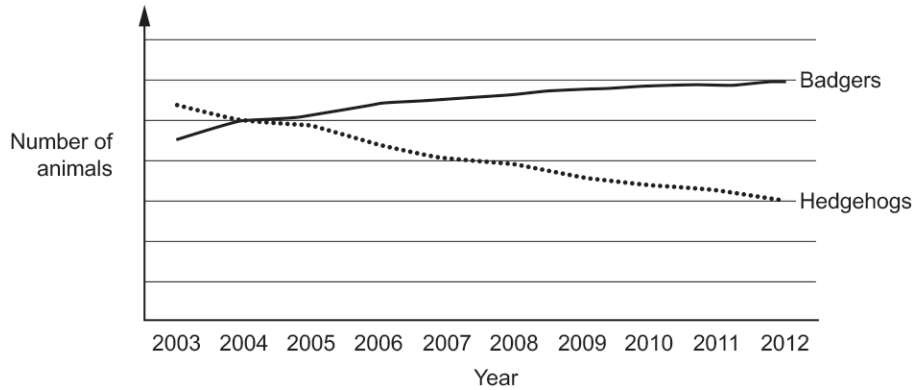
How many secondary consumers are shown in this food web?

[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.

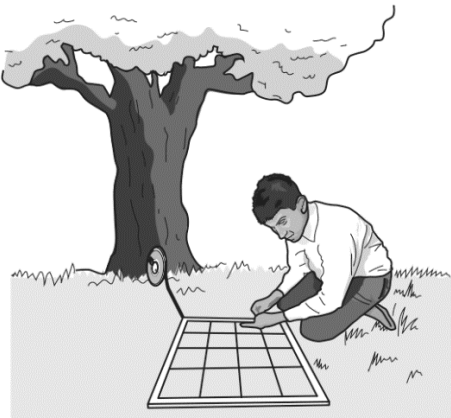
These hedgehogs do not roll up. They run away when frightened. The scientists think that genes control this behaviour.

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

Use ideas about natural selection.

[4]

17. 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.

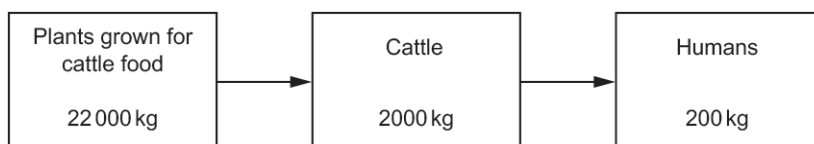
Distance from the tree (m)	Percentage of ground covered by plants (%)
1	10
2	15
3	18
4	22
5	50
6	58
7	62
8	64

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

Explain how the student's results show this.

[4]

18. 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]**

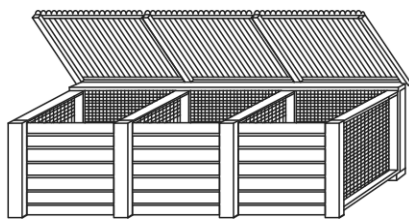
- ii. One way biomass is lost from the food chain is by insects eating the leaves of plants.

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

----- **[1]**

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

The composter has three sections.



Section A Section B Section C

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

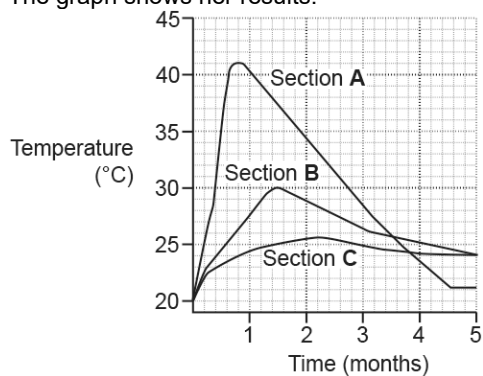
- Section **A** once a week
- Section **B** once a month
- Section **C** is not watered.

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]

END OF QUESTION PAPER