

Energy Flow, Food Chains & Food Webs

Question Paper

Level	O Level
Subject	Biology
Exam Board	Cambridge International Examinations
Topic	Relationships of organisms with one another and the environment
Sub Topic	Energy flow, food chains & food webs
Booklet	Question Paper 1

Time Allowed: 60 minutes

Score: /50

Percentage: /100

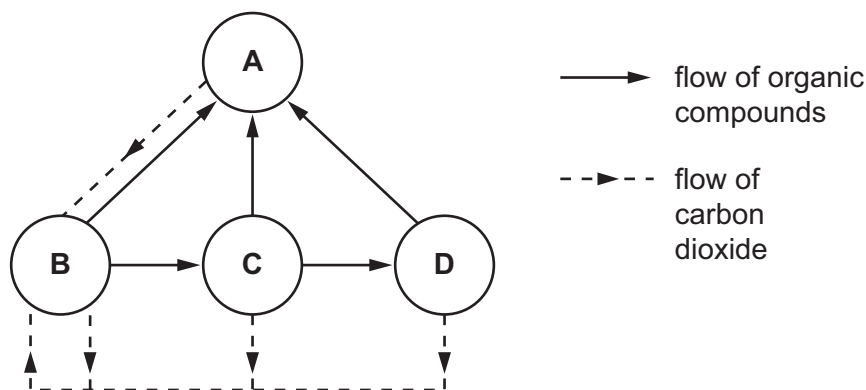
1 Which type of organism depends **directly** on light energy for its nutrition?

- A carnivore
- B decomposer
- C herbivore
- D producer

2 The diagram shows the flow of substances within an ecosystem.

The circles represent trophic levels.

Which circle represents herbivores?



3 A farmer is growing wheat in a field. The farmer uses insecticides to kill insect pests and chemicals to kill weeds in the field.

Which statements about this field are correct?

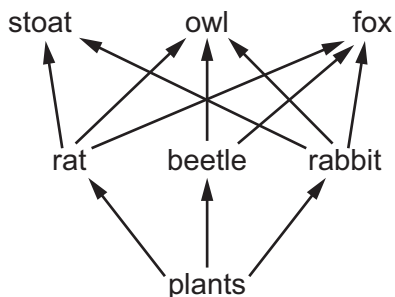
- 1 Both the wheat and the weeds are producers.
- 2 Insects feed at the first trophic level.
- 3 Weeds may use light, water and mineral ions that the wheat plants need.

- A 1 and 2 only B 1 and 3 only C 2 and 3 only D 1, 2 and 3

4 Which sequence describes the flow of energy in an ecosystem?

- A carnivore → herbivore → plant → Sun
- B plant → herbivore → carnivore → Sun
- C Sun → carnivore → herbivore → plant
- D Sun → plant → herbivore → carnivore

5 The diagram shows a food web.



What is likely to happen to the owl population if foxes die out?

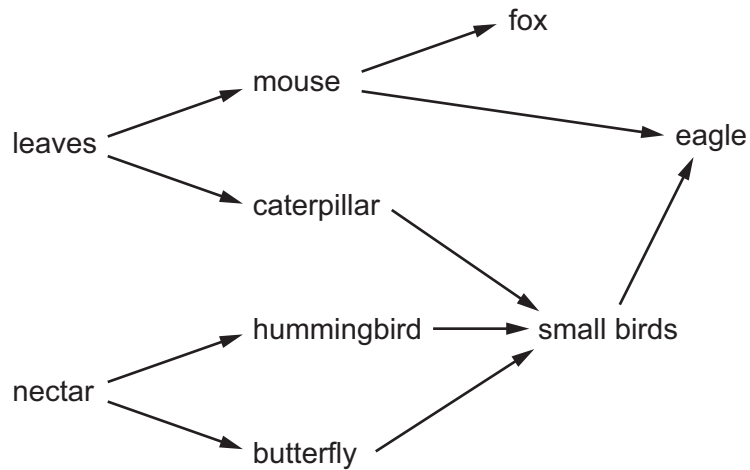
- A It will decrease because there will be more competition with stoats for food.
- B It will increase because there will be more rats, beetles and rabbits for them to eat.
- C It will stay the same because owls do not eat foxes.
- D It will stay the same because stoats will eat less food.

6 Some types of bacteria make carbohydrates from carbon dioxide and water using the energy from sunlight.

Which of the following describes these bacteria?

- A carnivores
- B decomposers
- C herbivores
- D producers

7 The diagram shows a food web.



Which statement about this food web is correct?

- A Eagles obtain their energy from foxes.
- B If the hummingbirds all die the caterpillars will have more food.
- C Part of this food web is the food chain: nectar → caterpillar → small birds
- D The small birds are carnivores.

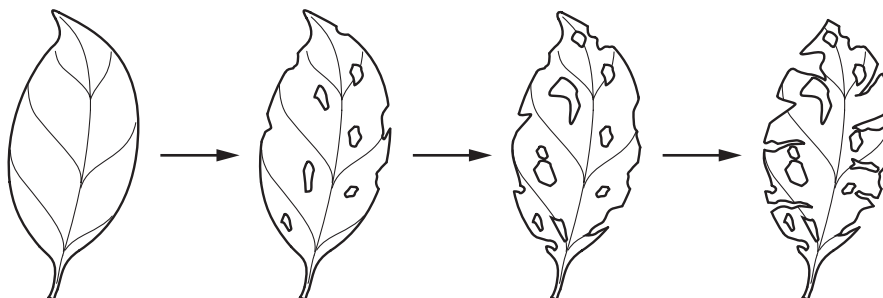
8 The diagram shows a food chain.

mahogany tree → caterpillar → songbird → hawk

Which type of organism is present in the largest numbers in this food chain?

- A carnivores
- B consumers
- C herbivores
- D producers

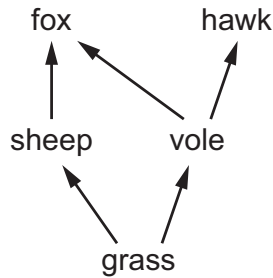
9 The diagram shows changes in the appearance of a leaf over a period of time, as it lies on the damp ground.



Which type of organism is most likely to cause these changes?

- A carnivore
- B decomposer
- C herbivore
- D producer

10 The diagram shows a food web.



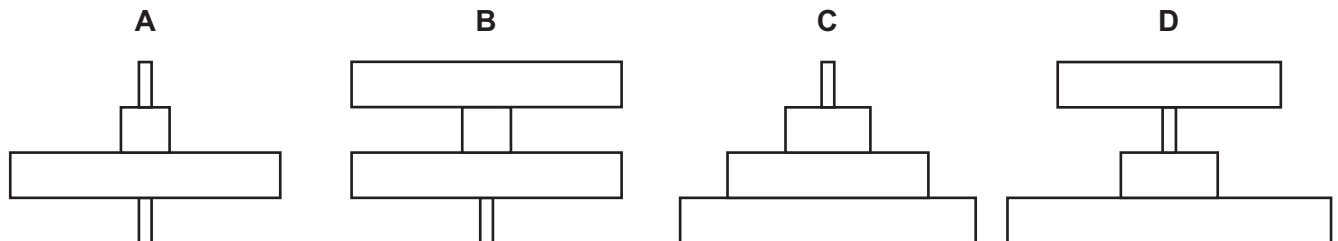
To which pair of animals is the greatest amount of energy available?

- A fox and hawk
 - B fox and sheep
 - C hawk and vole
 - D sheep and vole
- 11 Which statement correctly describes relationships in ecosystems?
- A Carbohydrates are passed from decomposers to producers.
 - B Energy is passed from carnivores to herbivores.
 - C Proteins are passed from primary consumers to producers.
 - D Water is passed from respiring decomposers to producers.

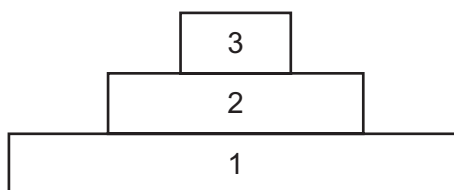
12 The diagram shows a food chain.

grass → rabbit → fox → flea

Which pyramid of numbers matches this food chain?



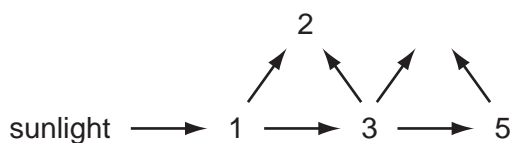
13 The diagram shows a pyramid of biomass.



What do levels 1, 2 and 3 represent?

	1	2	3
A	carnivore	herbivore	producer
B	carnivore	producer	herbivore
C	producer	carnivore	herbivore
D	producer	herbivore	carnivore

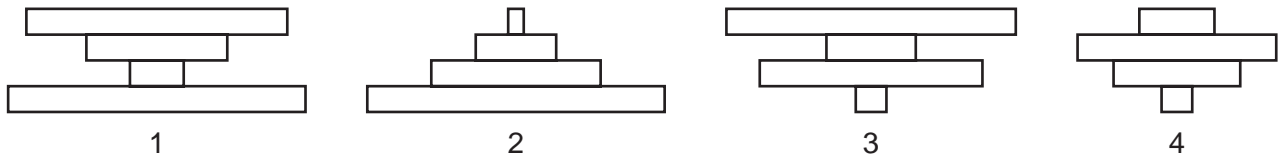
14 The diagram shows energy flow in a food web.



Which number represents an organism that eats both plants and animals?

- A** 2 **B** 3 **C** 4 **D** 5

- 15 A tree has insect larvae burrowing in its leaves. The emerging insects are eaten by birds and the birds have parasitic fleas living amongst their feathers.



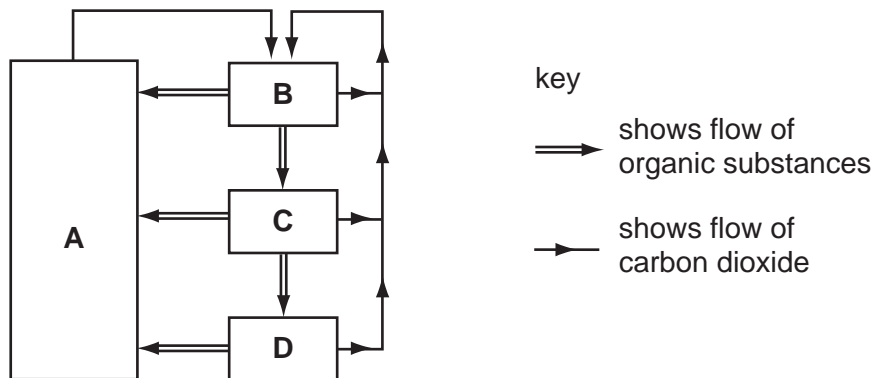
Which is a pyramid of biomass and which is a pyramid of numbers for this food chain?

	pyramid of mass	pyramid of numbers
A	1	3
B	1	4
C	2	3
D	2	4

- 16 The diagram represents the flow of substances within a balanced ecosystem.

The boxes are various trophic levels.

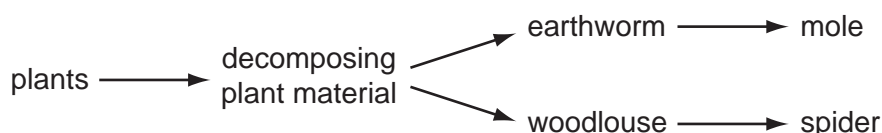
Which box represents producers?



17 Which processes increase and decrease the amount of carbon dioxide in the air?

	process causing increase in carbon dioxide	process causing decrease in carbon dioxide
A	burning of fossil fuels	respiration of plants
B	photosynthesis in plants	respiration of bacteria
C	respiration of animals	photosynthesis in plants
D	respiration of bacteria	burning of fossil fuels

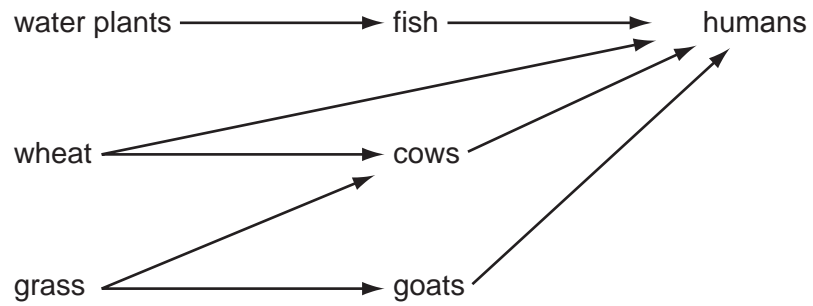
18 The flow chart shows part of a food web in a field.



What describes **both** the earthworm and the woodlouse?

- A carnivore and consumer
 - B consumer and herbivore
 - C decomposer and herbivore
 - D producer and carnivore
- 19 Which organisms **always** obtain their energy from dead organic matter?
- A consumers
 - B decomposers
 - C fungi
 - D producers
- 20 What eventually happens to all the energy in an ecosystem?
- A It is lost from the system as heat.
 - B It is recycled by decomposers.
 - C It is used by the producers.
 - D It is used by the top carnivore.

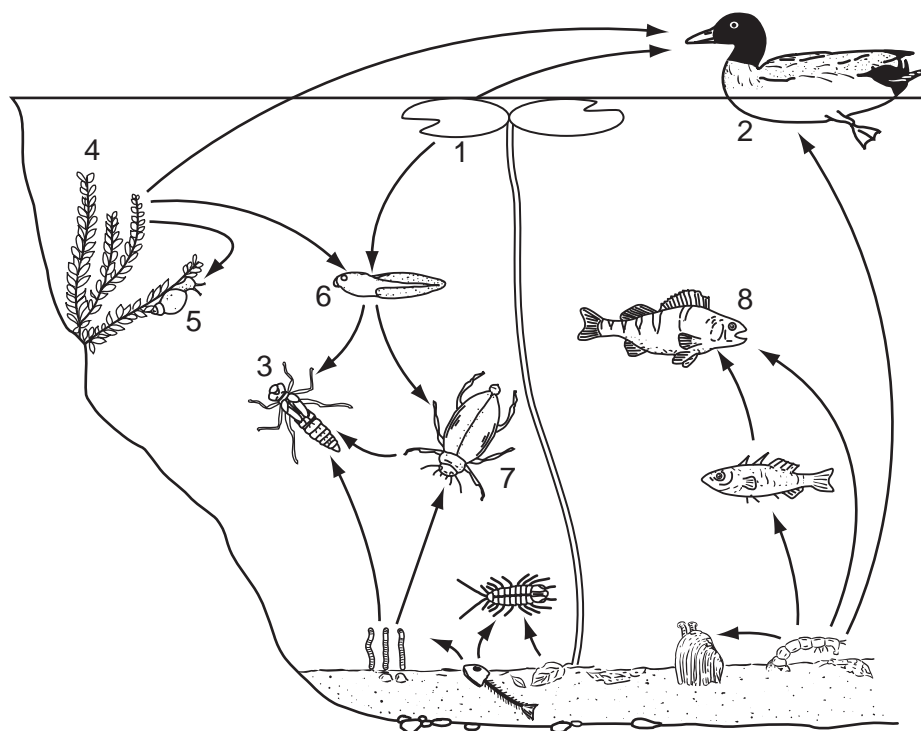
21 The diagram shows a food web.



What is the energy source for this food web?

- A carbohydrate
- B heat
- C minerals
- D sunlight

22 The diagram shows a food web in a pond.



Which of the organisms is a carnivore, which is a herbivore and which is a producer?

	carnivore	herbivore	producer
A	3	8	1
B	7	6	1
C	8	3	4
D	5	2	4

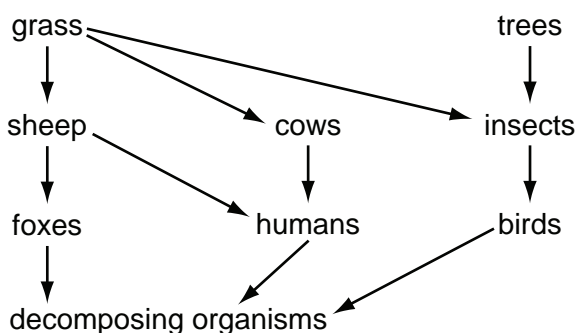
23 By which process do producers obtain energy?

- A** digestion
- B** photosynthesis
- C** translocation
- D** transpiration

24 Which process does **not** result in an overall loss of energy from the organism?

- A photosynthesis in a green plant
- B respiration in an animal
- C temperature control in humans
- D the germination of seeds

25 The diagram shows part of a food web.



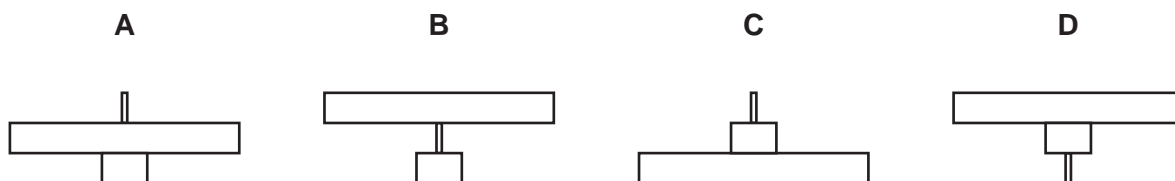
What is the original source of energy for this food web?

- A decomposer organisms
- B oxygen
- C producer organisms
- D sunlight

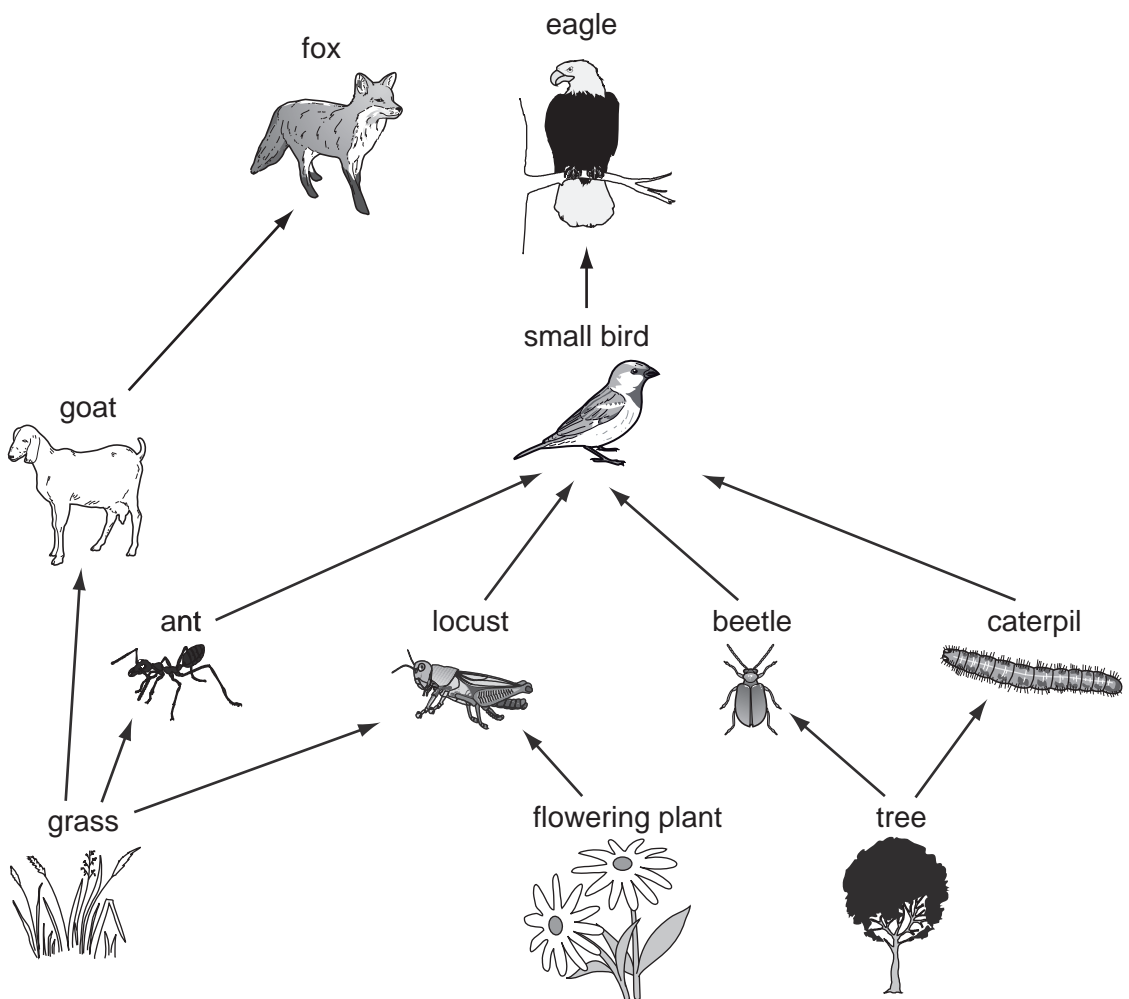
26 The table shows the mean dry biomass for the organisms in a food chain.

type of organism	mean dry biomass /g per m ²
producer	540
herbivore	26
carnivore	2

Which pyramid of biomass is correct for this food chain?



27 The diagram shows part of a food web.



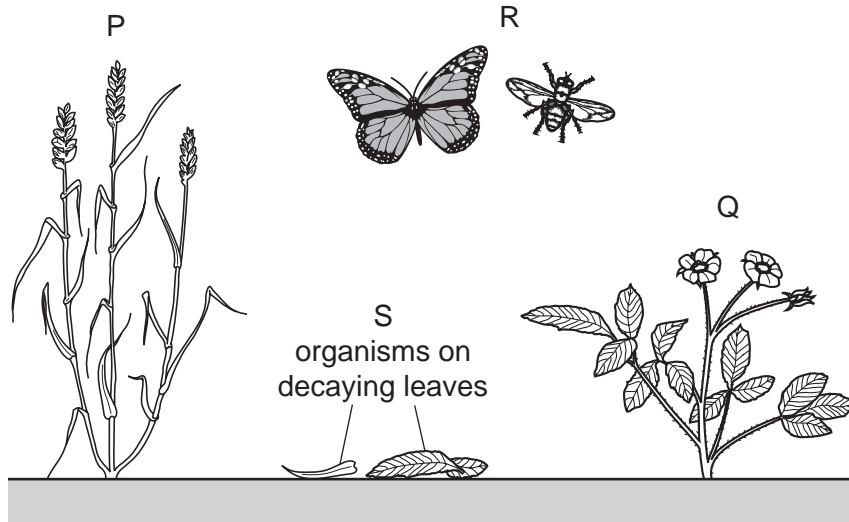
How many herbivores are shown?

- A 3
- B 4
- C 5
- D 6

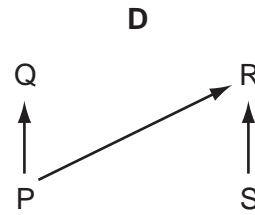
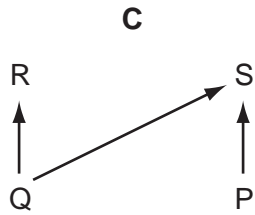
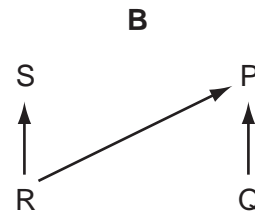
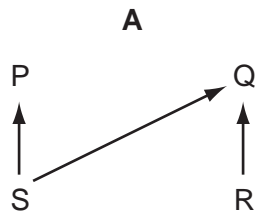
28 Why is a *producer* so called?

- A It produces carbohydrates.
- B It produces carbon dioxide.
- C It produces energy.
- D It produces oxygen.

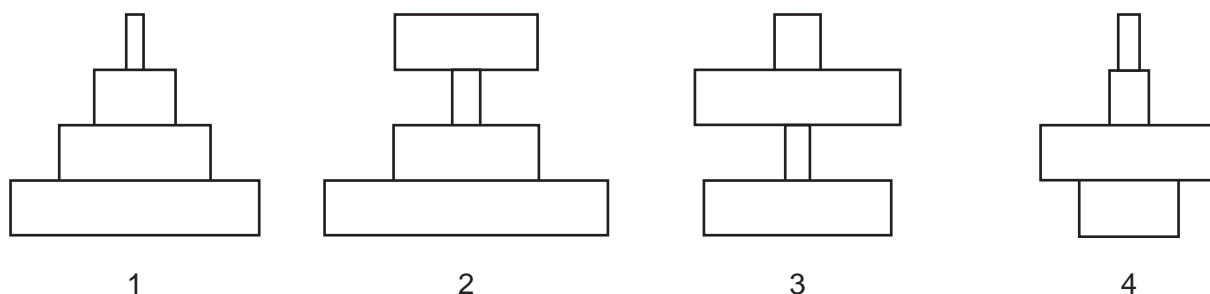
29 The diagram shows organisms in a habitat.



Which shows the feeding relationships of these organisms?



30 The diagram shows four ecological pyramids.



In a food chain, grass is eaten by cows. The cows have insects living on their skin. The insects are eaten by birds.

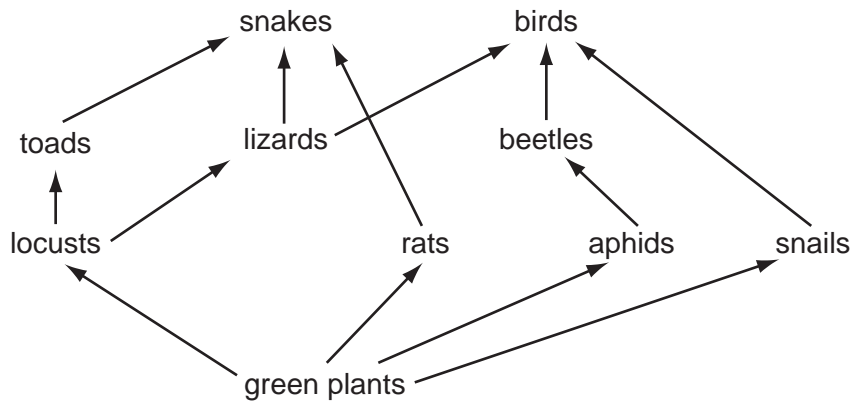
Which is the pyramid of mass and which is the pyramid of numbers in this food chain?

	pyramid of mass	pyramid of numbers
A	1	3
B	1	4
C	3	1
D	3	2

31 What would be an **undesirable** feature in an insecticide?

- A** It becomes more concentrated at each stage in the food web.
- B** It breaks down within a few months.
- C** It destroys one particular insect only.
- D** It destroys the immature forms of the insect.

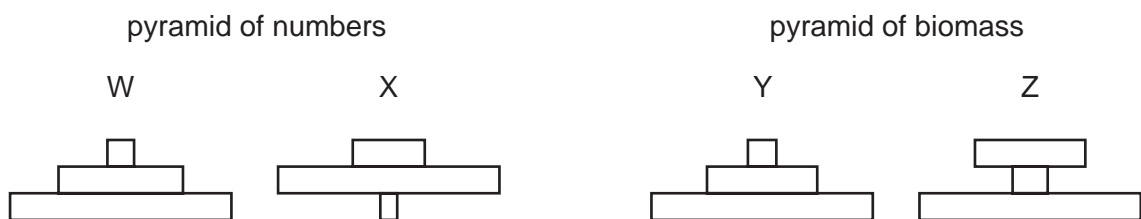
32 The diagram shows a food web in woodland.



In this food web, the beetles are

- A carnivores.
- B decomposers.
- C herbivores.
- D producers.

33 A single plant provides food for many herbivores. The herbivores supply food for a few carnivores.

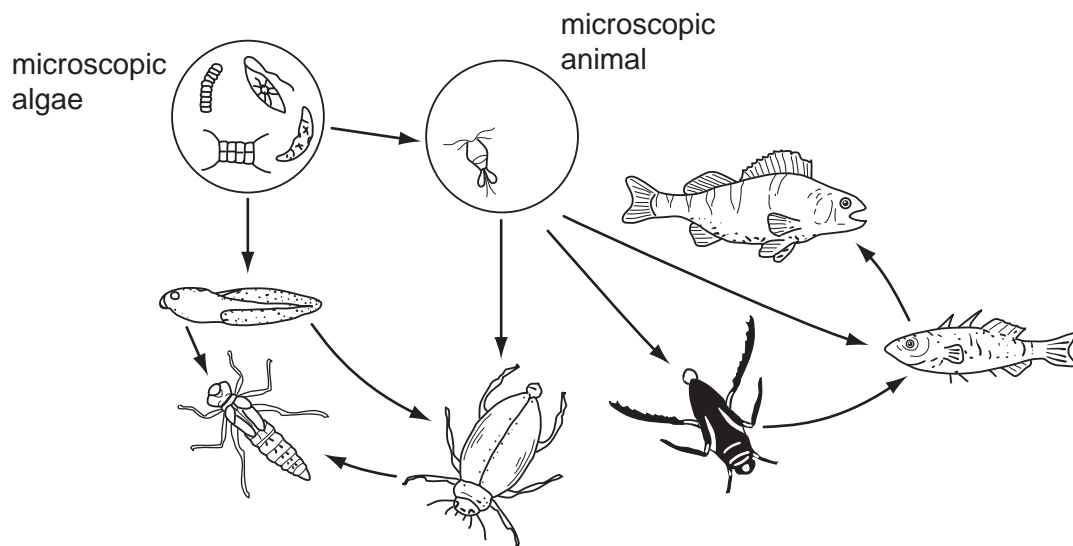


Which pyramid of numbers and which pyramid of biomass show this information?

	pyramid of numbers	pyramid of biomass
A	W	Y
B	W	Z
C	X	Y
D	X	Z

- 34 Which situation does **not** involve the cycling of the factor named?
- A carbon dioxide between plants, animals and the atmosphere
 - B energy along a food web of producers and consumers
 - C nitrogen between plants, animals, bacteria and the atmosphere
 - D water in an ecosystem

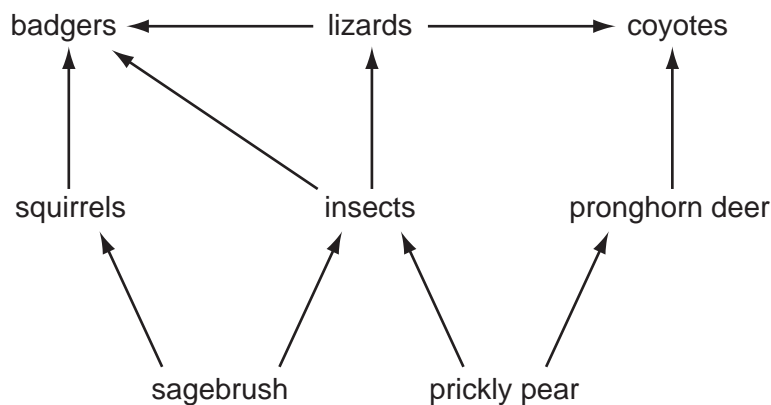
35 The diagram below shows part of a pond food web.



How many primary consumers are shown in this food web?

- A 1
 - B 2
 - C 3
 - D 4
- 36 A decrease in the numbers of producers in a food chain will cause
- A the consumers to increase in numbers.
 - B more animals to migrate into the area.
 - C the total productivity to increase.
 - D the total biomass to decrease.

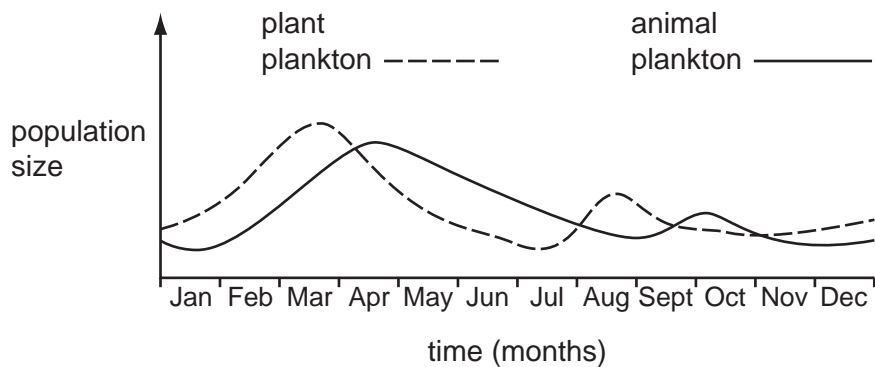
37 The diagram shows a food web from an ecosystem.



If the population of insects decreases, which other population will decrease the most?

- A badgers
- B lizards
- C sagebrush
- D squirrels

38 The graph shows changes in population over time for plant and animal plankton in a lake.



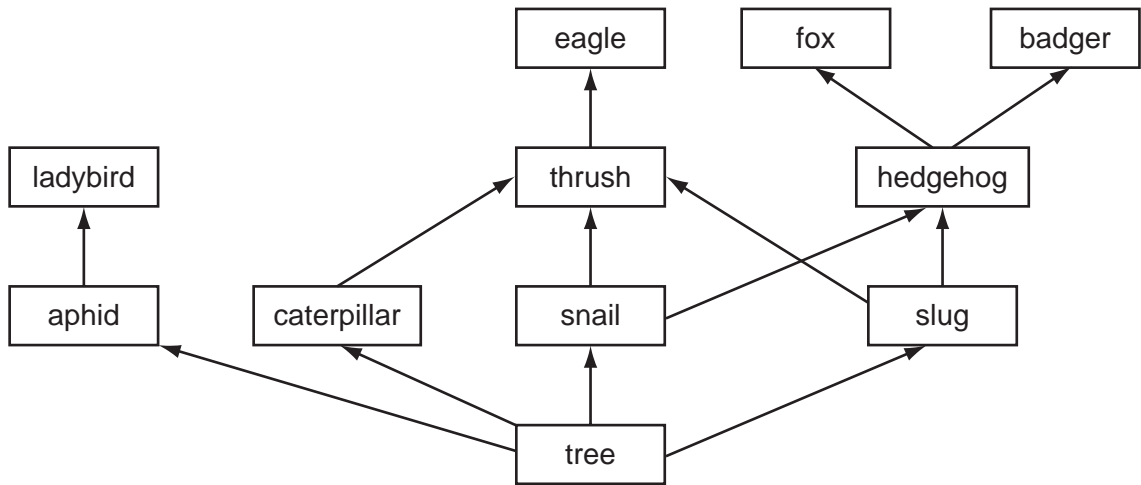
Consider the following statement in relation to the data provided by the graph.

‘Population changes in animal plankton lag behind similar changes in plant plankton because the animals feed on the plants.’

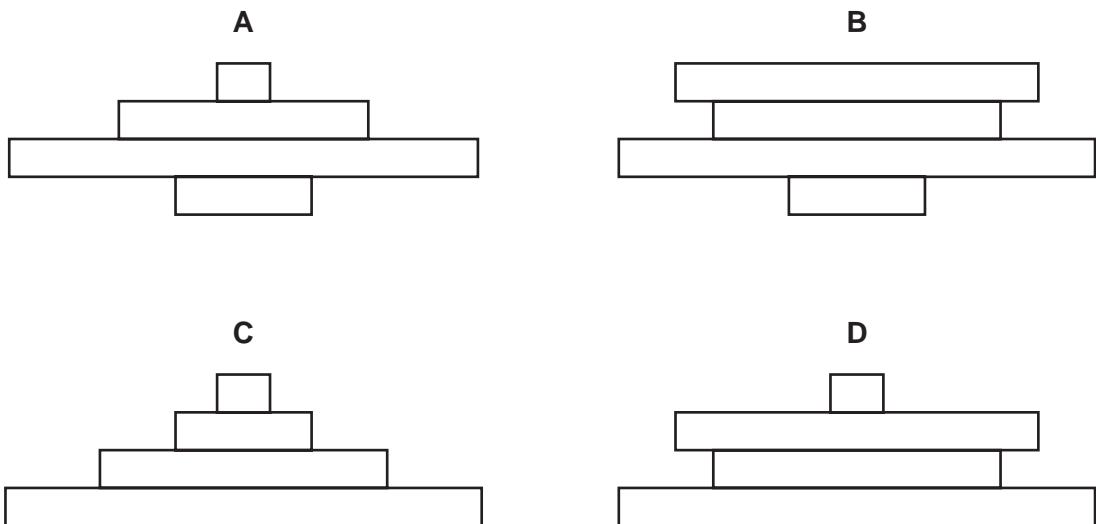
Into which category does the statement fall?

- A It is a reasonable interpretation of the data.
- B It is a restatement of the data, not an interpretation.
- C It is contradicted or not supported by the data.
- D More data are required in order for this interpretation to be made.

39 The diagram shows part of a food web.

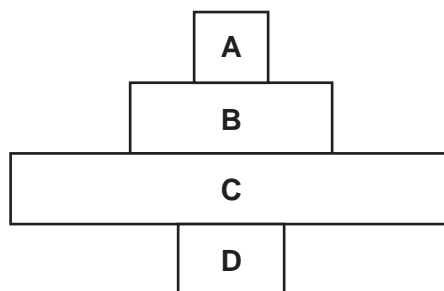


Which is a pyramid of numbers based on this food web?



40 The diagram shows a pyramid of numbers in an ecosystem.

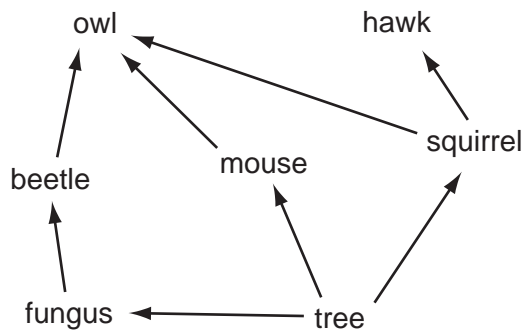
In which group of organisms are the individuals largest?



41 Which diagram shows part of the energy flow in an ecosystem?



42 The diagram shows a food web.



Which of the organisms, shown in the food web, can survive by taking in only simple inorganic materials?

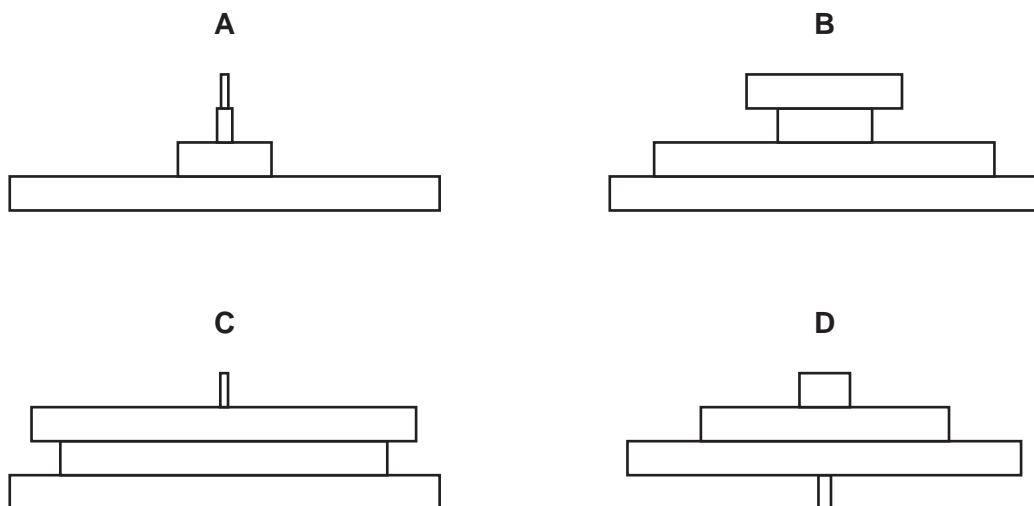
- A beetle
- B fungus
- C owl
- D tree

43 Which statement is **not** correct?

- A Anaerobic respiration releases less energy than aerobic respiration.
- B The sun is the principal source of energy input into biological systems.
- C Energy flowing through biological systems is recycled.
- D Active transport is an energy-consuming process.

44 A sparrowhawk eats small birds that feed on caterpillars. Caterpillars feed on plant leaves.

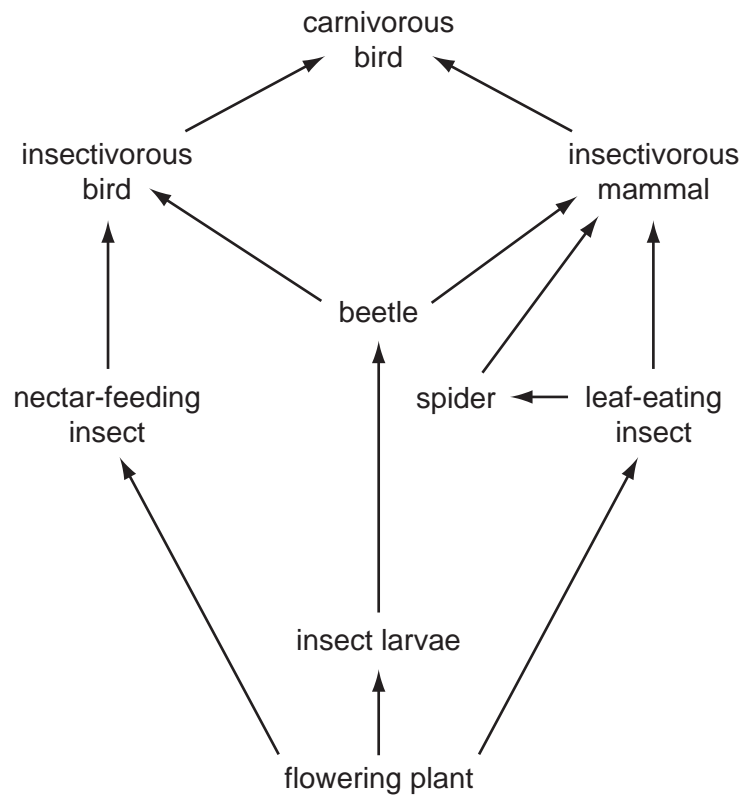
Which diagram shows the pyramid of biomass for this food chain?



45 Which is a possible sequence for energy flowing through a food web?

	lost as heat	present in glucose	present in protein	recycled for photosynthesis
A	–	2	1	3
B	1	–	3	2
C	2	3	–	1
D	3	1	2	–

46 The diagram shows part of a food web.

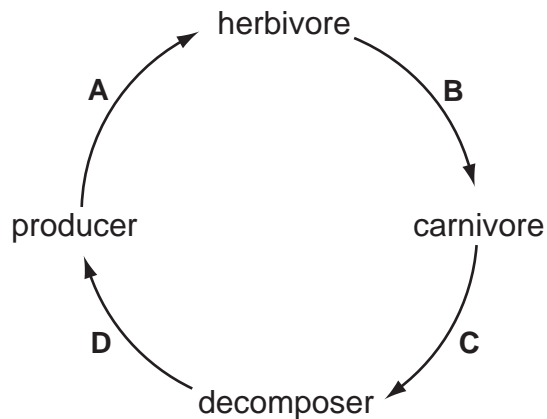


Which is a primary consumer?

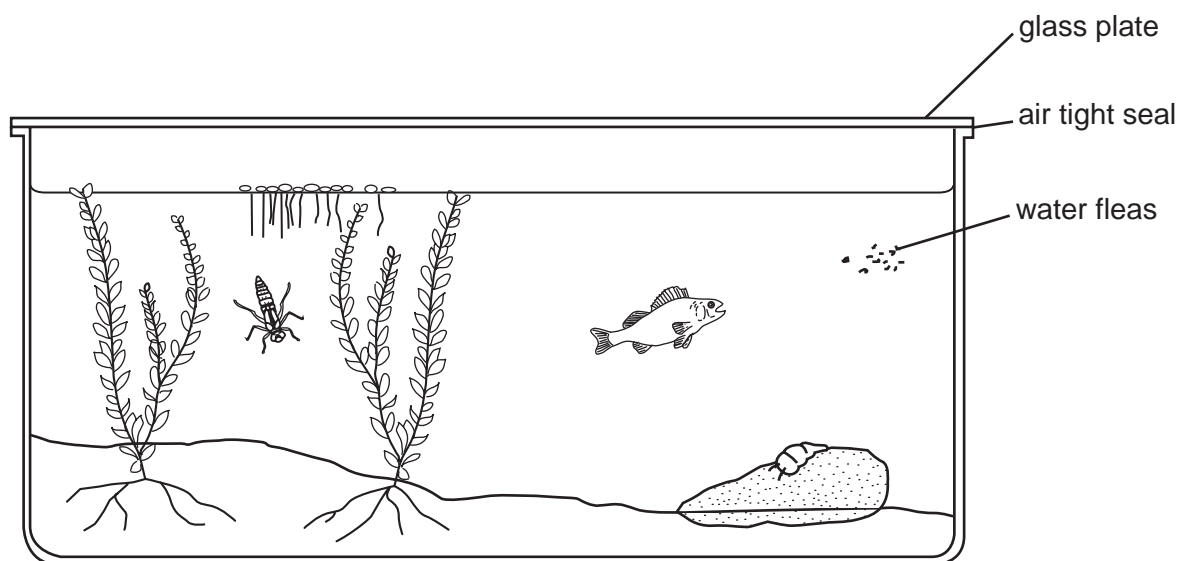
- A beetle
- B carnivorous bird
- C insectivorous mammal
- D nectar-feeding insect

47 The diagram shows how **carbon** circulates in nature.

Through which stage does most **energy** flow?



48 The diagram shows some animals and green plants sealed in an aquarium.



What must be supplied to keep the organisms alive for the longest possible time?

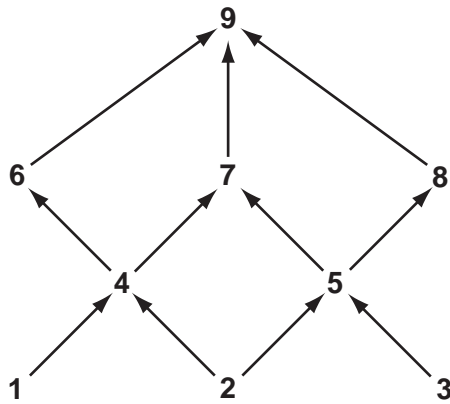
- A carbon dioxide
- B light energy
- C nitrates
- D oxygen

49 Some types of bacteria make carbohydrates from carbon dioxide and water using the energy from sunlight.

What are these bacteria?

- A anaerobic
- B consumers
- C decomposers
- D producers

50 The diagram shows nine organisms forming a food web.



Which of the organisms is a producer and which is a carnivore?

	producer	carnivore
A	1	4
B	2	6
C	5	8
D	7	9