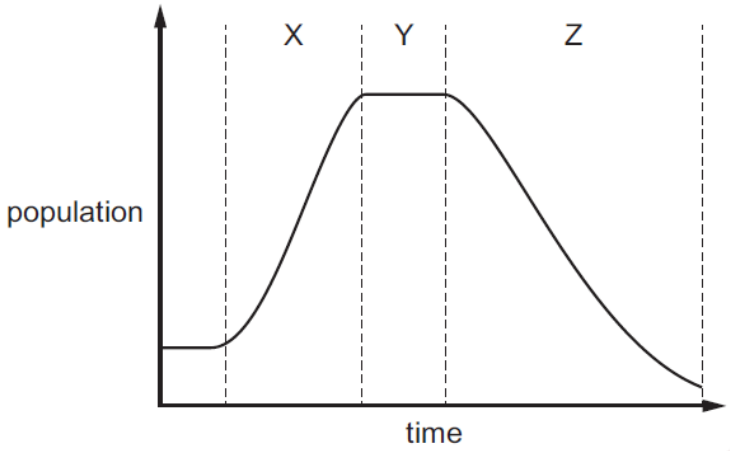
Organisms and their environment – 2021 IGCSE 0610

1. March/2021/Paper_22/No.37

The graph shows the change in population of an organism over time in an ecosystem.



Which row correctly identifies each phase of the population graph?

	X	Y	Z
A	lag	exponential (log)	stationary
B	lag	stationary	death
C	exponential (log)	death	stationary
D	exponential (log)	stationary	death

2. March/2021/Paper_22/No.40

The action of which type of bacteria would cause soil to be lacking in nitrates?

A aerobic

B denitrifying

C nitrifying

D nitrogen fixing

3. March/2021/Paper_32/No.3

Fig. 3.1 shows a food web.

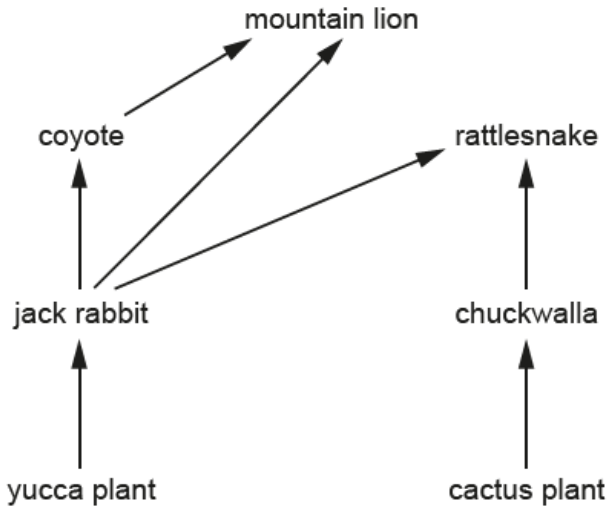


Fig. 3.1

(a) A scientist found that chuckwallas were also eaten by coyotes.

Draw an arrow **on Fig. 3.1** to show this information. [1]

(b) Table 3.1 shows some of the terms used to describe the organisms in Fig. 3.1.

Place tick(s) (✓) in all the boxes in Table 3.1 that correctly describe each organism.

Table 3.1

	producer	consumer	herbivore	carnivore
coyote				
jack rabbit				
rattlesnake				
yucca plant				

[4]

(c) State the name of the organism in Fig. 3.1 that is both a secondary and a tertiary consumer.

..... [1]

(d) A new organism that eats cactus plants was introduced to the food web in Fig. 3.1.

Predict **and** explain the effect this would have on the chuckwalla population.

.....

.....

.....

.....

..... [2]

(e) Chuckwallas are a type of lizard.

They have adapted to be able to lose part of their tail if they are caught by predators.

Fig. 3.2 is a photograph of a chuckwalla.

Fig. 3.2

Complete the sentences using words from the list to describe how chuckwallas have evolved the ability to lose part of their tails by natural selection.

Each word may be used once, more than once or not at all.

all	**alleles**	**behaviour**	**none**
offspring	**parents**	**predators**	**some**

A mutation caused some of the population of chuckwallas to be able to lose part of their tail.

Chuckwallas that could lose their tail were able to escape ..... .

These chuckwallas survived long enough to breed and pass their .....

on to their ..... .

Eventually ..... of the chuckwallas had the ability to lose their tails.

[4]

[Total: 12]

4. March/2021/Paper_42/No.6

(a) Fig. 6.1 shows a food web.

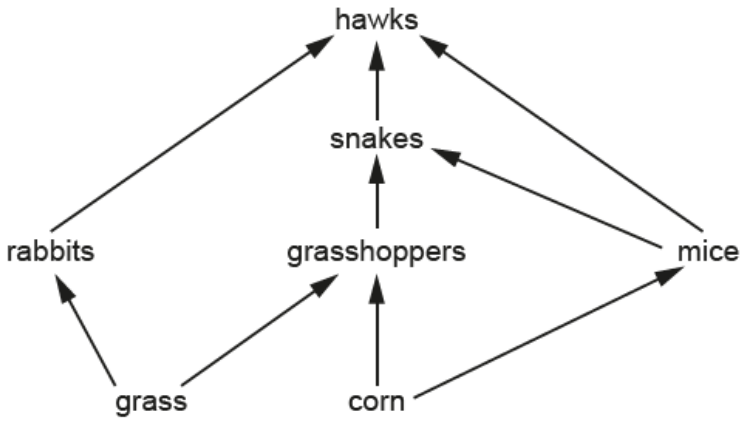


Fig. 6.1

(i) State the number of trophic levels in the food web in Fig. 6.1.

..... [1]

(ii) State the name of **one** organism that feeds at both the third and fourth trophic levels from Fig. 6.1.

..... [1]

(iii) State the name of the type of energy that is transferred between trophic levels.

..... [1]

(b) The total biomass of the snakes is much less than the total biomass of the mice in the food web shown in Fig. 6.1.

Explain why the total biomass of the snakes is less than the total biomass of the mice.

Use the term **energy** in your answer.

.....

.....

.....

.....

.....

.....

..... [3]

(c) Food shortages that result in famine can be caused by many factors.

Describe how drought can contribute to famine.

.....

.....

.....

.....

.....

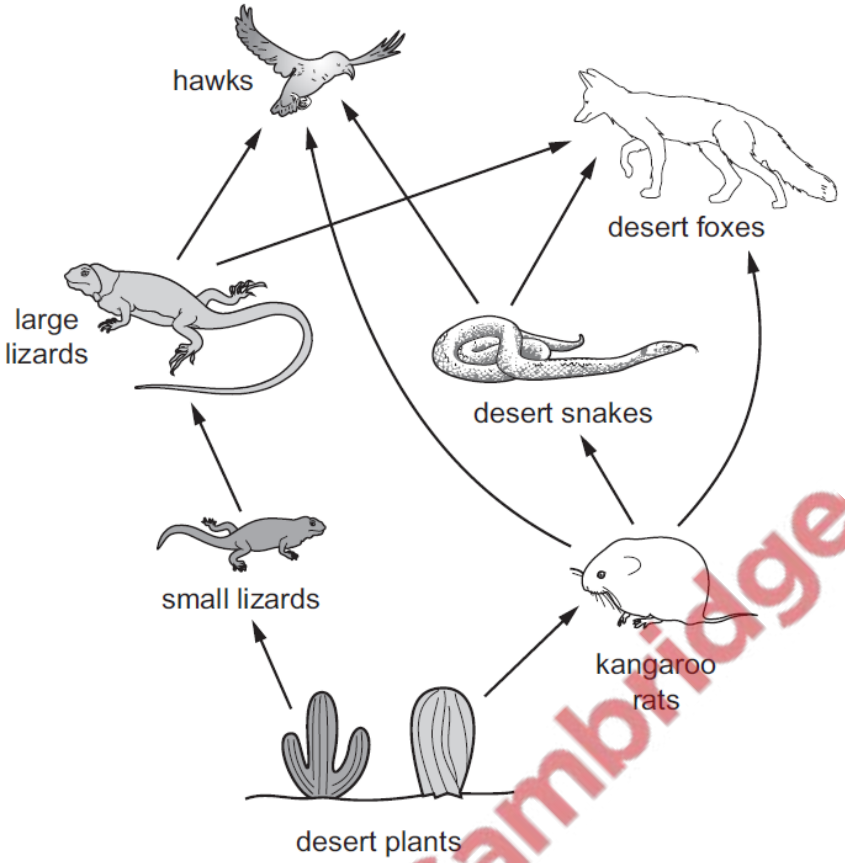
.....

..... [3]

[Total: 9]

5. June/2021/Paper_11/No.36

The diagram shows a food web in a desert.



Which organisms are **all** secondary consumers?

A desert foxes, hawks, large lizards and desert snakes

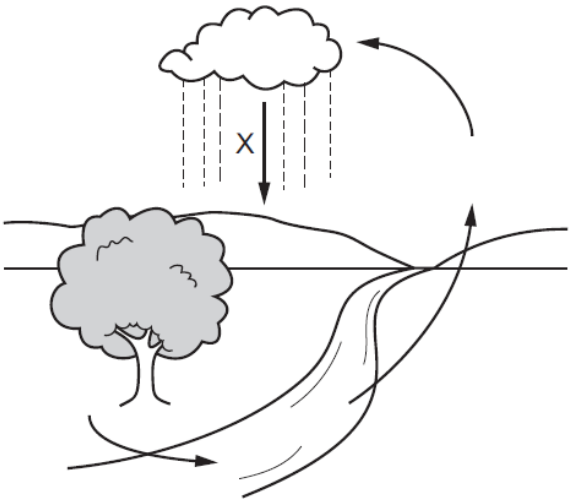
B desert foxes and hawks only

C kangaroo rats and small lizards

D large lizards and desert snakes only

6. June/2021/Paper_11/No.37

The diagram shows stages in the water cycle.



Which process is represented by the letter X?

A condensation

B evaporation

C precipitation

D transpiration

7. June/2021/Paper_11/No.38

What is an example of a population?

A all the arthropods in a pond

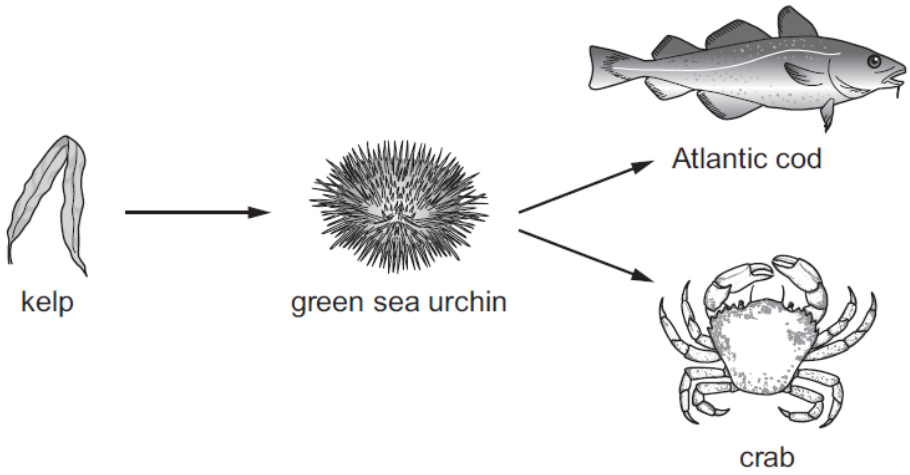
B all the crocodiles in a river

C all the plants in a wood

D all the zebras that lived from 1990–2010

8. June/2021/Paper_12/No.36

The diagram shows a food web.



What is the principal source of energy input into this food web?

A green sea urchins

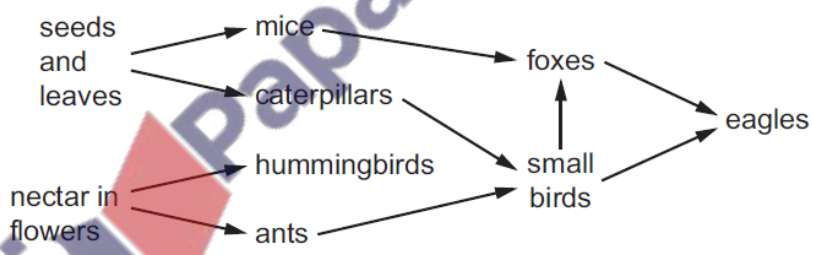
B kelp

C the sea

D the Sun

9. June/2021/Paper_12/No.37

The diagram shows a food web.



Which statement is correct?

A Eagles obtain all their energy by eating foxes.

B If the hummingbirds all die the caterpillars will have more food.

C The food chain nectar in flowers → ants → small birds → foxes is part of this food web.

D The mice and caterpillars are the only examples of herbivores in this food web.

10. June/2021/Paper_12/No.38

Which process in the water cycle only involves living organisms?

A condensation

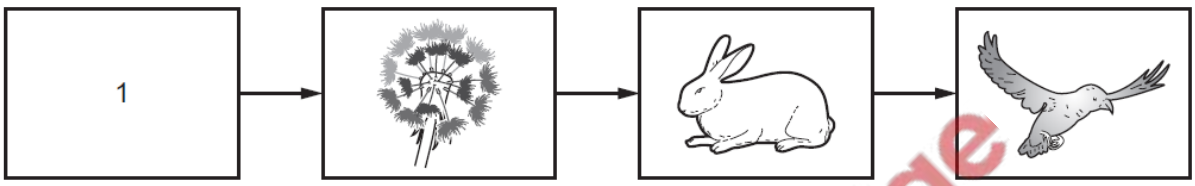
B evaporation

C precipitation

D transpiration

11. June/2021/Paper_13/No.36

The diagram shows the energy flow through part of a biological system.



What should be in the box labelled 1?

A heat

B consumer

C producer

D the Sun

12. June/2021/Paper_13/No.38

Which description of a population is correct?

A all the birds in a rainforest

B all the arachnids in a garden

C all the arthropods in the world

D all the red deer in a forest

13. June/2021/Paper_21/No.37

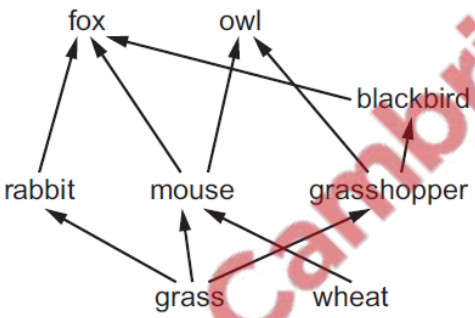
The diagram shows the flow of energy.

Which form of energy is transferred at points 1 and 3 in the diagram?

	1	3
A	chemical	chemical
B	heat	light
C	light	chemical
D	light	heat

14. June/2021/Paper_21/No.38

The diagram shows the feeding relationships in a food web.



Which organism may feed as both a secondary and a tertiary consumer?

A fox

B owl

C blackbird

D rabbit

15. June/2021/Paper_22/No.35

Which feature would help a plant to survive in a dry environment?

A large leaves

B many stomata

C small roots

D thick waxy cuticle

16. June/2021/Paper_22/No.37

Which type of energy is passed from organism to organism in a food chain?

A light

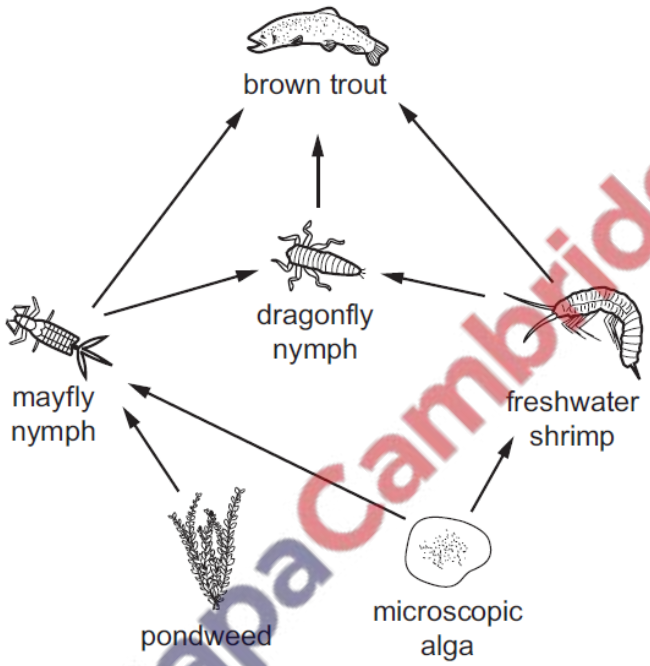
B chemical

C heat

D kinetic

17. June/2021/Paper_22/No.38

The diagram shows a food web.

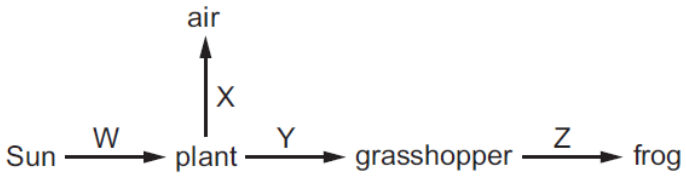


How many organisms feed at more than one trophic level?

A 0 **B** 1 **C** 2 **D** 3

18. June/2021/Paper_23/No.37

The diagram shows energy transfer through a food chain. The labelled arrows represent the energy transfers.



Which energy transfers are shown by the labelled arrows?

A X is heat energy transfer and Z is chemical energy transfer.

B Y is chemical energy transfer and X is light energy transfer.

C X is chemical energy transfer and Y is heat energy transfer.

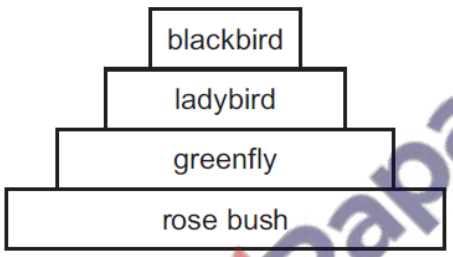
D Z is heat energy transfer and W is light energy transfer.

19. June/2021/Paper_23/No.38

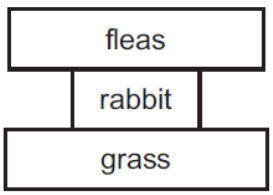
The organisms in a food chain can be represented by pyramids of numbers or pyramids of biomass.

Which diagram represents a pyramid of numbers?

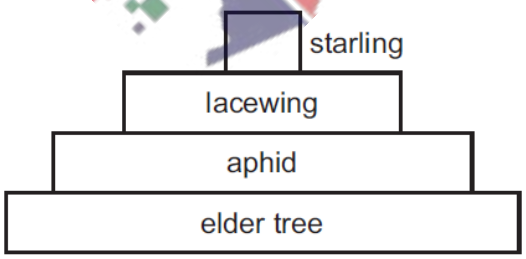
A



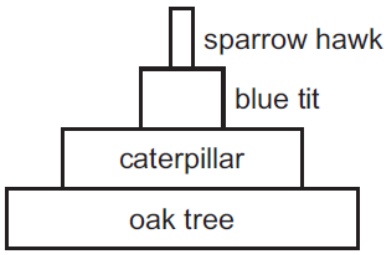
B



C



D



20. June/2021/Paper_23/No.39

Scientists wanted to know which one of four different varieties of bacteria, **A**, **B**, **C** or **D**, would be the best to use to make a protein.

They grew the bacteria for five days using the same starting mass of each bacterium. They then measured the mass of bacteria and the mass of protein produced per gram of bacteria.

The results are shown in the table.

Which variety of bacteria should the scientists choose?

	mass of bacteria at the start / g	mass of bacteria after five days / g	mass of protein / mg protein per g of bacteria
A	2	200	10
B	2	800	1
C	2	100	12
D	2	100	6

21. June2021/Paper_33/No.7

(a) Define the terms herbivore and carnivore.

herbivore .....

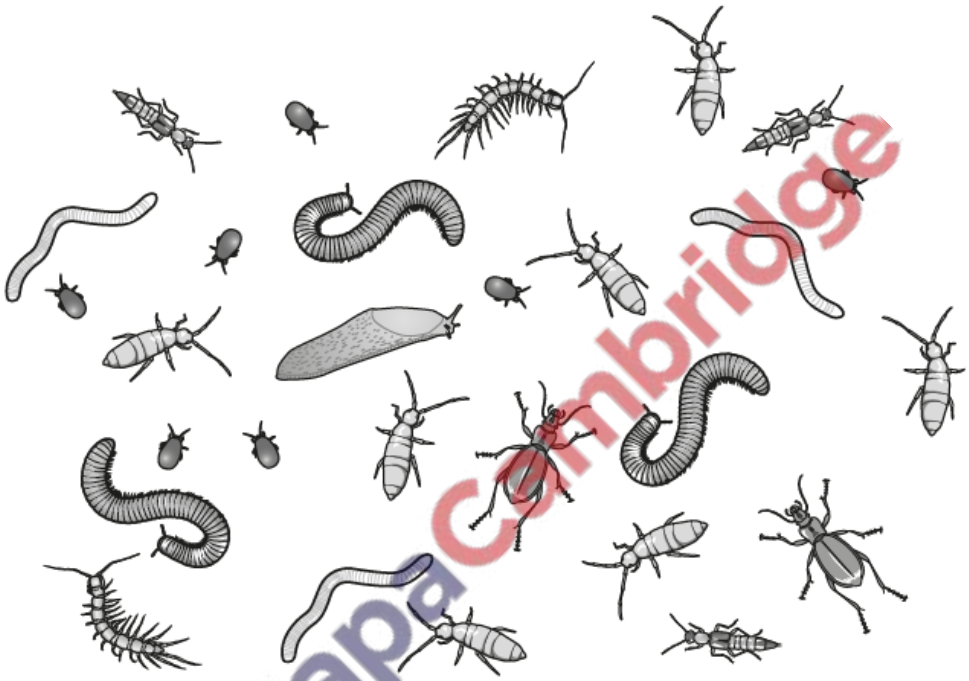
.....

carnivore .....

.....

[2]

(b) Fig. 7.1 shows some organisms collected from underneath a rotting log.

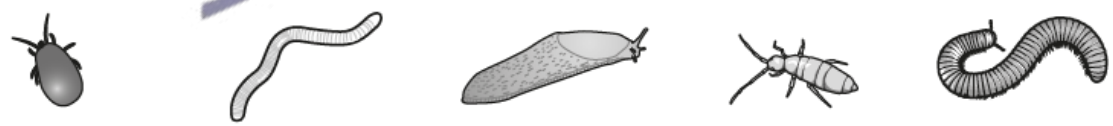


not to scale

Fig. 7.1

Fig. 7.2 can be used to identify these organisms.

herbivores



soil mite | potworm | slug | springtail | millipede

carnivores

centipede

ground beetle

rove beetle

not to scale

Fig. 7.2

Some students used Fig. 7.2 to identify and count the numbers of each soil organism.

Some of their results are shown in Table 7.1.

Table 7.1

	herbivores					carnivores		
names of organisms	millipedes	potworms	slugs	soil mites	springtails	centipedes	ground beetles	rove beetles
number of organisms	.....	3	1	.....	7	2	.....	.....
total number of organisms	21					7		

(i) Complete Table 7.1 by identifying and counting the **four** remaining named organisms in Fig. 7.1.

Write your answers in the four spaces in Table 7.1.

[2]

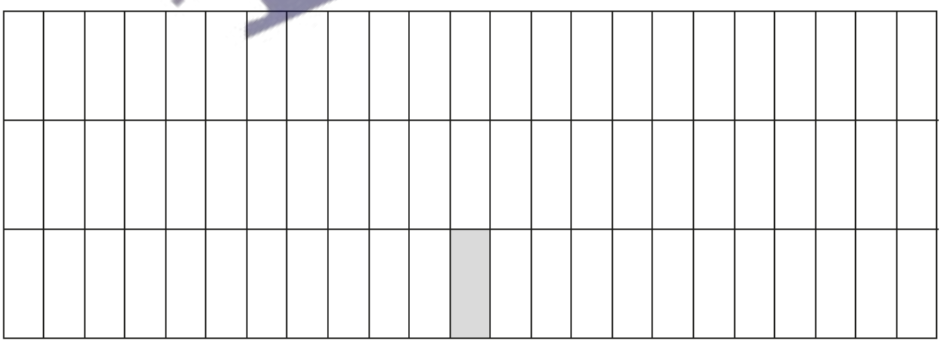
(ii) Use the information in Table 7.1 to draw a pyramid of numbers in Fig. 7.3.

Write the names of the **two** types of organism in the spaces at the side.

The row for the rotting log (the producer) has been done for you.

pyramid of numbers

type of organism



.....

.....

producer

Fig. 7.3

[3]

[Total: 7]