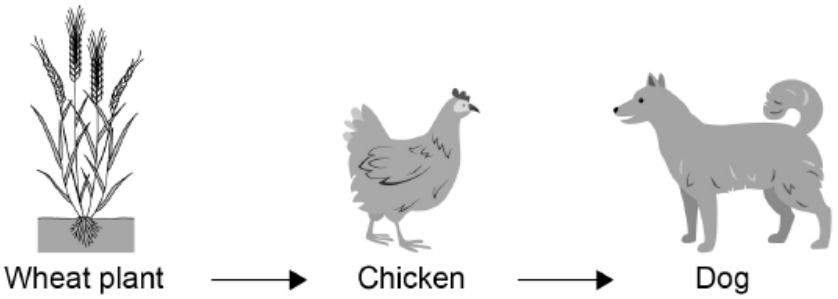
Trophic levels in an ecosystem – GCSE Biology

1. No.1

A food for pet dogs contains meat from chickens.

Figure 1 shows the food chain.

Figure 1



0 1 . 1 What is the trophic level of the dog?

[1 mark]

Tick (✓) **one** box.

1 ☐ 2 ☐ 3 ☐

0 1 . 2 Draw **one** line from each organism to the description of the organism's position in the food chain.

[3 marks]

Organism	Description
Chicken	Herbivore
Dog	Producer
Wheat	Secondary consumer
	Tertiary consumer

0 1 . 3 Name the process wheat plants use to make glucose.

[1 mark]

_____

0 1 . 4 Some of the chicken biomass does **not** become part of the dog's biomass.

What is **one** reason why?

[1 mark]

Tick (✓) **one** box.

Some of the chicken is used for the dog to grow ☐

The dog produces waste in faeces ☐

The wheat is eaten by the dog ☐

A new dog food has been developed.

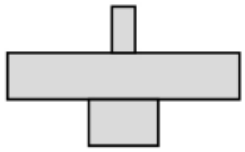
The new dog food is made from insects.

The insects in the dog food factory are fed on vegetables.

0 1 . 5 Which pyramid of biomass represents the vegetables, insects and dogs in this food chain?

[1 mark]

Tick (✓) **one** box.



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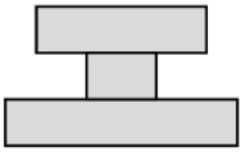

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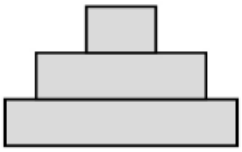


☐

0 1 . 6 Beef from cows is used to make some dog food.

Cows release methane.

The company that makes dog food from insects made the statement:

'Dog food made from insects is more sustainable than dog food made from beef.'

Which are **two** reasons that support the company's statement?

[2 marks]

Tick (✓) **two** boxes.

Dogs will eat more insects than cows	☐
Farming cows needs more land than farming insects	☐
Fewer cows being farmed will slow down global warming	☐
Fewer insects than cows are needed to produce dog food	☐
The food chain for dog food made from insects has more trophic levels	☐

2. No.7

A new dog food has been developed that does **not** contain meat from cows, sheep or chickens.

The new dog food contains insects.

The insects in the dog food factory are fed on waste vegetables.

0 7 . 1 Sketch the pyramid of biomass for the food chain that produces food for dogs from insects.

Label the pyramid.

[2 marks]

0 7 . 2 Describe **two** reasons why the biomass of the insects eaten by dogs does **not** all become biomass of the dogs.

[2 marks]

1 _____

_____

2 _____

_____

0 7 . 3 Explain how making dog food from insects could improve **human** food security in the future.

[4 marks]

3. No.1

Figure 10 shows a flightless bird called the dodo (*Raphus cucullatus*).

Figure 10

The dodo:

- was 1 m tall
- had a mass of 20 kg
- lived in rainforests on a tropical island
- ate fruits
- made its nest on the ground.

A female dodo laid only one egg each year.

Humans arrived on the island in the year 1507. By 1681 the dodo was extinct.

0 5 . 1 What is the genus of the dodo?

[1 mark]

Tick (✓) **one** box.

Animal ☐

Bird ☐

Raphus ☐

0 5 . 2 Before the arrival of humans, there were no other large animals living on the island.

Suggest **two** reasons why the dodo became extinct soon after the arrival of humans.

[2 marks]

1 _____

_____

2 _____

_____

Today, humans are cutting down large areas of tropical rainforests.

0 5 . 3 Suggest **one** use of the land after the trees have been removed.

[1 mark]

_____

_____

0 5 . 4 Why does the removal of trees cause an increase in carbon dioxide in the atmosphere?

[2 marks]

Tick (✓) **two** boxes.

There are fewer animals. ☐

There is less photosynthesis. ☐

There is less respiration. ☐

The soil dries out. ☐

The trees are burned. ☐

0 5 . 5 What effect would an increase in carbon dioxide in the atmosphere have on global air temperature?

[1 mark]

Tick (✓) **one** box.

Decrease ☐

Increase ☐

Stay the same ☐

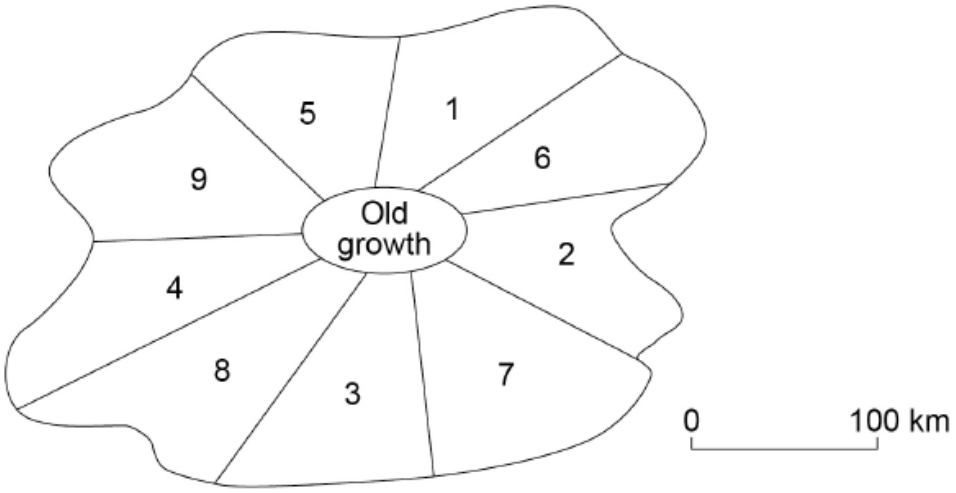
'Sustainable forestry' reduces the harmful effects of cutting down trees on the environment.

Figure 11 shows a method of 'sustainable forestry'.

Numbers 1–9 show different parts of a rainforest.

Figure 11

Map of the rainforest



The trees are cut down in the sequence 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9

- The trees are cut down in only one area at any one time.
- It takes 30 years to cut down the trees in each area.
- The trees in the 'Old growth' area are never cut down.

0 5 . 6 How many years would it take to cut down the trees in all of the numbered areas in **Figure 11**?

[2 marks]

Number of years = _____

0 5 . 7 The rainforest contains:

- 750 species of trees
- 400 species of birds
- 150 species of butterflies
- many other species of plants and animals.

Explain how the pattern of cutting down trees shown in **Figure 11** stops the biodiversity of the rainforest being reduced.

[4 marks]

1. No.7

Ragwort is a weed that grows on farmland.

Ragwort is poisonous to horses.

0 7 . 1 Plan an investigation to estimate the size of a population of ragwort growing in a rectangular field on a farm.

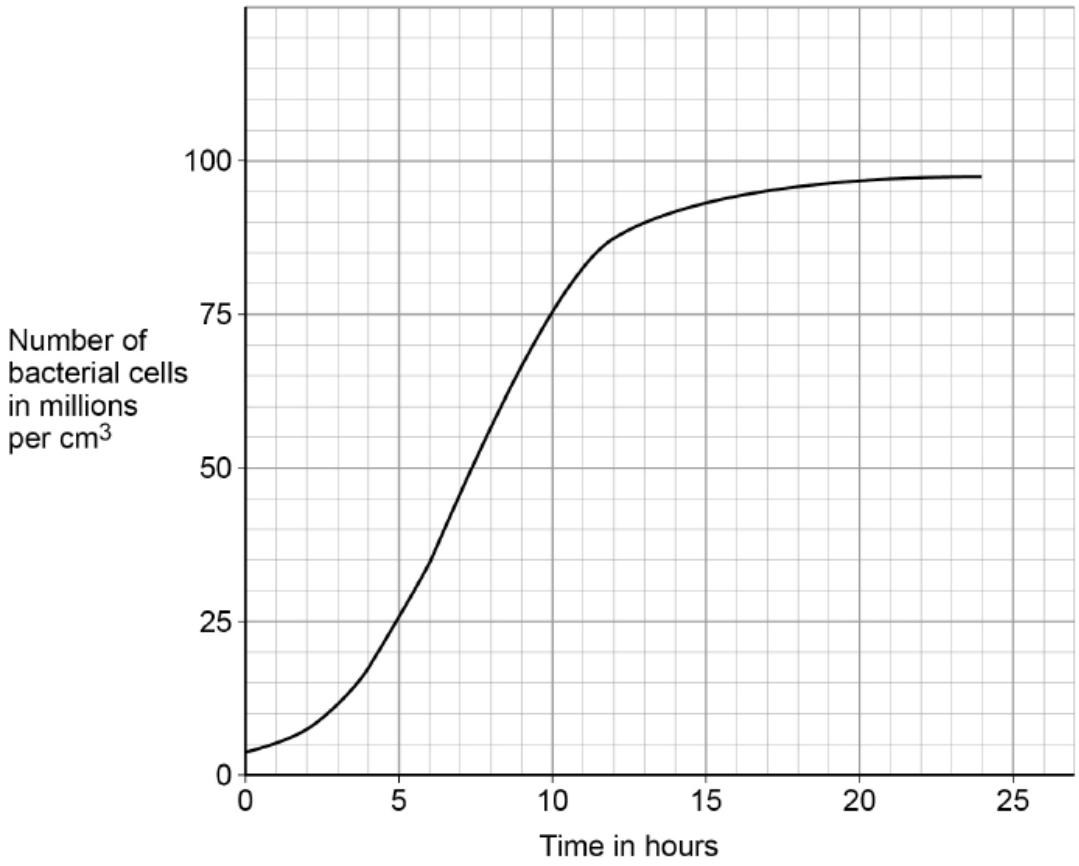
[4 marks]

The herbicide glyphosate will kill ragwort and other weeds.

Scientists use bacteria for the genetic engineering of crop plants to make the crops resistant to glyphosate.

Figure 8 shows the growth of a culture of the bacteria in a solution of nutrients at 25 °C

Figure 8



0 7 . 2 Why did the rate of reproduction increase between 2 hours and 7 hours?

[1 mark]

0 7 . 3 After 12 hours, the rate of reproduction decreased.

Suggest **three** ways the scientists could maintain a high rate of reproduction in the bacterial culture.

[3 marks]

1 _____

_____

2 _____

_____

3 _____

_____

0 7 . 4 The rate of reproduction of the bacteria is fastest at 7 hours.

How many times faster is the rate of reproduction at 7 hours than the rate at 12 hours?

[4 marks]

_____

_____

_____

_____

_____

_____

_____

_____

Rate at 7 hours is _____ times faster.

0 7 . 5 Scientists transferred a gene for resistance to the herbicide glyphosate into the bacteria.

The genetically-modified (GM) bacteria can then transfer the glyphosate-resistance gene to a crop plant.

Explain the advantage of making crop plants resistant to glyphosate.

[3 marks]