

## **GCSE Biology A (Gateway)**

**J247/02** B4-B6 and B7 Foundation (Foundation Tier)

### **Question Set 8**

1

The rock pocket mouse is a small grey coloured mouse that lives in Mexico.



- These mice are the main food for owls.
- Rattlesnakes also feed on these mice.
- The mice get most of their food from grass plants.

(a) Complete the sentences about this food web.

The grass plants are producers in the food web.

Mice are primary .....consumers..... in this food web.

The group of mice living in this habitat is called a population.

All the organisms living in this habitat is called the .....community.....

[2]

(b) (i) Scientists want to construct a pyramid of biomass for this food web.

They first need to estimate how many organisms there are in the area. They decide to do this using sampling.

Describe how the scientists would sample an area and ensure that the sample was **not** biased.

[2]

Set out a sample area and use random sampling within that area.

- (ii)\* To estimate grass cover and the number of animals, the scientists use a quadrat.

Why do scientists use sampling when studying the organisms living in a habitat?

Identify the limitations of this method and potential improvements that could be made to ensure that the estimated population size of plants and animals closely matches the actual value.

[6]

Scientists use sampling techniques to get an idea of the overall spread of organisms living in the habitat. This is because actually counting how many organisms live in the habitat is too time consuming and costly. One of these methods is using a quadrat which is a small grid which is placed in a random way in the sample area. The number of organisms are counted and then the process is repeated. The data can then be used to estimate whole number of these organisms in the habitat. However this has its limitations as only stagnant or slow moving organisms can be sampled using quadrats. Many animals will also move away from quadrat out of fear. These limitations can be overcome by using other methods such as capture/recapture, pitfall traps and potholes. Using these methods along with the quadrat and then using an average will give a much closer value to the actual. This is because all types of organisms can be sampled using these range of techniques.

- (c) In most areas of Mexico, the ground is covered in grey rocks.

[4]

In one area the ground is covered with black rocks.

The black rocks were formed about 1000 years ago when a volcano erupted. The scientists make two observations:

1. Very occasionally a black mouse is born to grey parents due to a mutation.
2. Black mice are well camouflaged.

Using these two observations, explain why most of the mice in this area are black and **not** the usual grey.

This is down to natural selection. The mice are fed on by snakes and owls. The black mice are at an advantage because they are camouflaged with their habitat so are eaten less. This allows more of them to survive and pass on their genes to future generations.

**Total Marks for Question Set 8: 14**

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