

Structured Questions

Populations & Communities

Populations in Ecosystems / Estimating Population Size / Limiting Population Size / Limiting Population Size: Examples / Population Growth Curves: Skills / Populations: Intraspecific Relationships / Community: Interspecific Relationships / Interspecific Competition / Chi-Squared Test: Skills

Easy (2 questions)	/10
Medium (3 questions)	/28
Total Marks	/38

Scan here to return to the course
or visit [savemyexams.com](https://www.savemyexams.com)

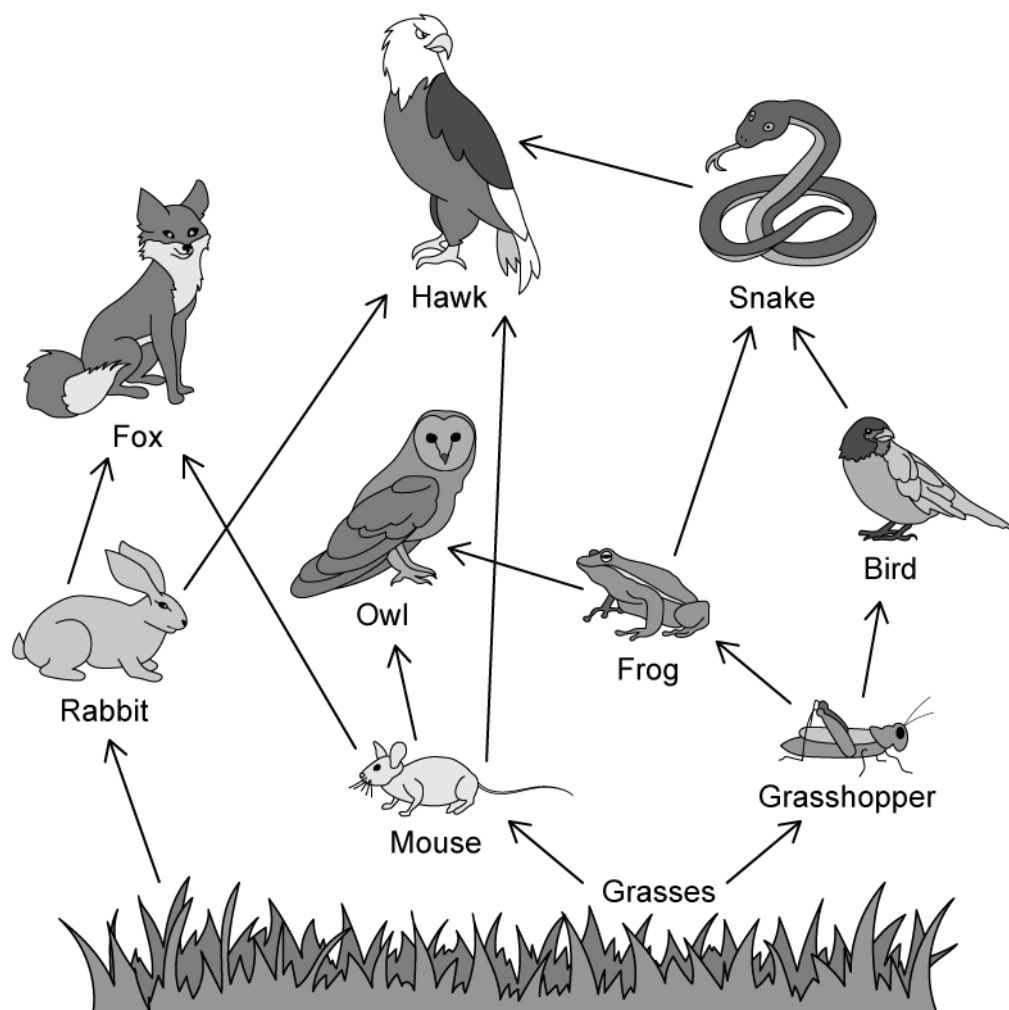


Easy Questions

1 (a) Give the definition of a species.

(1 mark)

(b) The image shows a woodland food web.



What word is used to collectively describe all the interbreeding foxes in the woodland represented by this food web?

(1 mark)

(c) Identify all the primary consumers from the forest food web.

(1 mark)

2 (a) Describe how a quadrat could be used to study the distribution of a particular species of clover plant in a meadow compared to a forest.

(5 marks)

(b) In a quadrat study, clover was found in 5 quadrats.

The numbers of squares containing clover in those 5 quadrats were 12, 39, 35, 85 and 27 respectively.

Each quadrat measured 50 cm × 50 cm and was divided into 100 squares.

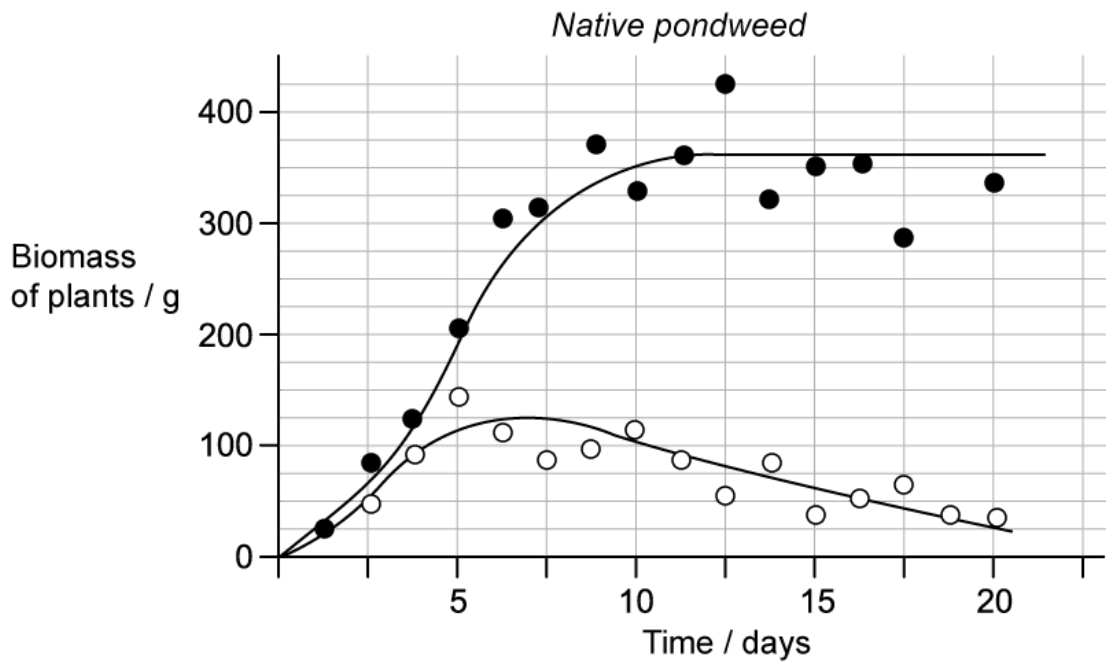
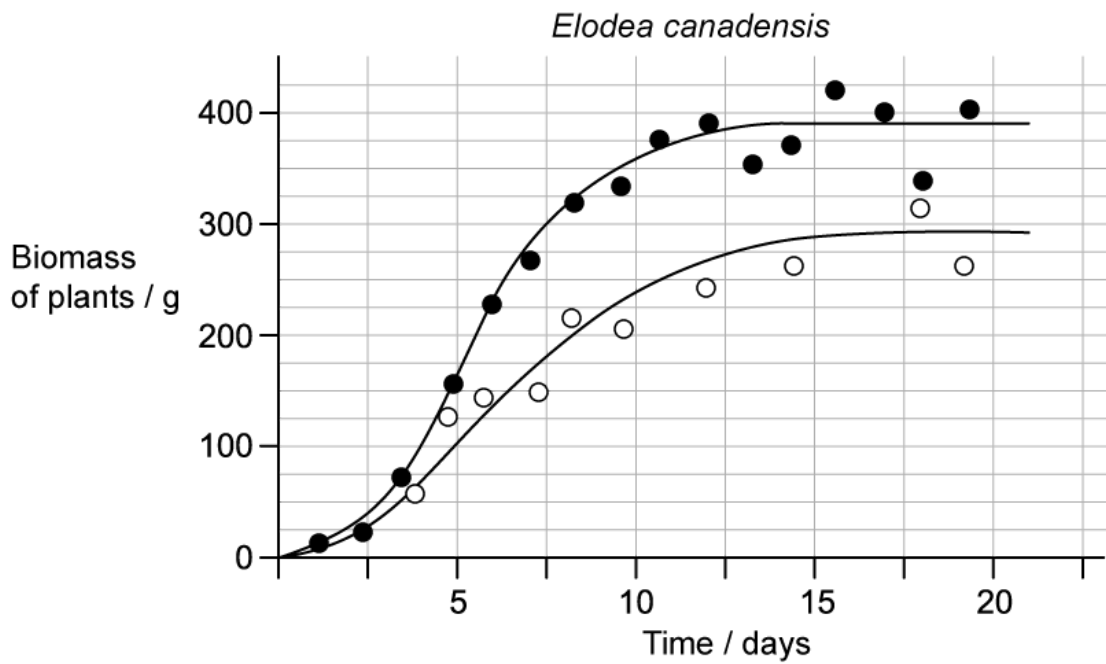
Calculate the overall percentage cover of clover in the 5 quadrats.

State your answer to the nearest whole number.

(2 marks)

Medium Questions

- 1 (a)** *Elodea canadensis* (Canadian pondweed) is a species of aquatic plant from North America. A student grew *Elodea canadensis*, along with a pondweed species native to the UK, in water tanks both separately and together. The graphs below show their results.



Key: ● = Plants grown in separate tanks ○ = Plants grown together in same tank

State **two** abiotic factors the student should have controlled throughout the experiment.

.....

.....

(2 marks)

- (b)** Calculate the difference in biomass between native pondweed grown separately and native pondweed grown in a tank together with *E. canadensis* after 15 days.

(1 mark)

- (c)** Explain the results for native pondweed for when both species of pondweed are grown together.

(2 marks)

- 2 (a)** Ecologists studied a rocky shore habitat which contained, among other organisms, several barnacle species, purple topshell snails (*Gibbula umbilicalis*), seaweeds, and lichens.

State, with a reason, which of the organisms listed above make up a single population.

.....

.....

(2 marks)

- (b)** The ecologists wanted to find out whether there was an association between the distributions of purple topshell snails and the common rock barnacle, *Semibalanus balanoides*.

Outline the method ecologists would use to collect data to determine whether or not such an association existed.

.....

.....

.....

(3 marks)

- (c)** A chi-squared test was carried out to determine whether or not there was a significant association between purple topshells and common rock barnacles on a rocky shore. When the calculated chi-squared value was compared to values in a critical values table it was found to be smaller than the critical value at a 0.05 probability level.

Deduce what can be concluded from this analysis?

.....

.....

(2 marks)

3 (a) Smardale Gill is a nature reserve in the UK in the county of Cumbria. It is one of the few locations where it is possible to view red squirrels due to their significant decline in number in the UK.

A researcher is looking to count the number of red squirrels that live in this habitat in order to aid with their conservation.

Describe the method that can be used to estimate the population size of red squirrels in this area.

.....

.....

.....

.....

(4 marks)

(b) The sampling took place over several days and in three different locations across Smardale Gill, known as sites A, B and C.

Area of Smardale Gill	First sample population size	Second sample population size	Number of marked individuals in the second sample
A	39	43	12
B	51	48	20
C	18	31	7
Total	108	122	39

(i) Using the data in the table above, estimate the population size of red squirrels in Smardale Gill.

[2]

(ii) List **four** assumptions that are made when making this estimation.

[4]

.....

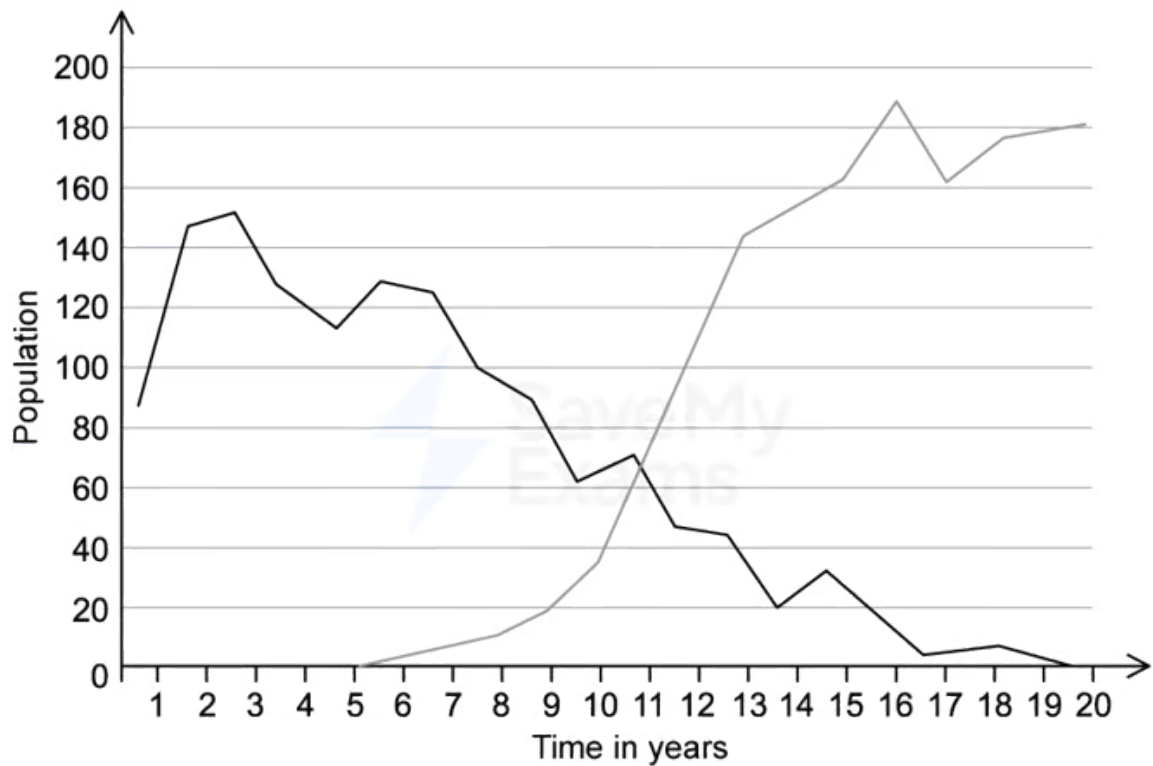
(6 marks)

(c) Suggest **two** limitations of this sampling method for the purpose of red squirrel conservation in Smardale Gill.

(2 marks)

(d) The reason decline in the number of red squirrels is due to interspecific competition with non-native grey squirrels.

The data below shows an example of how the numbers of each species of squirrel has changed since the grey squirrels were first introduced in the 1800s.



Key: — = Red squirrels — = Grey squirrels

Copyright © Save My Exams. All Rights Reserved

(i) Define the term interspecific competition.

[1]

(ii) Explain why the red and grey squirrels were not able to coexist together in the same location.

[3]

.....

.....

.....

.....

(4 marks)