

1. Outline six factors that affect the distribution of plant species.

Temperature <i>Enzyme-controlled reactions occur at optimal temperatures, and some plants show extreme adaptations, such as frost-resistant crops and Manzanita shrubs, which need fire for germination. ⁽¹⁾</i>	Soil pH	Light
Water	Salinity	Mineral nutrients

2. Explain how the following factors affect the distribution of animal species:

Factor	Effect on the distribution of animals
Temperature	
Water	
Food Supply	

Breeding sites	
Territory	

3. Explain the following interactions between species, giving two examples of each:

<i>Herbivory</i>	Explain:	
	e.g. 1:	e.g. 2:
<i>Predation</i>	Explain:	
	e.g. 1:	e.g. 2:
<i>Intra-specific competition</i>	Explain:	
	e.g. 1:	e.g. 2:
<i>Inter-specific competition</i>	Explain:	
	e.g. 1:	e.g. 2:
<i>Parasitism</i>	Explain:	
	e.g. 1:	e.g. 2:

Mutualism	Explain:	
	e.g. 1:	e.g. 2:

4. Explain what is meant by the *niche concept*.
5. Give an example of two species in their niches:

Example 1:	<i>Ocellaris amphiprion</i> (ocellaris clownfish)
Habitat:	
Nutrition:	
Interactions:	
Predators:	
Reproduction:	
Other information:	

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Habitat:	
Nutrition:	
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6. Distinguish between *fundamental* and *realized niches*.

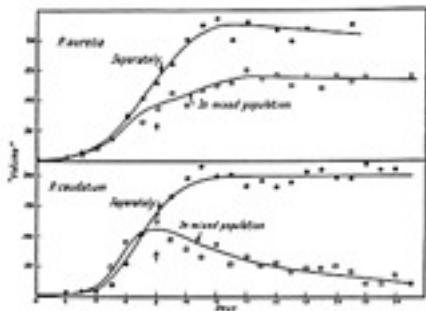
Fundamental:

Realised:

7. Using examples, explain the consequences of environmental change on a species with :

A narrow niche:	A broad niche:

8. Outline the method and importance of GF Gause's paramecium experiments. (<http://www.ggausa.com/gfg05.htm>)



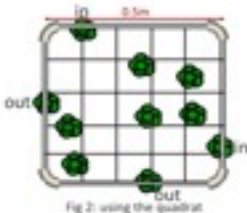
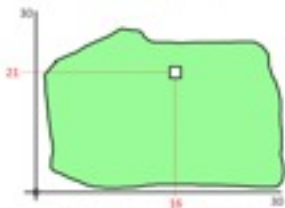
9. Explain the *competitive exclusion principle*.

10. Using examples, explain how competitive exclusion can lead to:

- The removal/ replacement of one species from a niche.
- Niche partitioning

11. Random Sampling and Quadrats

- Annotate the diagrams below to show how random sampling and quadrats can be used to estimate the population of a plant species in a given area.



- Explain the importance of randomness in selection of quadrat locations in a sample site.

- c. Outline two simple methods for generating random coordinates or otherwise ensuring that selection of a sample site is random.
- d. Describe measures that could be taken to ensure that the data are statistically reliable.
12. Describe how the quadrat method could be used to compare the population size of two plant species in a given area.
13. The data collected can be used to compare the populations of two or more species.

Species	Percentage cover in each quadrat (±2%)										mean	STDEV
A	12	34	32	45	12	34	46	12	54			
B	7	9	23	5	4	12	5	8	2			

- a. Calculate the mean and standard deviation of each set of results.
- b. Evaluate these data, based on the means and standard deviations.

- c. State the name of a statistical test that can be applied to test the significance of a difference between the means of two populations.

H_0 = "There is..."

Confidence limit usually chosen in Biology:

- d. The value of t was calculated as 3.995.

Use the t -table to determine the significance
of the results.

df	0.10	0.05	0.025
2	2.9200	4.3027	6.2054
3	2.3534	3.1824	4.1765
4	2.1318	2.7765	3.4954
5	2.0150	2.5766	3.1634
6	1.9432	2.4469	2.9687
7	1.8946	2.3646	2.8432
8	1.8595	2.3060	2.7535
9	1.8331	2.2622	2.6850
10	1.8125	2.2281	2.6388
11	1.7959	2.2010	2.5931
12	1.7823	2.1788	2.5600
13	1.7709	2.1604	2.5326
14	1.7613	2.1448	2.5096
15	1.7531	2.1315	2.4899
16	1.7459	2.1199	2.4729
17	1.7396	2.1098	2.4581
18	1.7341	2.1009	2.4450
19	1.7291	2.0930	2.4334
20	1.7247	2.0860	2.4231
21	1.7207	2.0796	2.4138
22	1.7171	2.0739	2.4055

$n =$

Degrees of freedom ($n-2$) =

Critical value =

Conclusion:

Reject/ accept H_0 .

There is / is no significant difference in distribution of species

A and species B.

Can you also complete this using Excel?

14. What is the function of a *transect*?

15. Explain how a transect would be carried out to correlate the distribution of a species with an abiotic variable.

16. State some examples of transects that you might carry out.

Biotic Variable		Abiotic Variable
	Vs.	
	Vs.	
	Vs.	

17. Sketch a kite graph to show how it would be used to display transect data.

18. Monitoring productivity

- a. Define *biomass*.
 - b. Suggest some reasons for studying the biomass of an ecosystem.
 - c. Outline one method for estimating the biomass of different trophic levels of an ecosystem.
 - d. State some of the ethical concerns associated with measuring biomass and how these may be alleviated.
19. Explain why biomass is generally low at higher trophic levels.

