

## Structured Questions

# Ecological Niches

Ecological Niches / Methods of Nutrition / Nutrition in Hominidae: Skills / Nutrition: Adaptations of Organisms / Competition Between Species

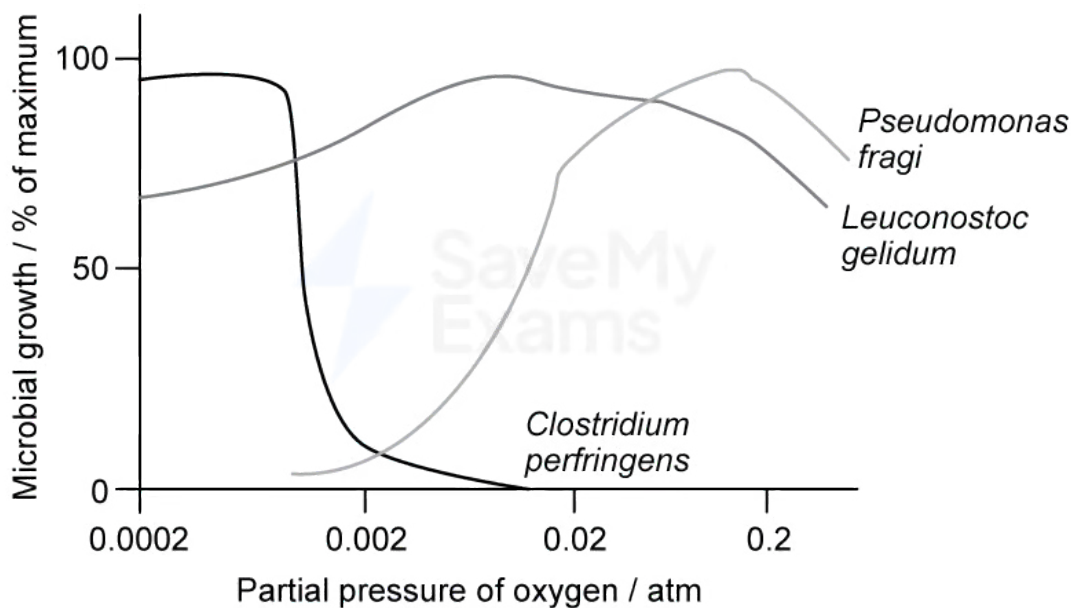
Medium (3 questions)	/32
Hard (1 question)	/7
<b>Total Marks</b>	<b>/39</b>

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# Medium Questions

- 1 The graph below shows the growth of three bacterial species at different partial pressures of oxygen.



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Describe the effect of changing oxygen concentration on the growth of the bacterial species.

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(5 marks)

- 2 (a) Scientists studied the the dentition of several groups of hominids, including *Australopithecus sediba*, *Homo habilis* and *Homo sapiens*.

State what can be concluded about the classification of the three hominid species from their assigned taxa.

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(3 marks)

- (b) Some of the dentition of the studied hominid species can be seen in the image below.



[Source: adapted from John Hawks et al (2017) New fossil remains of *Homo naledi* from the Lesedi Chamber, South Africa  
[eLife 6:e24232](#)]

Compare and contrast the dentition of *A. sediba* (A), *H. habilis* (B) and *H. sapiens* (C).

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**(4 marks)**

**(c)** Explain how the diet of extinct hominids, such as *A. sediba* and *H. habilis*, can be deduced from theories about diet and dentition.

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**(2 marks)**

**(d)** A student looked at the image in (b) and concluded that the diets of modern humans (*H. sapiens*) and *A. sediba* were quite similar.

Evaluate the student's conclusion.

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**(3 marks)**

**3 (a)** Adaptations enable living organisms to fill their ecological niche.

Explain a range of adaptations that aid animals in holozoic nutrition.

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**(7 marks)**

**(b)** Explain the difference between a fundamental and a realised niche.

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**(4 marks)**

**(c)** Outline the metabolic diversity present in the archaea.

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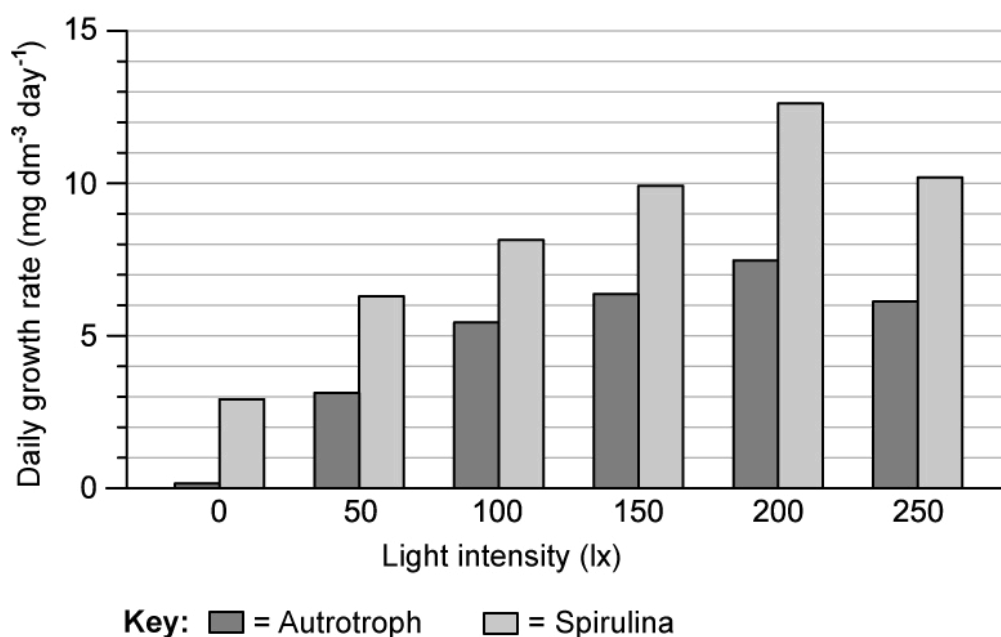
**(4 marks)**

# Hard Questions

- 1 (a) *Spirulina* (*Athrospira platensis*) is a blue-green alga that is consumed for its nutritional benefits, which are considered to be good for oral health, eye health and maintaining healthy blood pressure, amongst other benefits.

The graph shows the results from an investigation into the optimum growing conditions for *Spirulina*.

*Spirulina* was grown in a glucose medium and exposed to different intensities of light. The same method was carried out with an autotrophic species of alga.



Explain how the results show that *Spirulina* is a mixotrophic organism.

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(3 marks)

- (b) Compare the growth rate of *Spirulina* and the autotrophic algal species when light intensity was increased from 0 to 200 lx.

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.....  
**(2 marks)**

**(c)** Suggest how Spirulina may be adapted to function as a mixotroph.

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.....  
**(2 marks)**