

Year 11 Integrated Science General

2022

Task 3: Ecosystems and Adaptation Test

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| **Assessment Type:** Test |  | Name: |  |
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| **Conditions:**  1 hour, test conditions |  | Teacher: |  |
|  |  |  |  |
| **Assessment weighting:**  5% of school mark |  | Date: |  |

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| --- | --- |
| **Section** | Marks |
| **Part one: multi-choice** |  |
| **Part two: Short Answer** |  |
| **Total Mark** |  |

**Feedback:** Please see SEQTA for your feedback and comments.

**PART ONE: MULTIPLE CHOICE**

***Please use the Zipgrade answer sheet for your answers.***

1. *"Ecosystems and environments are the same thing."*
2. True
3. False
4. Define the term **population**
5. All of the living organisms and their environment
6. All of the individuals of the same species
7. All of the populations in an area that interact
8. All of the members of one species living in an area
9. A **Habitat** is…
10. A place where you learn bad habits
11. A city or town where a human lives
12. The same thing as an environment
13. The place where an organism lives
14. Is the concentration of oxygen in a pond a **biotic** or an **abiotic factor**?
15. Biotic Factor
16. Abiotic Factor
17. What is meant by the term **niche?**
18. The role and place an organism has in its environment
19. The ability of an organism to survive and reproduce
20. The abiotic and biotic factors surrounding an organism
21. The non-living things in the environment that affect other living organisms
22. The **hummingbird** (*Archilochus colubris*) feeds on the nectar produced by flowers. As it feeds, pollen from the flowers sticks to its beak and is spread around, helping the plant to **reproduce.** Both the hummingbird and the plant are **helped** by this interaction.

Which type of **symbiotic relationship** this is an example of.

1. A hummingbird flying over a flower

   Description automatically generated with medium confidenceMutualism
2. Commensalism
3. Parasitism
4. Competition
5. The titan triggerfish (*Balistoides viridescens*) is so big, it moves rocks and pieces of coral around as it feeds on a A fish swimming in the water

   Description automatically generated with medium confidencereef. Smaller fish can then come in and eat food that was previously protected by the rocks and coral. The triggerfish itself is **not affected** by its relationship with the smaller fish.

This type of **symbiotic relationship** is this an example of

1. Mutualism
2. Commensalism
3. Parasitism
4. Competition
5. What name is given to a feature of an organism that improves its chances of survival?
6. An adaption
7. A phenotype
8. A variation
9. A type of natural selection
10. Over many generations, what would the number of well-adapted organisms in a population be expected to do?
11. Increase
12. Decrease
13. Stay constant
14. Unable to know
15. Select the **true** statement:
16. Adaptations and natural selection are the same thing
17. Adaptations provide a benefit in any environment
18. Adaptations provide a benefit in a specific environment
19. Adaptations are not common in a population
20. Fish have a specific shape that enables them to move more quickly in water. This serves as an example of a
21. Mental adaptation.
22. Behavioural adaptation.
23. Physiological adaptation.
24. Structural adaptation.
25. When birds fly south for the winter they are demonstrating which type of adaptation?
26. Structural adaptation
27. Successful reproduction
28. Hibernation
29. Behavioural adaptation
30. Black bears can store extra body fat and can undergo hibernation to preserve energy when food is unavailable. What type of adaptation is this?
31. Behavioural adaptation
32. Convergent evolution
33. Structural adaption
34. Physiological adaption
35. Which of the following is not an example of an adaptation:
36. The appearance of the moth *Abrostola trigemina*, which looks like a broken twig.
37. The long, broad wings of the red-tailed hawk that allow it to sustain a gliding flight over open country while it searches for prey.
38. The rounded body shape of the sargassum crab which resembles brown algae.
39. All of the above are examples of adaptations.
40. What is speciation?
41. the detailed description of a species
42. specific characteristics of a gene
43. non-functional structures of an organism
44. the formation of a new species

**END OF PART ONE**

**PART TWO: SHORT ANSWER**

***Please refer to the below text when answering questions 16 to 22:***

Industrial Melanism is a term used to describe the adaption of a population in response to pollution. One example of rapid industrial melanism occurred in populations of peppered moths in Manchester, England from 1845 to 1890. Before the industrial revolution, the trunks of the trees in the forest around Manchester were light greyish-green due to the presence of lichens. Most of the peppered moths in the area were light coloured with dark spots. As the industrial revolution progressed, the tree trunks became covered in soot and turned dark. Over a period of 45 years, the population of peppered moths with darker wings increased, while the population of peppered moths with light greyish-green wings decreased significantly.

From 1845 to 1890 a scientist decided to study the populations of pepper moths. She set traps to capture peppered moths and record the numbers captured ever 5 years. Her data is displayed in the table below.

|  |  |  |
| --- | --- | --- |
| Year | Number of Light-Coloured Moths | Number of Dark-Coloured Moths |
| 1845 | 556 | 64 |
| 1850 | 537 | 112 |
| 1855 | 484 | 198 |
| 1860 | 392 | 210 |
| 1865 | 246 | 281 |
| 1870 | 225 | 367 |
| 1875 | 193 | 412 |
| 1880 | 147 | 503 |
| 1885 | 84 | 594 |
| 1890 | 58 | 638 |

1. Assuming that, in the beginning, the peppered moths were all light coloured, how did the dark colouring first occur in the moth population? (1 mark) \_\_\_\_\_\_\_\_\_\_\_\_mutations/genetic variation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What event caused the tree trunks around Manchester to become darker?

(1 mark)

\_\_\_\_\_\_\_\_\_\_\_\_\_ the soot during the industrial revolution \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Why do you think the scientist chose to record the numbers of each colour variant every 5 years? (1 mark)

\_\_\_\_\_ 5 years is a good scale to measure changes over time \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Graph the data from the table comparing the numbers of each variety of peppered moth. Make sure you include a title and axis labels. (5 marks)

700

650

600

550

500

450

400

350

300

250

200

150

100

50

0

1845 1850 1855 1860 1865 1870 1875 1880 1885 1890 1895 1900

1. Use your graph to describe how the population of both light and dark coloured moths changed over the 45 years. (2 marks) \_\_\_\_\_\_\_\_\_\_ the light coloured moths decreased in population over time, while the darker moths increased over time. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Using your understanding of adaptations and Natural Selection, attempt to explain the reasons for the changes in populations of light and dark coloured moths. (3 marks)

* 1 mark – variations in the population caused by mutations
* 1 mark – dark moths adapted to the darker tree trunks
* 1 mark – lighter moths were selected out by predators, due to their easier ability to be seen on the darker trees.

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1. In 2021 the population of light-coloured moths was seen to increase. Provide a possible reason for this observation. (1 mark)

* Reduce in soot/carbon dioxide producing factories/industry
* Tree bark is becoming lighter again
* Predators selecting out darker colour moths over light.

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**END OF TEST**