**Task 4: Test- SOLUTIONS**

Natural selection and adaptations of flora and fauna

Name: ­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
Teacher: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Mark: ­­­­\_\_\_/34  
Comment: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Assessment type:** Test

**Conditions**

1 hour, test conditions

**Task weighting**

5% of the school mark for this pair of units

**Part One: Multiple Choice**

1. What name is given to a feature of an organism that improves its chances of survival?
2. An adaption
3. A phenotype
4. A variation
5. A type of natural selection
6. Over many generations, what would the number of well-adapted organisms in a population be expected to do?
7. Increase
8. Decrease
9. Stay constant
10. Unable to know
11. How do adaptations begin?
12. Selected genetic mutations
13. Random genetic mutations
14. Adaptations occur every other year
15. When the organisms requests it
16. Select the **true** statement:
17. Adaptations and natural selection are the same thing
18. Adaptations provide a benefit in any environment
19. Adaptations provide a benefit in a specific environment
20. Adaptations are not common in a population
21. Domesticated guppy fish have large, brightly coloured fins. In contrast, wild guppy fish have small and dull-coloured fins.

A picture containing fish, spiny-finned fish

Description automatically generated

*domesticated guppy*

*wild guppy*

Through which process have domesticated guppy fish attained such different fins to their wild counterpart?

1. Convergent evolution
2. Artificial selection
3. Parallel evolution
4. Natural selection
5. Finish the sentence:   
   Mutations occur randomly in DNA, mutations \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
6. are always harmful
7. can be helpful or have no effect, but mostly harmful
8. can be helpful, harmful or have no effect
9. are always helpful
10. Fish have a specific shape that enables them to move more quickly in water. This serves as an example of a
11. Mental adaptation.
12. Behavioural adaptation.
13. Physiological adaptation.
14. Structural adaptation.
15. When birds fly south for the winter they are demonstrating which type of adaptation?
16. Structural adaptation
17. Successful reproduction
18. Hibernation
19. Behavioural adaptation
20. Black bears can store extra body fat and can undergo hibernation to preserve energy when food is unavailable. What type of adaptation is this?
21. Behavioural adaptation
22. Convergent evolution
23. Structural adaption
24. Physiological adaption
25. Which of the following is not an example of an adaptation:
26. The appearance of the moth Abrostola trigemina, which looks like a broken twig.
27. 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.
28. The rounded body shape of the sargassum crab which resembles brown algae.
29. All of the above are examples of adaptations.

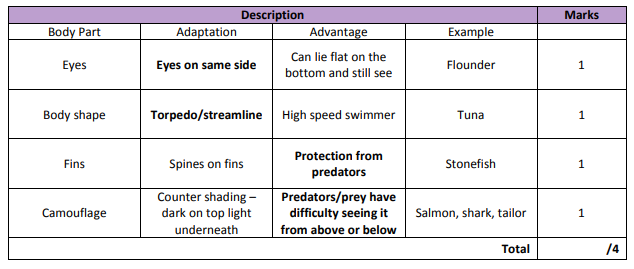
**Part Two: Short Answer**

1. The Venus Fly Trap has many adaptations that helps it attract and consume its food. Name two of these adaptations and explain how they help the Venus Fly Trap get its food.
2. \_Name (1 mark) Clearly explains benefit (1 mark) (2 marks)
3. \_Name (1 mark) Clearly explains benefit (1 mark) (2 marks)
4. a) Identify two abiotic factors which would influence the adaptations of organisms living in Antarctica.

Any two reasonable factors (e.g. lack of sunlight/cold temperatures) (2 marks)

b) Give an example of an adaptation for an organism

Adaptation related to environment (1 mark)

1. Complete the table of fish adaptations below by filling in the blank

(4 marks)

**Part Three: Extended Response**

1. Refer to the following passage to answer the following questions:

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 every 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?

Mutation/variation\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(1 mark)

1. What event caused the tree trunks around Manchester to become darker?

Industrial revolution\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(1 mark)

1. Graph the data from the table comparing the numbers of each variety of peppered moth. Make sure you include **all** titles.

700

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300

250

200

150

100

50

0

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

Titles (1 mark) Axis Title and units (1 mark) Accurate plotting (1 mark)   
Line graph (1 mark) Legend(1 mark)

(5 marks)

1. Use your graph to describe how the population of both light and dark coloured moths changed over the 45 years.

Increase of dark population, decrease of light as the industrial revolution discoloured the trees or similar \_(2 marks)

1. Explain the reason for the increase in the number of dark coloured moths. Camouflage (1 mark) allows dark coloured moths to avoid predators on dark coloured trees (1 mark)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(2 marks)
2. Explain the peppered moth events in terms of natural selection.   
   The dark coloured moths survived more than the light coloured moths and were therefore more likely to reproduce (usually dark offspring) \_\_\_\_\_\_\_\_\_(1 mark)
3. In 2021 the population of light-coloured moths was seen to increase. Provide a possible reason for this observation.

Any reasonable reason \_\_\_\_(1 mark)

**End of Test**

**Additional graph and space for questions:**

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

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_