**GENERAL INTEGRATED SCIENCE**

**UNIT 3**

**TASK 5 – Ecosystem AND SPECIES TEST**

***Mark Scheme***

**NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ WEIGHTING: 5%**

**DUE DATE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Power Point /20 10%**

**Test : \_\_\_\_\_\_ / 48 90 %**

**Overall mark \_\_\_\_\_ %**

|  |  |  |
| --- | --- | --- |
|  | **Marks Allocation** | **Your Total** |
| **Multiple Choice** | 7 |  |
| **Short Answer** | 31 |  |
| **Extended Response** | 10 |  |
| **TOTAL** | 48 |  |

In the following section circle the correct answer. If you make a mistake put a cross through it and circle the correct answer.

***Multiple-Choice Section (7 Marks)***

1. Biodiversity is defined as :
   1. The biosphere and how it impacts population.
   2. Measure of how many species are living in an ecosystem.
   3. Variations amongst one species of organisms.
   4. Biological importance of relationships in an ecosystem.
2. Which of the following statements is TRUE?
   1. Urban ecosystems are the most biodiverse ecosystem.
   2. Agricultural ecosystems have many different types of plants growing.
   3. Natural ecosystems are more complex and stable then another ecosystem.
   4. Stability of ecosystems is not linked to biodiversity.
3. An organism’s ability to survive and thrive is affected by:
   1. Human influence, the changing environment and inherited traits.
   2. Human influence, the food they eat and sustainability strategies.
   3. Whether males and females like each other and birth rates.
   4. Birth rates and resources available to the organisms
4. Which of the following statement describes Natural Selection?
   1. The maximum number of organisms that can be successfully maintained in an ecosystem.
   2. Where organisms better adapted to their environment survive and thrive.
   3. Traits stop species from evolving leading to little change in the gene pool.
   4. Limiting factors within the ecosystem help control populations.
5. Which of the following factors does not play a role in how species change over time?
   1. Mutation
   2. Migration
   3. Frequency of alleles
   4. Colouring
6. Which of the following is not an example of a structural adaptation?
7. The colour of an eye.
8. The wings of a bird.
9. The scales on a snake.
10. The talons of an eagle.
11. Which of the following are abiotic factors?

(i) trees

(ii) reeds

iii) water

(iv) pH

(v) ducks

(vi) air

(vii) fish

1. (i), (ii), (iii)
2. (iii), (iv) and (v)
3. (iii), (iv) and (vi)
4. (iv), (v), (vi) and (vii)

**Short answer section.**

**The following information is to be used for the next five (5) questions.**



*London in the early 1800’s is right as the industrial revolution is starting. The light-coloured body of moths are able to blend with the light-coloured lichens and tree bark. This means birds (or prey) have a hard time seeing the moth, allowing them not to be eaten.*

*But it is becoming darker due to coal-powered factories spewing soot into the air and suddenly all the trees have gone from looking white to looking much darker. So due to soot now on everything, white moths have a problem.*

*The dark-coloured moths on the other hand now don’t have a problem. The dark moth has a different form of the gene that affects pigmentation making it black. Moths breed very quickly and can several batches of offspring in one season. Black moths represented 2% of the moth population at the start of the Industrial Revolution. But by 1895 it’ll be 95%!*

1. State one factor that changed around the time of the Industrial Revolution, include what type of factor it was. (2 marks)

*Abiotic, the colour of the trees, air quality*

*Biotic, the number of black coloured moths*

1. State 2 other human activities that could have interfered with biodiversity of moths and other species at the start of the Industrial Revolution and explain how they affected species. (4 marks)

*Chopping down trees*

1. What is natural selection? (1 mark)

*Where nature selects the organism best suited to the environment – survival of the fittest*

1. Explain three things that can cause variation in a species. (3 marks)

*Mutation – changes DNA causes changes to species(1)*

*Meiosis- DNA does not separate the same every time(1)*

*sexual reproduction –offspring combination of DNA from parents(1)*

1. Explain how natural selection leads to the change in Peppered Moth species. Include how the variation of black peppered moth could have happened originally and why the species gradually changed over time. (4 marks)

*Black variation occurred due to a mutation (1)*

*Environment became darker so black moth better suited to environment so survives(1)*

*Black will breed and become the normal(1)*

*White will be eaten and eventually die out/numbers reduced(1)*

1. What would this change in species over time be called? (1 mark)

*Evolution*

1. During the industrial Revolution many other species became extinct. Explain why you think some species became extinct but the peppered moth survived. (3 marks)

*Some species breed too slowly (1)*

*so could not produce enough different offspring/offspring that was better suited to the new environment(1)*

*the moth breed quickly enabling offspring better suited to environment to be born in enough number to continue the species (1)*

1. Living species possess adaptations that enable them to survive in particular habitats. These adaptations can be placed in three categories:-

* Structural adaptations
* Behavioural adaptations
* Functional/physiological adaptations

In the space below write a description of each type of adaptation. (3 marks)

Structural adaptation is a *structure/physical part of an organism/physical features usually seen externally (1)*

Behavioural adaptation is *: is things an organism does that enable it to survive/ the way it acts (1)*

Functional/physiological adaptation is *an internal response to an external stimuli (1)*

1. Many species in Australia have special adaptations that enable them to survive the harsh environments that can be found across the country.

Choose one species that you have studied and answer the following questions with reference to that species.

1. What is the name of the species and what type of environment does it live in. (1 mark)

Eg Thorny devil – lives in desert

1. Describe three adaptations the species has that enable it to survive in its particular habitat. State the type of adaptation it is, a description of the adaptation and explain how it helps the organism survive. (6 marks)

*Three adaptations described that enable it to survive (1 mark per adaptation) and the type of adaptation named(one mark per adaptation)*

1. Most birds sit on their eggs to keep them warm until they hatch. Megapode birds:

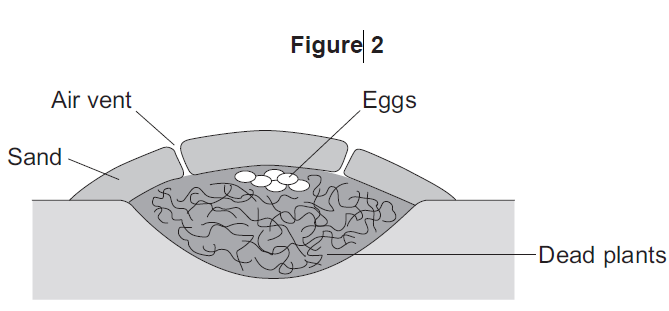
● dig a large hole in sand

● fill the hole with dead plants

● lay their eggs on top of the dead plants

● cover the surface with a thick layer of sand.

**Figure 2** shows a megapode bird’s nest.



1. What type of adaptation is being described in the information above? (1 mark)

*behavioural*

1. The dead plants in the nest decay. The decaying process helps to keep the eggs warm for many weeks. Suggest how. (2 marks)

*Decomposers break down plant material – respiration gives off heat*

*Sand acta as an insulator keeping the heat in*

*Decay is a slow process so heat given out over long period of time*

*Any suitable reason plus explanation*

**Extended Response:**

Part of Darwin’s voyage included a visit to the Galapagos Islands in the Pacific Ocean, close to South America. Islands form a very important piece of evidence in Darwin’s theory, because they isolate populations from each other.

**Read the story below:**

*A long time ago, a small flock of sparrow-like birds called finches were blown out to sea by a fierce storm. They lost their bearings but flew on in search of the mainland, going further and further out to sea.*

*At the point of exhaustion, 600 miles from home, they spotted a speck of land - an island in the middle of the sea. They were saved and could rest, drink and feed before returning home. But this island was perfect: it had abundant seeds and other food, plenty of shelter, nesting sites and (amazingly) no predators or other birds to compete with. Life was much harder on the mainland. There was no need for the birds to move on.*

*Their numbers grew - until they became just a bit too numerous for the little island. Some found it hard to find enough food for themselves or their offspring, and young birds were driven away from areas where food was available. Some birds were forced to fly across the sea to nearby islands. There, they found new territories, also with no predators or other birds to compete with. As the plants and their seeds were just a little different on each island, some birds were better than others at finding and eating the new food sources. Birds which could break open fruits and eat the seeds survived well enough to produce lots of babies. Eventually, after a very long time, all the islands became occupied by these birds but the finches on each island were slightly different.*

Scientists believe that this story is just the sort of scenario that happens when new, volcanic islands like the Galapagos are colonised by animals (and plants). It shows how a theory has to include a plausible mechanism to explain events. The questions in this activity are similar to those which a scientist like Darwin would have to deal with when presenting his theory to other (sceptical) scientists.

Answer the following questions about the story using Darwin’s theory.

**Discussion questions (10 marks)**

1. Explain why it is unlikely that more than one flock of birds would find the islands in this way at the same time. (2 marks)

*The storm was not a normal occurrence (1), random birds arrived so unlikely to occur more than once – any suitable answer plus explanation*

1. Suggest two possible reasons why there were no predators on the island. (2 marks)

*Nothing to eat so predators died (1), predators could not swim that far (1), island new so have not colonised it yet (1) – any suitable 2 reasons*

1. Why were there no other birds to compete with? (2 marks)

*Island new so have not arrived yet (1), too far for them to fly (1), happy where they are so no need to go off and fly in hope of finding food (1) – any 2 suitable reasons*

1. Why might some finches survive better than others on the same food sources? (2 marks)

*Better adaptations to acquire food* source, *better adaptations to open food source, better adaptations to digest food – any suitable two.*

1. Why were the finches slightly different on each island? (2 marks) (2 marks)

*The food source on each island is slightly different(1) so finch population has “adapted” to the food source (any suitable of way of stating this)*