



National 5

Unit 3

Life on earth

Ink exercise 4

Adaptation, natural selection and  
the evolution of species

Once completed and marked-

Think about and list below the areas I need to work on

## Multiple choice

Tick one answer from each question.

1. What is a mutation?

- a. A change to an organism's appearance
- b. A change to an organism's behaviour
- c. A change to an organism's genetic material

2. How can you increase the rate of mutation?

- a. By variation
- b. By radiation
- c. By natural selection

3. What can cause variation?

- a. Changes in the environment
- b. Isolation
- c. Mutation

4. What can cause variation to be passed on to offspring?

- a. Most well-adapted individuals can reproduce
- b. Reproduction involves passing on genes
- c. Less well-adapted individuals cannot reproduce

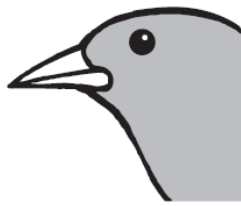
5. What are the only types of characteristics that can be passed on by inheritance?

- a. Those that make an organism more likely to survive and reproduce
- b. Those that are present in all the organisms in a population
- c. Those that are the result of the genes an organism possesses

6. What is meant when an organism is described as having a 'selective advantage'?
- The organism is unable to survive and reproduce in its environment
  - The organism has characteristics that help it to survive and reproduce in its environment
  - The organism can change to help it survive and reproduce in its environment
7. Which of the following is an example of evolution by natural selection?
- A giraffe increasing its neck length by stretching to reach the top of a tree.
  - A human increasing the size of their muscles as a result of training
  - An increase in the number of drug resistant bacteria in a population
8. What is the correct order for the events of speciation?
- Isolation → mutation → selection
  - Mutation → isolation → selection
  - Mutation → selection → isolation
9. During speciation when do two groups of organisms become separate species?
- When they become isolated from each other
  - When they look different
  - When they cannot interbreed to produce fertile offspring
10. Which of the following is an example of a selection pressure?
- Competition for food
  - Variation
  - Mutation

11.

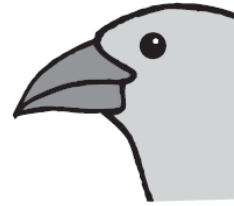
(a) The diagrams below give some information about three species of Darwin's Finches which live on the Galapagos Islands.



Feeds on insects



Feeds on seeds



Feeds on seeds

Using evidence from the diagrams, explain why these three finch species occupy different niches.

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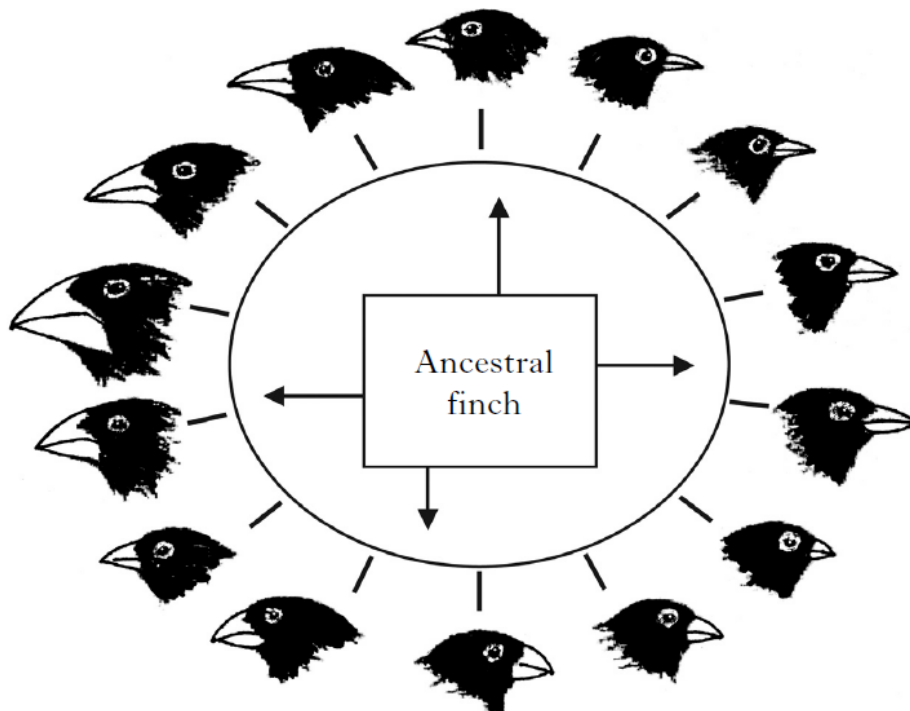
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12.

It is thought that Darwin's finches evolved from one type of ancestral finch.

The diagram below shows examples of different species of Darwin's finches.



- (a) (i) What **two** observations can be made from the diagram about the structure of the finches' beaks?  
\_\_\_\_\_ 1
- (ii) Name one environmental factor which has led to this variation.  
\_\_\_\_\_ 1
- (b) What term is used to describe the role that each finch plays within its community?  
\_\_\_\_\_ 1
- (c) The existence of some Darwin's finches is under threat in the Galapagos Islands due to human activity.
- (i) Give an example of a human activity that could be affecting the finches.  
\_\_\_\_\_ 1
- (ii) What could be an effect of this human activity on finch biodiversity?  
\_\_\_\_\_ 1

13. Complete the paragraph below using the following terms;

Advantage

Isolated

Mutations

Natural selection

Speciation

If a population of organisms becomes \_\_\_\_\_ from the other members of its species, it may undergo \_\_\_\_\_ and eventually become a new species. This happens if \_\_\_\_\_ follows a different path in this new environment and some \_\_\_\_\_ that would have been neutral or disadvantageous before now confer an \_\_\_\_\_ on the organisms. (4)

14. Decide whether each of the following statements is true or false.

Where a statement is false, give the word(s) that should have been used in place of the word(s) in bold print.

- a) **Adaptation** is the only source of new variation amongst living things. \_\_\_\_\_
- b) Most mutations confer **an advantage** on the mutant organism.  
\_\_\_\_\_
- c) Some mutations are **neutral** and have no effect on the mutant's phenotype. \_\_\_\_\_
- d) An inherited characteristic that makes an organism well suited to its environment is called an **evolution**. \_\_\_\_\_
- e) **Natural selection** is the process by which the members of a population best adapted to changing environmental conditions survive and pass their genes on to succeeding generations.  
\_\_\_\_\_

(5)

25 marks