18. Variation and selection

18.3 Selection

Paper 1 and 2

Question Paper

Paper 1

Questions are applicable for both core and extended candidates

1 Which statement is an example of natural selection?

A choosing donkeys with desirable characteristics to breed

B choosing to cross-pollinate wheat plants with the highest yields

C inserting genes into a crop plant to improve its nutritional qualities

D in wild flowers, the development of petals that look like insects to attract pollinators

2 The list shows statements about selection.

1 Individuals reproduce and pass on their alleles to the next generation.

2 Genetic variation exists between individuals and many offspring are produced.

3 Individuals struggle for survival and compete for resources.

4 Individuals that are better adapted to the environment survive.

5 Individuals with desirable features are selected by humans.

Which statements are correct descriptions of natural selection?

A 1, 2, 3 and 4

B 1, 2 and 5 only

C 2, 3 and 4 only

D 3, 4 and 5 only

3 What is needed for natural selection to take place?

A excess resources for the population

B no variation within a population

C reproduction by individuals that are better adapted to the environment than others

D selection by humans of organisms with desired characteristics

4 Which statement about selective breeding is correct?

A It does not involve humans.

B It involves a struggle for survival.

C It always involves only one parent.

D It involves parents that possess desirable features.

5 A species of insect usually has pale-coloured wings. This helps to camouflage them on pale-coloured tree trunks. A few of the insects in this species have darker coloured wings.

After a number of years the tree trunks become darker in colour due to environmental changes. The insects with dark-coloured wings become more common than insects with pale-coloured wings in this species.

Which process causes this change in the proportion of insects with dark-coloured wings?

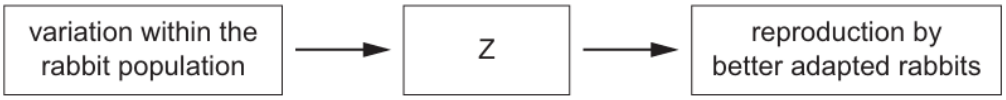
A biotechnology

B conservation

C natural selection

D selective breeding

6 The diagram shows some of the stages involved in natural selection in wild rabbits.



Which statement is missing from box Z?

A competition between rabbits for limited resources

B passing on of alleles to the next generation of young rabbits

C production of limited numbers of young rabbits

D selection by humans of rabbits with desirable characteristics

7 A student wrote some statements describing the stages involved during selective breeding of plants.

1 Farmers select individual plants with desirable features.

2 Farmers cross these individuals to produce the next generation.

3 The farmers then select the offspring with the desirable features.

Which statements are correct?

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

8 Which statement about selective breeding is correct?

A The inheritance of alleles is not involved.

B Only individuals better adapted to the environment will survive.

C Individuals are crossed to produce the next generation.

D There is competition for resources.

9 The statements describe aspects of selective breeding and natural selection.

Which statement applies **only** to selective breeding?

A Humans select individuals which have desirable features.

B Individuals pass their alleles to the next generation.

C There may be a large number of offspring produced.

D There is variation between individual offspring.

10 When is evolution by natural selection most likely to occur?

A when there is a stable population of predators

B when there is a stable environment

C when there is less variation in the population

D when there is more variation in the population

11 What is required for natural selection to occur?

A genetic variation between individuals

B humans selecting desirable characteristics

C no competition between individuals or resources

D offspring produced by asexual reproduction

Paper 2

Questions are applicable for both core and extended candidates unless indicated in the question

12 The photograph shows a species of fish called a leafy sea-dragon.

Leafy sea-dragons live in areas of the sea where seaweed is present.

Which statements explain how natural selection caused the leafy sea-dragon species to develop? **(extended only)**

1 Leafy sea-dragons that looked like seaweed were better adapted to their environment.

2 Leafy sea-dragons that survived passed on the allele for their appearance to their offspring.

3 Humans selected leafy sea-dragons that looked like seaweed.

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

13 Which term is used when humans cross individuals with desirable features?

A genetic breeding

B natural breeding

C pure-breeding

D selective breeding

14 A species of insect usually has pale-coloured wings. This helps to camouflage them on pale-coloured tree trunks. A few of the insects in this species have darker coloured wings.

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Which process causes this change in the proportion of insects with dark-coloured wings?

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B conservation

C natural selection

D selective breeding

15 New strains of the crop plant wheat can be produced by cross-breeding disease resistant plants with those that give high yields of grain.

What is this an example of?

A natural selection

B artificial selection

C genetic engineering

D asexual reproduction

16 What occurs as a result of artificial selection? **(extended only)**

A antibiotic resistance in bacteria

B disease resistant crops

C presence of roots in cactus plants

D sickle cell anaemia

17 Which statement explains why the allele for sickle-cell anaemia is commonly found in human populations in certain parts of the world?

A It is transmitted by mosquitoes.

B It protects people against malaria.

C It prevents people being bitten by mosquitoes.

D It increases oxygen transport.

18 The development of antibiotic resistance in bacteria is an example of which process? **(extended only)**

A evolution by artificial selection

B evolution by natural selection

C variation due to genetic engineering

D variation due to asexual reproduction

19 Why is the allele for sickle-cell anaemia common in some parts of the world?

A Malaria protects against sickle-cell anaemia.

B Sickle-cell anaemia is caused by malaria.

C Sickle-cell anaemia is transmitted by mosquitoes.

D The sickle-cell anaemia allele protects against malaria.

20 Which statement describes how a species becomes adapted to its environment?

A Genetic similarities give rise to different genotypes which may have a reproductive advantage.

B Genetic variation gives rise to different phenotypes which may have a reproductive advantage.

C Phenotypic similarities give rise to different genotypes which may have a reproductive advantage.

D Phenotypic variation gives rise to different phenotypes which may have a reproductive advantage.

21 Which statement describes the relationship between evolution and natural selection?

A A change in the adaptive features of a population over time causes evolution, resulting in natural selection.

B Evolution causes a change in the adaptive features of a population over time, resulting in natural selection.

C Evolution causes natural selection, resulting in a change in the adaptive features of a population over time.

D Evolution is the change in the adaptive features of a population over time as a result of natural selection.