

A-Level Biology

Name: _____ Score: _____

1. Most features, such as height, are caused by:
 - ☐ neither genes nor environment
 - ☐ environmental factors only
 - ☐ genetic factors only
 - ☐ both genetic and environmental factors
2. Natural selection creates new variation in a population when it is needed.
 - ☐ True ☐ False
3. A change in the allele frequencies of a population over generations is called _____.

4. Selective breeding (artificial selection) differs from natural selection because:
 - ☐ it never changes the population
 - ☐ it only happens in bacteria
 - ☐ no alleles are passed on
 - ☐ humans choose which organisms breed, rather than nature
5. Evolution is best described as:
 - ☐ the gene pool of a population changing over generations, forming new species
 - ☐ a single mutation
 - ☐ the loss of all genetic variation
 - ☐ an individual changing during its life
6. Continuous variation is:
 - ☐ clear separate groups controlled by one gene
 - ☐ a smooth range controlled by many genes plus the environment
 - ☐ caused only by the environment
 - ☐ the same in every individual
7. In natural selection, which individuals are most likely to pass on their alleles?
 - ☐ a random selection
 - ☐ the largest ones only

- ☐ those that produce the fewest offspring
- ☐ those best adapted, which survive and reproduce

8. In a population the recessive phenotype (q^2) makes up 0.04 of individuals. What is the recessive allele frequency, q ?

9. When humans choose which organisms breed to pass on useful features, it is called _____ selection.

10. Speciation is the formation of a new species, when two populations can no longer interbreed.

- ☐ True ☐ False

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1. **both genetic and environmental factors**

Height depends on the alleles inherited and on diet/lifestyle – a combination of genes and environment.

2. **False**

False. Natural selection cannot create variation; it acts on variation that already exists. New variation comes from mutation (and is reshuffled by sexual reproduction).

3. **evolution**

Selection and genetic drift change allele frequencies – that is evolution at the genetic level.

4. **humans choose which organisms breed, rather than nature**

In artificial selection, people choose the breeders to pass on useful features; in natural selection, the environment selects.

5. **the gene pool of a population changing over generations, forming new species**

Evolution is the change in a population's gene pool over time, which can lead to new species.

6. **a smooth range controlled by many genes plus the environment**

Continuous variation (e.g. height) is a smooth range from many genes; discontinuous is separate groups from few genes.

7. **those best adapted, which survive and reproduce**

The best-adapted individuals survive, reproduce, and pass on their helpful alleles, which spread over generations.

8. **0.2**

$q^2 = 0.04$, so $q = \sqrt{0.04} = 0.2$. (Then $p = 1 - q = 0.8$.)

9. **artificial**

Artificial selection (selective breeding) is the same mechanism as natural selection – but humans, not the environment, do the selecting.

10. **True**

It can be allopatric (geographical barrier) or sympatric (same area).