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 appearing in one individual

   ☐ the loss of all genetic variation from a population

   ☐ an individual changing to suit its surroundings 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

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   ☐ 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

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).

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