

Benchmark Test 5

Choose the letter of the best answer.

1 Which aspect of an organism is acted upon by natural selection?

- A genotype
- B phenotype
- C haplotype
- D karyotype

2 Which of the following *most* directly affects an individual's ability to survive and reproduce in its environment?

- A frameshift mutations
- B physical characteristics
- C allele combinations
- D parenting skills

3

Genotype	Phenotype
<i>cc</i>	Normal legs and gait
<i>Cc</i>	Abnormally short legs and shuffling gait
<i>CC</i>	Unknown

The chart shows allele combinations for a gene that controls leg development in chickens. What is *most* likely the reason that the phenotype for *CC* chickens is unknown?

- A Chickens with this combination are sterile.
- B Chickens with this combination have a range of phenotypes.
- C Chickens with this combination die before hatching.
- D Chickens with this combination carry recessive alleles.

4 How can an allele that leads to death in homozygous individuals remain in a population's gene pool?

- A Individuals that are homozygous for the allele pass it on to offspring.
- B Individuals that are homozygous for the allele do not pass it on to offspring.
- C Individuals that are heterozygous for the allele pass it on to offspring.
- D Individuals that are heterozygous for the allele do not pass it on to offspring.

5 Tay-Sachs is a genetic disease that causes death in early childhood. Children must have two copies of the recessive, disease-causing allele to get the disease. What can be said about the genetic make-up of the parents of a child with Tay-Sachs?

- A Neither parent has the recessive allele.
- B Each parent has one recessive allele.
- C Only one parent has the recessive allele.
- D Both parents have two recessive alleles.

6 Which of the following is true of spontaneous genetic mutations?

- A They can occur in all organisms.
- B They can occur only in females.
- C They can occur only in males.
- D They can occur only in adults.

7 A farmer raising sheep chooses healthy breeding partners carefully in an attempt to produce healthy lambs. However, once in a while a sickly lamb is born. What is one reason that sickly lambs continue to be born?

- A New mutations appear in the population.
- B There is little diversity in the population.
- C There are many individuals in the population.
- D There is too much variability in the population.

8 Which of the following *best* describes how frequently new mutations in a gene pool are generated?

- A continuously
- B rarely
- C when populations evolve
- D during sexual reproduction



The picture shows snails of the same species with a variety of shell patterns. What would be the *most* likely cause of such variation within a species?

- A artificial selection
- B natural selection
- C asexual reproduction
- D mutations

10 Which of the following increases the ability of a species to survive after an extreme change in environmental conditions?

- A genetic variation
- B sexual reproduction
- C asexual propagation
- D adaptive radiation

11 Biologists in China and the United States choose mating partners for captive pandas in an effort to maintain high genetic diversity. What benefit does this diversity have for the panda population?

- A allows for better opportunities to reproduce
- B keeps the panda coat patterns consistent around the globe
- C increases the chance that population could survive environmental change
- D decreases the number of twin pandas born

12 A certain population of penguins is well adapted to living in warm temperatures. Individuals in this population can cool down by increasing blood flow to their flippers. What has *most* likely caused this trait to become so common?

- A natural selection
- B genetic drift
- C gene flow
- D sexual selection

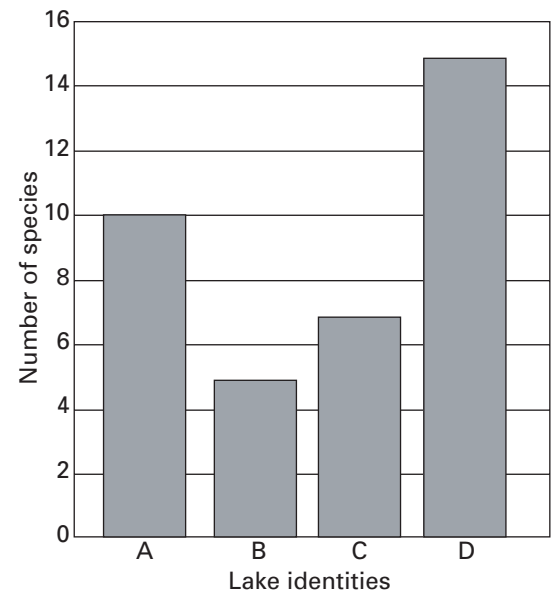
13 An entomologist studying a tree beetle population finds that 50% of the beetles are spotted. Two months later, she finds that 75% of the beetles in the same population are spotted. Which of the following *best* explains this trend?

- A** The spotted beetles are less likely to be eaten than non-spotted beetles.
- B** The spotted beetles have fewer offspring than the non-spotted beetles.
- C** The spotted beetles move slower than the non-spotted beetles.
- D** The spotted beetles are more susceptible to disease than the non-spotted beetles.

14 Which of the following is necessary for natural selection?

- A** long life spans
- B** low mutation rate
- C** phenotypic variability
- D** few offspring

15 Lake Species



The graph shows the number of species found in four different lakes. After an extreme change in environmental conditions, which lake would *most* likely continue to support life?

- A** lake A
- B** lake B
- C** lake C
- D** lake D

16 Which of the following factors decreases the chance that at least some members of a species will survive after an environmental change?

- A** natural selection
- B** random mating
- C** low genetic diversity
- D** large gene pool

17 How does genetic drift affect a population?

- A** It decreases genetic variability.
- B** It increases the number of individuals.
- C** It increases reproductive ability.
- D** It decreases the mutation rate.

18 People living in the Lake Maracaibo region of Venezuela have a higher incidence of the genetic disorder called Huntington’s disease than the rest of the Venezuelan population. They are mostly descendants of one woman who carried the allele for the disorder. What is the name given to this type of influence on a population?

- A** gene flow
- B** founder effect
- C** bottleneck effect
- D** natural selection

19

African Elephant Population Changes in Uganda, 1960s–1999

Year/Time period	Number of animals
1960s	30,000
1982/3	2,000
1995/6	1,900
1999–2003	2,400

(data from www.uwa.or.ug/trends.pdf)

The chart shows the change in the number of individuals in an African elephant population over 40 years. Which of the following is the *most* likely description of the population in 1999?

- A** It had less genetic diversity than the 1960s population.
- B** It had the same number of mutations as the 1960s population.
- C** It had more beneficial traits than the 1960s population.
- D** It had more offspring than the 1960s population.

20 Which of the following can reproductive isolation of populations *most* likely lead to?

- A** increased mutations
- B** newer species
- C** fewer extinctions
- D** lower gene flow

21 A male donkey and a female horse can mate and produce a hybrid, which is a mule. However, mules are usually sterile. How is this an example of reproductive isolation?

- A** Donkeys and horses are geographically isolated.
- B** Donkeys and horses are heterozygous for all traits.
- C** Donkeys and horses can produce only female offspring.
- D** Donkeys and horses cannot normally produce fertile offspring.

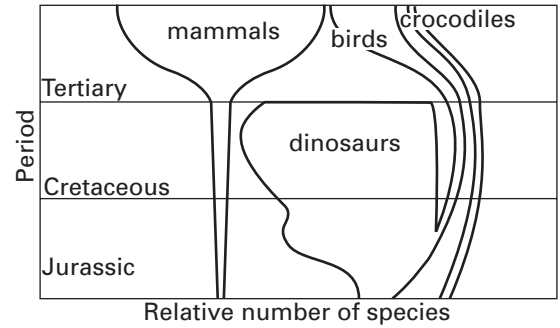
22 A single species of plant living on a New Zealand island evolved into two species 250,000 years ago. Which of these events *most* likely led to this change?

- A** The mutation rate of the plant increased.
- B** The reproductive rate of the plant decreased.
- C** An isolated population evolved genetic differences.
- D** A small group of seeds was burned in a fire.

23 The study of biological diversity using the fossil record is limited to examining what type of differences between species?

- A** physical
- B** reproductive
- C** genetic
- D** behavioral

24



What was *most* likely the cause of the increase in mammal species shown in the tertiary period?

- A** drop in Earth's temperature
- B** increased symbiosis with crocodiles
- C** coevolution with birds
- D** less competition with dinosaurs

25 Which of the following occurrences is *most* likely to be followed by a mass extinction?

- A** reproductive isolation
- B** adaptive radiation
- C** environmental change
- D** genetic equilibrium