

Topic 5: Evolution

Directions: Each of the following questions or incomplete statements is followed by five suggested answers or completions. Select the one that is best in each case.

- Choose the correct order: kingdom,
 - phylum, order, class, family, genus, species
 - order, phylum, class, family, genus, species
 - phylum, class, order, family, genus, species
 - phylum, class, order, family, species, genus
 - phylum, family, order, class, species, genus
- The gene pool of a population may be altered by all of the following EXCEPT
 - immigration.
 - emigration.
 - mutations.
 - genetic drift.
 - operation of the Hardy-Weinberg law.
- Which scientist(s) believed that evolutionary change occurred when species used their bodies in new ways?
 - Lamarck
 - Darwin
 - Malthus
 - I only
 - II only
 - III only
 - I and III only
 - II and III only
- Whales have been found to contain leg bones in their body wall. These are an example of
 - homologous structures.
 - vestigial structures.
 - fossils.
 - geologic evolution.
 - analogous structures.
- Which of the following is NOT part of Darwin's theory of evolution?
 - Common descent
 - Overproduction
 - Survival of the fittest
 - Variations
 - Inheritance of acquired traits
- The graph below shows the mating seasons for seven species of frogs in eastern North America. Different breeding sites are used when mating seasons overlap.

Which two species of frogs have almost identical mating seasons?

 - Peeper frog and leopard frog
 - Tree frog and green frog
 - Wood frog and leopard frog
 - Leopard frog and pickerel frog
 - Peeper frog and wood frog

7. Which of the following is NOT used by taxonomists in classifying related species together in broader taxonomic categories?

- (A) Similarity in structure
- (B) Similarity in evolutionary history
- (C) Similarity in habitat
- (D) Similarity in biochemical composition
- (E) Similarity in embryonic development

8. The presence of a nuclear membrane, photosynthetic capability, and a multicellular form can be characteristics of members of which kingdom(s)?

- I. Animalia
- II. Protista
- III. Plantae

- (A) I only
- (B) II only
- (C) III only
- (D) II and III only
- (E) I and III only

9. The best definition of natural selection is

- (A) the constancy of species populations in spite of the production of far more offspring than needed to maintain them.
- (B) the appearance in the fossil record of a new species relatively suddenly, over a short period of time.
- (C) the greater survival and reproduction of organisms with favorable variations than of organisms with unfavorable variations.
- (D) the strengthening and development of a body part by constant use.
- (E) the inheritance of traits that are acquired during an organism's lifetime.

Directions: Questions 10–12 refer to the set of lettered choices below. Select the one lettered choice that best fits each statement. A choice may be used once, more than once, or not at all.

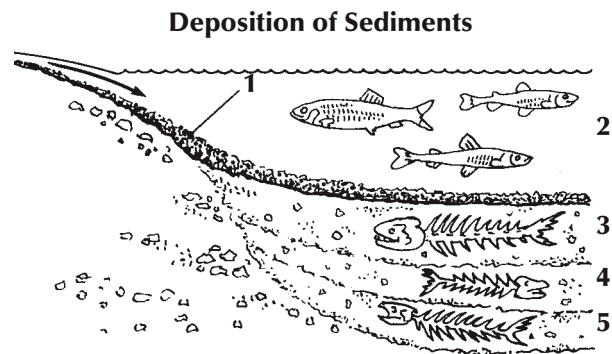
- (A) Geographic isolation
- (B) Reproductive isolation
- (C) Polyploidy
- (D) Adaptive radiation
- (E) Convergent evolution

10. A result of abnormal cell division that can cause formation of new species.

11. Division of a population by some natural barrier, such that the gene pools of the resulting groups can no longer intermix.

12. The physical inability of different groups of organisms to interbreed successfully, resulting in the formation of new species.

Directions: Questions 13–16 refer to the diagram below with certain parts labeled with numbers. Each question is followed by five suggested labels or answers. For each question select the one best answer.



13. Fossils are located in layer(s)

- (A) 1 only
- (B) 2 only
- (C) 5 only
- (D) 3, 4, and 5
- (E) 2, 3, 4, and 5

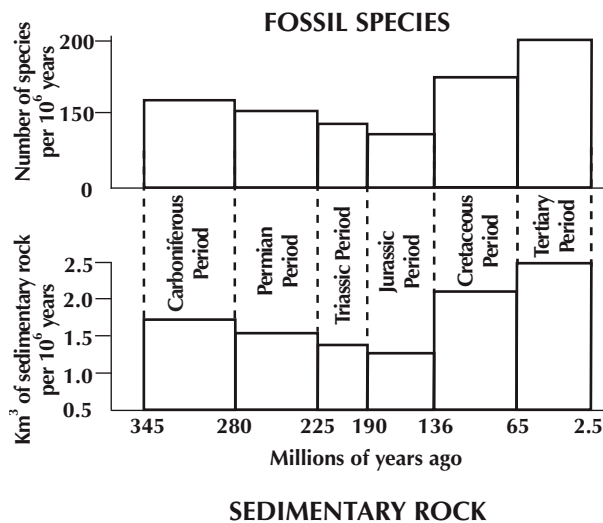
14. The oldest fossil is located in layer

- (A) 1
- (B) 2
- (C) 3
- (D) 4
- (E) 5

15. The newest fossil is located in layer
 (A) 1 (B) 2 (C) 3 (D) 4 (E) 5
16. Sediments have turned to rock in layer(s)
 (A) 1 only (D) 3, 4, and 5
 (B) 3 only (E) 1, 3, 4, and 5
 (C) 5 only

Directions: The following group of questions concerns a laboratory or experimental situation. Study the description of the situation. Then choose the one best answer to each question.

Questions 17–20 refer to the two graphs below. Over the years, paleontologists have collected data to create a history of the Earth’s organisms. The two graphs below provide information about the six periods of the geologic time scale from the Carboniferous Period to the Tertiary Period. The top graph shows the rate of appearance of animal species of a certain group, in number of species per million years, in the fossils from each period. The bottom graph shows the estimated rate of formation of sedimentary rocks, in cubic kilometers per million years, for each period.



17. The rate of occurrence of species is greatest in the fossils from the
 (A) Carboniferous Period.
 (B) Jurassic Period.
 (C) Permian Period.
 (D) Cretaceous Period.
 (E) Tertiary Period.
18. The total number of species found in the fossils of the Permian Period is about
 (A) 150
 (B) 8250
 (C) 42,000
 (D) 1.5×10^6
 (E) 150×10^6
19. The patterns of the two graphs
 (A) appear to have no statistical significance.
 (B) appear to be inversely related.
 (C) indicate the importance of controls in a scientific investigation.
 (D) appear to be similar.
 (E) strongly support the theory of evolution.
20. The best interpretation of the data presented in both graphs is that
 (A) the number of animal species present on the earth at any time depends on the rate at which rock sediments are being deposited.
 (B) more species enter the fossil record when the rate of sedimentary rock formation is greater.
 (C) sedimentary rocks have been forming at a steadily increasing rate since the end of the Carboniferous Period.
 (D) geologic change has been most rapid in the Tertiary Period.
 (E) mass extinctions occurred at the end of each period represented.