

REVIEW EXERCISES: UNIT 20

A. Fill in the blanks in the statements below.

1. Fossils are generally found in _____ rock.
2. The deeper the rock within the earth's crust, the older it is. This is a statement of the law of _____.
3. The amount of time it takes for half the atoms of a given sample of a radioactive element to decay to a stable end product is the _____ of that element.
4. In the geologic time scale, the time period in which there was no life on earth was the _____.
5. The fossil-forming process in which plant and animal parts are gradually replaced by hard minerals is called _____.
6. The wing of a bat and the flipper of a whale are _____ structures.
7. Body parts of different types of animals that are similar in function but different in structure and evolutionary origin are _____ structures.
8. The appendix in humans is an example of a _____ organ.
9. The theory of use and disuse was formulated by _____.
10. The theory of evolution by natural selection was developed by _____ and _____.
11. The capacity of a species to produce more offspring than can survive is called _____.
12. "Survival of the fittest" was part of Darwin's process of _____.
13. Both Darwin and Lamarck thought that variations could be passed on from one generation to the next by the inheritance of _____ characteristics.
14. In Weismann's theory of the continuity of the germplasm, the germplasm included all the _____ cells.
15. Mutations were first documented by the Dutch botanist _____.
16. All the genes of a population make up the _____.
17. The law that states that in stable populations the gene frequencies remain constant from one generation to another is the _____ law.
18. The study of the hereditary factors that affect a population is called _____.
19. The evolution of a new species most commonly follows from _____ of a population.
20. The evolutionary branching of a single species into a number of different species that fill different environmental niches is called _____.

B. In the answer space for each question, write the letter of the choice that best completes the statement.

- _____ 1. Which of the following is *not* a source of genetic variation? (a) chromosome mutation (b) recombination (c) gene mutation (d) somatic mutation
- _____ 2. A mixture of human blood and rabbit serum shows more clumping than a mixture of human blood and monkey blood. This observation provides evidence for evolution in the area of (a) comparative anatomy (b) comparative embryology (c) comparative biochemistry (d) fossils
- _____ 3. A comparison of which of the following factors could provide the strongest evidence for a close evolutionary relationship between two different animals? (a) blood proteins (b) use of forelimbs (c) foods consumed (d) habitats occupied
- _____ 4. According to Lamarck, the white coat of the polar bear appeared as a result of (a) mutation (b) the need to adapt to the environment (c) overproduction (d) survival of the fittest
- _____ 5. The Hardy-Weinberg law does not apply if there is (a) a large breeding population (b) a high rate of mutation (c) no migration into or out of the population (d) random mating within the population
- _____ 6. Which of the following most strongly affects the rate of evolution in a population? (a) the number of chromosomes in the species (b) environmental changes (c) the size of the organisms (d) random migration out of the population
- _____ 7. When adaptive radiation occurs, (a) no new mutations appear (b) new species fill available environmental niches (c) natural selection ceases (d) mating between species increases
- _____ 8. Which of the following is *not* thought to have been present in the atmosphere of the primitive earth? (a) methane (b) water vapor (c) ammonia (d) oxygen
- _____ 9. According to the heterotroph hypothesis, the first living organisms on earth were (a) anaerobic heterotrophs (b) anaerobic autotrophs (c) aerobic autotrophs (d) aerobic heterotrophs
- _____ 10. According to Weismann's theory of the continuity of the germplasm, it was impossible for acquired characteristics to be passed on to succeeding generations because (a) only somatic cells are involved in reproduction (b) only changes in eggs can be inherited (c) only changes in sperm can be inherited (d) only germ cells are involved in reproduction
- _____ 11. "The progressive change in genes in a population" is a modern definition of (a) natural selection (b) a gene pool (c) evolution (d) population genetics
- _____ 12. Under constant environmental conditions, the frequency of a beneficial allele within a population will most likely (a) increase (b) decrease (c) remain unchanged (d) first increase, then decrease

- _____13. In a stable population where the gene frequencies remain constant, the rate of evolution is (a) increasing (b) decreasing (c) normal (d) zero
- _____14. The method of dating used to establish the age of a fossil thought to be less than 40,000 years old is (a) potassium-argon method (b) radiocarbon method (c) uranium-lead method (d) oxygen-nitrogen method
- _____15. At the beginning of which of the following eras was there a tremendous increase in the variety of living forms? (a) Archeozoic (b) Precambrian (c) Paleozoic (d) Mesozoic
- _____16. Which of the following is a mathematic expression of the Hardy-Weinberg law? (a) $p^2 + 2pq + q^2 = 1$ (b) $p^2 + pq + q^2 = 1$ (c) $p + pq + q = 100$ (d) $p^2 + 2pq + q^2 = 100$
- _____17. Variations that aid in survival are (a) adaptive radiations (b) adaptive variations (c) alleles (d) natural variations
- _____18. When two similar organisms show reproductive isolation, it means that (a) they cannot interbreed and produce viable offspring (b) they tend to mate selectively within the population (c) they are of the same species (d) they can breed in nature but not under artificial conditions
- _____19. In a stable population of mice, 37 percent of the animals carry the recessive gene for black coat color. According to the Hardy-Weinberg law, what percentage of the next generation will carry this gene? (a) 18½ percent (b) 37 percent (c) 55½ percent (d) 74 percent
- _____20. Which of the following has *not* affected the evolutionary process in domestic plants and animals? (a) inbreeding (b) selective breeding (c) artificially induced mutations (d) cross-breeding between species

C. Place the letter of the definition at right in the space to the left of the term it defines.

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| _____ 1. population genetics | A. Dinosaur tracks. |
| _____ 2. abiogenesis | B. The deeper the rock layer, the older it is. |
| _____ 3. Hardy-Weinberg law | C. Distribution of genes within a population. |
| _____ 4. imprint | D. Progressive change of genes in a population. |
| _____ 5. Louis Pasteur | E. Disproved theory of inheritance of acquired characteristics. |
| _____ 6. adaptive radiation | F. Spontaneous generation. |
| _____ 7. evolution | G. Hereditary factors affecting a population. |
| _____ 8. gene frequencies | H. In a stable population, gene frequencies remain constant from one generation to another. |
| _____ 9. law of superposition | I. Disproved theory of abiogenesis. |
| _____ 10. Auguste Weismann | J. Evolutionary branching to fill available niches. |