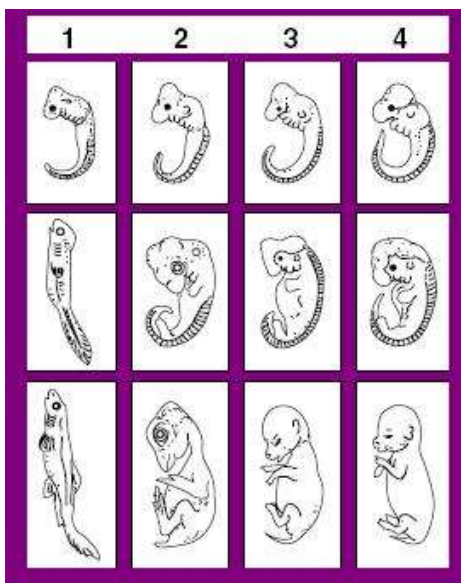


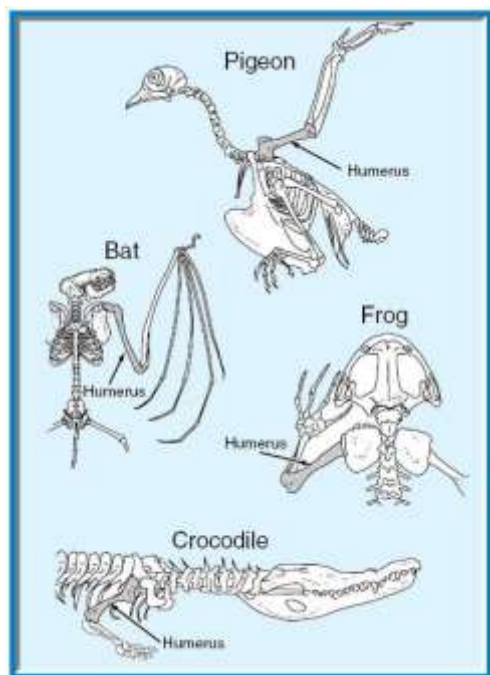
Evolution by Natural Selection Quiz

- 1. Which of the following statements describes the process of natural selection?**
 - a. Individuals survive that have inherited traits adapted to their environment.
 - b. Farmers select animals with desirable variations for breeding.
 - c. Populations sharing the same gene pool interbreed and create new species.
 - d. New species are formed via genetic engineering.
- 2. Change in species is described as a process that usually occurs over long periods of time. Yet, even though antibiotics have only been widely used for fifty years, scientists recognize that overuse of antibiotics has led to antibiotic-resistant strains of bacteria. The reason this can occur in a relatively short span of time is that —**
 - a. there are many different types of bacteria
 - b. bacteria reproduce rapidly
 - c. travelers carry bacteria around the world
 - d. bacteria are very small
- 3. Which of the following characteristics of a population may interfere or impede its ability to evolve over time?**
 - a. Environmental instability
 - b. High rate of reproduction
 - c. Low genetic diversity
 - d. Strong selective pressure
- 4. The theory of evolution by natural selection was originally proposed by Charles Darwin in 1859. However, his theory has been revised over time as new scientific information has been discovered. Which of the following portions of the modern theory of evolution by natural selection was *not* originally proposed by Darwin?**
 - a. Organisms produce more offspring than any natural habitat can sustain.
 - b. Some variations help certain individuals produce more offspring than others, thus allowing them to contribute more to the make-up of the population
 - c. The ultimate source of all variations is mutations in the DNA of individuals.
 - d. Variation exists among individuals in a population.
- 5. Two plant species found in a dry region of the western United States exhibit vastly different abilities to survive. Species A has very slow stem growth and few leaves but is very abundant. Species B has rapid stem growth and many leaves but is very rare. Which hypothesis is most likely supported by this information?**
 - a. Flower size and color may give species B an advantage over species A.
 - b. Reduced root growth may give species A an advantage over species B.
 - c. Leaf shape may give species B an advantage over species A.
 - d. Reduced stem growth may give species A an advantage over species B.
- 6. The trait for dark wings (D) is dominant to light wings (d) in peppered moths. At one point in time, the frequency of each allele was 50% of the entire gene pool of moths near London. After the industrial revolution, the frequency of dark-winged moths increased. Which of the following must have happened to the gene pool for wing color in this population?**
 - a. The frequency of both alleles increased.
 - b. The frequency of the dark allele increased, while the light allele decreased.
 - c. The frequency of the light allele increased, while the dark allele decreased.
 - d. The frequency of both alleles decreased.

7. Which of the following statements correctly summarizes the difference between gradualism and punctuated equilibrium?
- Gradualism describes evolution; punctuated equilibrium describes homeostasis.
 - Gradualism describes evolution as slow and steady; punctuated equilibrium describes evolution as fast and dramatic, interspersed with long periods of no change.
 - Gradualism describes evolution as fast and dramatic, interspersed with long periods of no change; punctuated equilibrium describes evolution as slow and steady.
 - Gradualism was supported by Lamarck; punctuated equilibrium was supported by Darwin.
8. A scientist discovers a population of finches on an island that appear similar to a population on a nearby island. In order to test whether they are members of the same species, the scientist should first _____.
- analyze amino acid sequences from individuals from each population
 - compare their feeding and nesting behaviors
 - describe the niche that each population occupies on each island
 - test whether they will mate and produce healthy, fertile offspring



9. The chart at left shows vertebrate embryo development. Which of these would be least related to the others?
- 1
 - 2
 - 3
 - 4

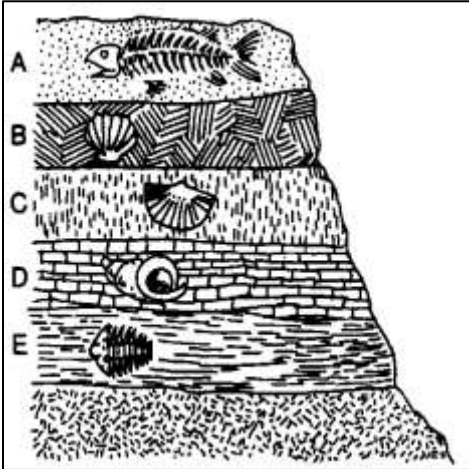


10. All the organisms shown at left belong to the Phylum Chordata. The structural similarity in the organisms suggests that —
- the humerus is the same size in all chordates
 - only animals that walk on 4 legs need the humerus
 - the humerus is attached to the skeleton by immovable joints
 - chordates have common ancestors

Unknown animal: Met-Gly-Ser-Tyr-Tyr-Arg-His-His-Glu-Lys-Asp

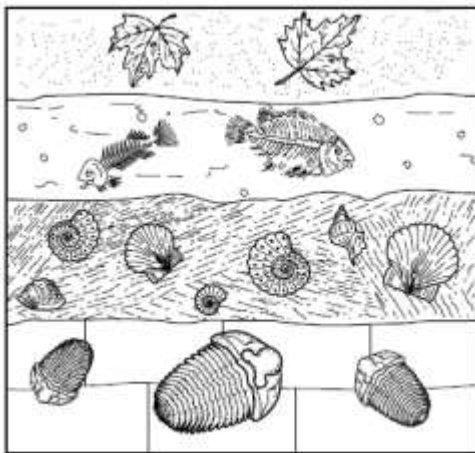
11. One method of determining the classification of an animal is by comparing the amino acid sequence. Which of these animals most closely resembles the unknown animal?

- a. Mouse: Met-Gly-Ser-Tyr-Tyr-Arg-His- Glu-Val-Val-Leu
- b. Dog: Met-Gly-Ser-Tyr-Tyr-Arg-His-Asp- Glu-Lys-Asp
- c. Horse: Met-Gly-Ser-Ser-Tyr-Arg-Arg- Asp-His-Glu-Lys-Asp
- d. Cat: Met-Gly-Ser-Tyr-Tyr-Arg-His-His- Arg-Cys-Thre-Asp



12. Over long periods of time, carbon-14 found in rock decays to carbon-12. In the diagram above, which strata (layer) would be expected to contain the *most* carbon-14?

- a. A
- b. B
- c. D
- d. E



13. The diagram shows undisturbed sedimentary rock strata containing fossils. Which statement best summarizes the history of this area?

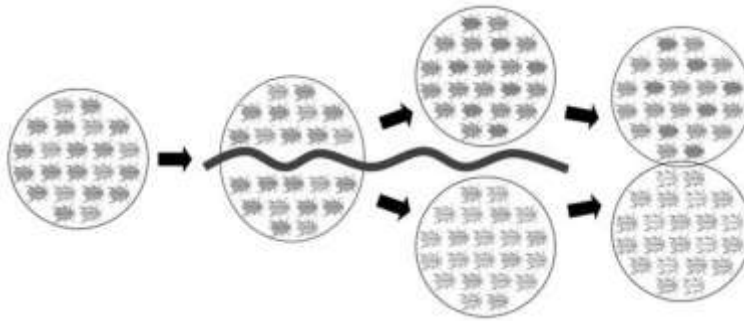
- a. The area was once a forest and was replaced by a freshwater lake.
- b. The area was once a freshwater lake and was replaced by a saltwater sea.
- c. The area was once a saltwater sea and later was replaced by a coniferous forest.
- d. The area was once a saltwater sea and later was replaced by a forest.

14. All organisms share some common features, including the presence of DNA, cellular organization, and the use of ATP for energy. These similarities suggest _____.

- a. organisms have not changed much since life first appeared on Earth
- b. organisms intentionally developed these characteristics for survival early in the history of life
- c. these characteristics evolved independently in different organisms
- d. these characteristics were inherited from a single common ancestor

15. What is the main advantage of sexual reproduction?

- a. It allows organisms to make more offspring – twice the number of parents means twice the number of offspring.
- b. It decreases genetic diversity, so the likelihood of genetic mutations is reduced.
- c. It increases genetic diversity, so populations are more adaptable to changes in the environment.
- d. It requires less energy than asexual reproduction.



- 16. The diagram above shows two populations of beetles being isolated by a geographic barrier before being reunited after several generations; after the isolation members of each population were still able to interbreed, despite variations in physical appearance. Which of the following statements accurately describes the changes shown in the diagram?**
- After being reunited, the lighter beetle population will outcompete the darker one because they are more highly evolved.
 - Because of slightly different conditions on either side of the barrier, each isolated population of beetles evolved differently over time.
 - In order to survive conditions south of the geographic barrier, the beetles purposefully adapted to change their body color.
 - The original beetle population has undergone divergent evolution to produce two separate species.
- 17. Which of the following accurately describes a difference between absolute and relative dating of fossils?**
- Only absolute dating methods are based on the idea that fossils gain radioactivity over time (older fossils have more radioactive energy than newer fossils).
 - Only absolute dating methods of fossils provide reliable information about the evolutionary past of organisms.
 - Only relative dating methods provide an actual age of a fossil (i.e. number of years old).
 - Only relative dating methods rely on the law of superposition – older fossils are found in deeper layers of rock.

For questions 18 – 20, circle all correct answers and fill them in on the Scantron sheet.

- 18. Which 3 of the following are required for evolution by natural selection?**
- Competition for survival
 - Geographic isolation
 - Genetic variation
 - Reproduction
 - Speciation
- 19. An organism's fitness depends most directly on which 2 of the following factors?**
- Its ability to survive
 - Its ability to reproduce
 - Its intelligence
 - Its physical strength
 - Its resistance to disease
- 20. Which 3 of the following will increase the rate of evolution in a population?**
- environmental stability
 - genetic diversity
 - large population size
 - rapid reproduction
 - strong selective pressure