

Standard 5: Evolution Common Assessment

Directions: Fill in the appropriate letter on your answer sheet for each question below.

SB5a. Trace the history of the theory.

1. Lamarck's theory of evolution includes the concept that new organs in a species appear as a result of---

- continual increases in population size.
- the actions of organisms as they use or fail to use body structures.
- an unchanging local environment.
- the natural variations already present within the population of organisms.

2. Those individuals best fit to the environment

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- Survive to reproduce
- produce LESS offspring
- are sterile and can't make more offspring
- become a new species

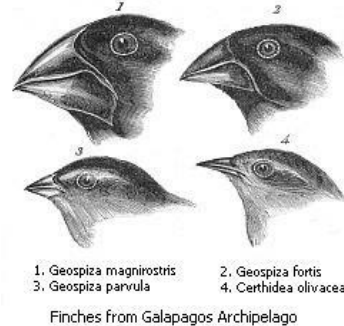
3. Charles Darwin studied several species of finches. He observed that different species had different traits that made them more suitable to their DIFFERENT environments. However, these finches have very similar DNA sequences. What caused this to occur?

- extinction
- natural selection
- inheritance of acquired traits
- use and disuse

4. An industrial city with many cars and factories has a peppered moth population that is mostly dark colored. If this city creates laws to decrease air pollution, encourage carpooling and clean up soot and smog from building surfaces, the peppered moth population in 30 years will most likely-



- not change at all and still be mostly dark colored
- cause all moths to become extinct
- be mostly light colored
- none of the above



5. The above image shows four different finches that Charles Darwin found while on the Galapagos Islands. This information led Darwin to develop the idea that organisms change, or evolve, over time. Which of these would best describe what Darwin saw as the MAJOR difference(s) between these finches?

- They all ate different food
- They all lived in different areas
- Both where they lived and what they ate were different
- Only their beak size was different and they lived together

6. While on the Galapagos Islands, Darwin noticed that there were a number of species of finches that he theorized descended from a common ancestor. He hypothesized that these finches became isolated on an island and adapted to fit an ecological role on that island. What about the finches led Darwin to this belief?

- Feather color
- Body size
- Beak shape
- Mating behavior

7. According to the theory of natural selection, a species that lacks (does not have) the variations necessary to adapt to a changing environment will most likely

- become overpopulated
- mutate
- become extinct
- fossilize

SB5b. Explain the history of life in terms of biodiversity, ancestry, and the rates of evolution.

8. According to the theory of evolution, differences between species may be the result of:

- the disuse of body structures
- the transmission of acquired characteristics
- mutations which cause adaptations in organisms
- overuse of body structures

9. What is evolution?

- a) A gradual change in a population over many generations
- b) A theory of how life began on Earth
- c) Animals adapting to their environment in one generation
- d) Traits acquired in one lifetime being passed down to the next generation

10. An inheritable mutation may occur if an organism has a change in its —

- a. Appendages
- b. internal organs
- c. DNA structure
- d. ATP production rates

11. The cotton whitefly has become a key pest, damaging many kinds of crops. The cotton whitefly has developed resistance to a variety of pesticides. Pesticide resistance would most likely develop in insects that:

- A. reproduce rapidly
- B. feed on few types of plants
- C. undergo complete metamorphosis
- D. live in very limited regions

12. Two nucleotide sequences found in two different species are almost exactly the same. This suggests that these species

- a. are evolving into the same species
- b. are not related at all
- c. may have a common ancestor
- d. are identical

13. Fossils of Archeopteryx show that this animal had feathers, like a bird. It also had a bony tail, teeth, and claws on its wings, like a reptile. This fossil is evidence that supports the idea that :

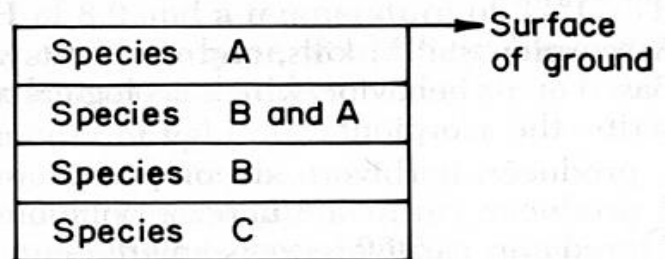
- A. birds and reptiles have a common ancestor
- B. birds have changed very little over 150 million years
- C. reptile species are more advanced than bird species
- D. reptiles are warm-blooded like birds

14. Which theory of how evolution occurs would argue that all of the oak species in Georgia appeared suddenly from one common ancestor, over a short period of time, due to some extreme environmental changes, and that since that time, they have not changed much?

- a. gradualism
- b. microevolution
- c. macroevolution
- d. punctuated equilibrium

SB5c. Explain how fossil and biochemical evidence support the theory.

15. The diagram below represents a section of undisturbed layers of sedimentary rock in Georgia and shows the location of fossils of several closely related species. According to currently accepted evolutionary theory, which is the most probable assumption about species A, B, and C?



- a. Species B is older than species C.
- b. Species C existed before species B.
- c. Species A is the oldest species.
- d. Species B is younger than species A.

16. Evidence that supports the theory of evolution is/are ___.

- a) homologous structures
- b) embryological development
- c) molecular biology
- d) all the above

17. Examples of homologous structures are ___.

- a) bird wing and butterfly wing
- b) bat's wing and human arm
- c) whale fin and fish fin
- d) bat's wing and bird's leg

18. Vestigial structures are structures that:

- a) have an important use now, but didn't in the past.
- b) do not have a function now, but may have in the past.
- c) show no evidence of evolution
- d) continue to have a function.

19. Scientists routinely explore whether two different animal species have evolved from a recent common ancestor. _____ is the MOST useful technique to help with this determination.

- a. Analysis of strands of DNA
- b. Comparisons of bones and muscles
- c. Comparisons of items eaten for food
- d. Studies of embryos during development

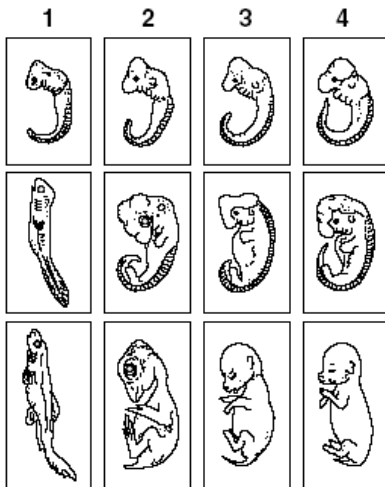
Species DNA Sequence

Species	Number of Differences from Human Sequence
<i>Gorilla gorilla</i> (gorilla)	1
<i>Hylobates lar</i> (gibbon)	3
<i>Lemur catta</i> (lemur)	30
<i>Macaca mulatta</i> (Rhesus monkey)	8
<i>Saimiri sciureus</i> (squirrel monkey)	11

20. The amino acids for beta hemoglobin found in five animal species were compared to the amino acids found in human (*Homo sapiens*) beta hemoglobin.

The number of sequence differences was recorded. Based on the molecular data, what inference could you make about the anatomy of these species compared to human anatomy?

- Anatomically, lemurs are most like humans.
- Anatomically, gorillas are most like humans.
- Anatomically, none of the species are similar to humans.
- Anatomically, only the lemur differs from humans in any way.



21. The diagram shows the embryo development of four vertebrates and suggests all of the following EXCEPT:

- common ancestry of vertebrates.
- there are significant differences in the embryos of all four groups.
- there are very few differences in the development of any vertebrates.
- common features (gills and segments) in the embryos of all vertebrates.

SB5d. Relate natural selection to changes in organisms.

22. Although the Arctic fox and the kit fox are closely related, they look very different because the individuals:

- acquired traits during their lifetimes that contributed to survival
- with traits most suited to their environments reproduced most successfully
- migrated long distances to environments that most suited their traits
- passed on to their offspring acquired behaviors that were helpful

23. In a specific population of trout fish, one variety that exists has a large tail, which allows some individuals in the population of trout to swim faster than others. The population density for the trout with this adaptation is shown to be increasing each year, whereas the population of the small tail trout appear to be decreasing. This is probably an example of ____.

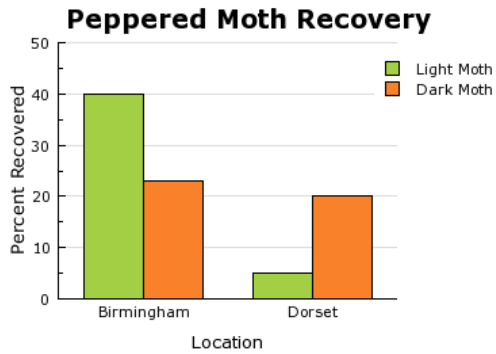
- Overproduction of offspring
- Survival of the fittest
- passing on of aquired traits
- organisms which are distantly related

24. Horses and tapirs have a common ancestor, but now look very different. Horses now are grassland animals adapted for grazing on grass and shrubs. Tapirs are jungle animals that live in dense forests and eat fruit, leaves, and aquatic vegetation. Which of the following led to the development of such differences in the two species?

- selective breeding
- convergent evolution
- DNA hybridization
- natural selection

25. Suppose orange beetles and green beetles live in the same environment. Green beetles are harder to see on leaves, so birds eat primarily orange beetles. According to the theory of natural selection, in the future orange beetles will

- move to a place without green beetles.
- decrease in population until they possibly become extinct.
- reproduce to their full potential until they increase in number.
- breed with green beetles until there are no longer orange beetles.



26. The graph shows the results of a famous biological experiment. In the experiment, Kettlewell believed that the peppered moth demonstrated how environmental pressures influence evolution. He studied two areas. Birmingham was a rural wood, with natural conditions. Dorset was an urban area. The moths use tree trunks to camouflage themselves against birds, which are their major predators. Natural gene variations produce a light form of the peppered moth, and a dark form, meaning that they are not equally visible.

Which of the following statements is NOT supported by Kettlewell's data?

- Dark moths had a survival disadvantage in industrial Dorset.
- Light moths had a survival advantage in forested Birmingham
- Light moths had a survival disadvantage in industrial Dorset.
- Dark moths had a survival disadvantage in forested Birmingham.

SB5e. Recognize the role of evolution to biological resistance (pesticide and antibiotic resistance)

27. When a bacterial population is exposed to an antibiotic—

- none will die.
- all dominant individuals will live.
- some individuals will die, some will survive.
- all individuals will die.

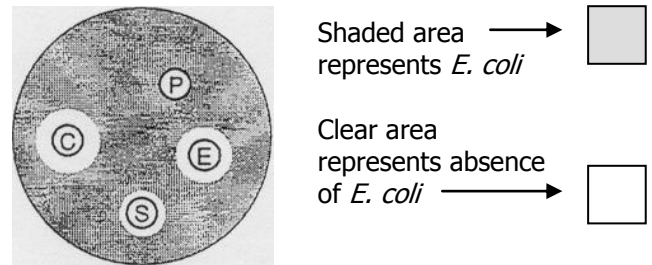
28. Antibiotics are used to destroy—

- viruses
- animals
- bacteria
- none of the above

29. When antibiotics are used frequently, over time, a population of bacteria will ___.

- be killed more easily (be *less* resistant to antibiotics)
- be killed less easily (be *more* resistant to antibiotics)
- become extinct
- remain the same

30. Four discs, each soaked in a different antibiotic, were placed on the surface of a culture plate that had been inoculated with *E. coli* bacteria. The diagram below shows the culture plate after it had been incubated for 48 hours.



- P = penicillin
 E = erythromycin
 C = chloramphenicol
 S = streptomycin

Which antibiotic was MOST effective in inhibiting (stopping) the growth of *E. coli*? **Hint: CLEAR circles show bacterial growth that has been STOPPED**

- penicillin
- erythromycin
- chloramphenicol
- streptomycin

31. Which situation is a good illustration of a biologically resistant species?

- A mule, despite being the product of two different species (a horse and a donkey).
- A staph bacteria in a hospital that is not killed by penicillin or several other antibiotics.
- An alligator. Alligators still survive, despite being dated by fossils to the time of dinosaurs.
- A species of African cichlid fish, which is thought to have rapidly evolved, along with 500 other similar species.