

Name: _____

Date: _____

1. Some viral diseases require only one vaccination, which lasts for years. For other diseases like the flu, vaccinations last only one season. The flu vaccine lasts such a short time because the flu virus

- A. is more easily transmitted
 - B. mutates much more rapidly
 - C. is less dangerous
 - D. is much smaller
-

2. There are two types of modern whales: toothed whales and baleen whales. Baleen whales filter plankton from the water using baleen, plates made of fibrous proteins that grow from the roof of their mouths. The embryos of baleen whales have teeth in their upper jaws. As the embryos develop, the teeth are replaced with baleen.

Which of the following conclusions is **best** supported by this information?

- A. Primitive whales had teeth as adults.
- B. Toothed whales descended from baleen whales.
- C. Baleen whales are evolving into toothed whales.
- D. Descendants of modern baleen whales will have both teeth and baleen as adults.

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3. During the fall reproductive season, the belly of a male brook trout becomes bright orange. The orange belly provides some camouflage and helps attract females.

This trait evolved in brook trout because, compared to males with pale bellies, males with bright orange bellies are more likely to

- A. live in good habitats.
- B. be eaten by predators.
- C. mate with other species of fish.
- D. fertilize eggs to produce offspring.

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Biology Standard 5 (BiologyStandard5)

4. Cheetahs have come close to extinction due to hunting, drought, and disease. There is now very little genetic variation in cheetah populations.

Which of the following is a result of the limited genetic variation in the current cheetah populations compared to earlier cheetah populations with more variation?

- A. Cheetahs in current populations are more resistant to new diseases.
- B. The survival rate of young cheetahs is increased in current populations.
- C. Cheetahs in current populations are less able to interbreed with other species.
- D. The current cheetah populations are less likely to be able to adapt to environmental changes.

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5. The illustration below represents a marine iguana.



The marine iguanas of the Galápagos Islands feed on seaweed and algae. Marine iguanas have flattened tails while other species of iguanas that live inland on the Galápagos and on the South American mainland have rounded tails.

Which of the following **best** explains this difference in tail shape?

- A. Flattened tails are better for swimming than rounded tails.
- B. Flattened tails move more easily on land than in the ocean.
- C. Flattened tails are harder for predators to grasp than rounded tails.
- D. Flattened tails release heat more rapidly in the ocean than on land.

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6.

Charles Darwin made several very important observations about a particular group of organisms in the Galapagos islands. From this, a later scientist, John Gould, noted that these types of organisms adapted and evolved from common ancestors, in conjunction with environmental conditions. What feature in organisms did Darwin first observe?

- A. genetic differences in sweet pea plants
 - B. similarities in the wings of bats and birds
 - C. differences in the beaks of similar finches in the Galapagos islands
 - D. similarities between the bone structures of humans and chimpanzees
-



The pictures above show two animals that appear to be related, but are not. The thylacine in the top picture is an extinct marsupial. Despite having a pouch like kangaroos, the thylacine developed large canine teeth and a dog-like body, and used to be a major predator in Australia before becoming extinct. The bottom picture is the golden jackal, a predatory wild dog native to a similar environment in Africa. Unlike the thylacine, jackals are placental, and have babies the same way humans do. What type of evolution do the thylacine and jackal have in common?

- A. adaptive evolution
 - B. convergent evolution
 - C. Darwinian evolution
 - D. divergent evolution
-

8.

Which statements is insufficiently supported by Darwin's theory of natural selection?

- A. There is competition for resources among all living things.
 - B. Most organisms reproduce only to the carrying capacity of the environment if they are left alone.
 - C. Natural selection leads to the evolution of a species.
 - D. All living species have genetic variety.
-

Biology Standard 5 (BiologyStandard5)

9.

In 1950, about 97% of Strep throat infections that doctors treated received a prescription of penicillin. By 2000, only about 12% of Strep throat infections were treated with penicillin. From an evolutionary standpoint, why might this be true?

- A. The penicillin made in 1950 was of better quality, due to changes in manufacturing processes.
 - B. Over time, the use of penicillin killed off weaker Strep bacteria, and most of what survives is now resistant to penicillin.
 - C. Over time, Strep bacteria have gradually learned how to defend themselves against penicillin.
 - D. The mold that penicillin is made from has become less common, because Strep bacteria have out competed it.
-

10.

An earthquake creates a new canyon in a mountain area. This canyon separates two populations of mountain turtles to the east and the west of the new canyon. To the west of the new canyon, there are large groves of berry bushes. East of the canyon, there are no berry bushes and only a few plants. However, there is a large river with lots of insects and minnows. Based on this scenario, what is likely to happen to the two populations of mountain turtles?

- A. Because of different conditions, they will rapidly become two new species of turtle.
 - B. Over a long period of time, different environmental conditions will cause two species of turtles to evolve.
 - C. The turtles to the east of the canyon will jump or crawl across the canyon and join the other turtles in the berry fields.
 - D. Despite differences in food and environmental conditions, since the turtles were one species in the beginning, they will remain the same species.
-

11.

	Amino Acid Position									
	1	2	3	4	5	6	7	8	9	10
Gorilla	Ala	Leu	Glu	Gly	Pro	Gly	Thr	Asp	Phe	Tyr
Chicken	Ala	Leu	Glu	Met	Pro	Gly	Arg	Cys	Phe	Tyr
Iguana	Ala	Leu	Glu	Met	Pro	Gly	Arg	Cys	Phe	Cys
Bullfrog	Ala	Leu	Glu	Met	Pro	Gly	Cys	Glu	Phe	Cys
Shark	Thr	Leu	Glu	Leu	Pro	Gly	Cys	Glu	Phe	Ala

The amino acid sequences from the animals are for cytochrome C, a protein that carries oxygen. Based on the chart, which two animals probably evolved from the most recent common ancestor?

- A. the gorilla and the chicken
 - B. the chicken and the iguana
 - C. the iguana and the bullfrog
 - D. the bullfrog and the shark
-

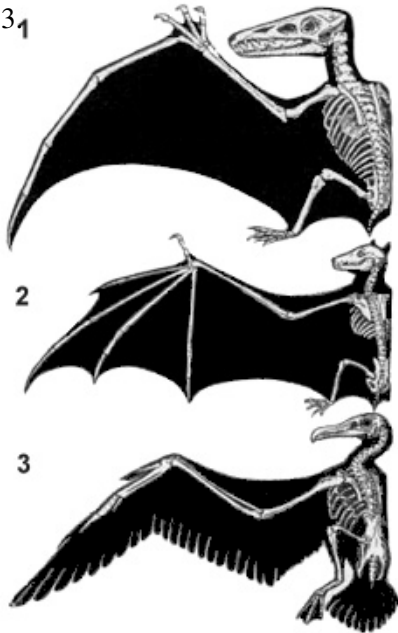
12.



The blind mole rat is a close relative of other rats. However, mole rats live underground for their entire lives. As a result, their eyes have evolved into useless structures. Presumably, mole rats will not have eyes at all in the distant future. What type of structures are the mole rat's eyes?

- A. analogous structures
 - B. homologous structures
 - C. selective structures
 - D. vestigial structures
-

13₁



The diagram shows the wings of a pterodactyl, a bat, and a condor. While they all have wings, it is obvious from the diagram that the wings are constructed differently from one another, around different bones. What does this suggest about their wings?

- A. The animals are closely related, and the wings are the result of divergent evolution.
 - B. The animals are closely related, and the wings are the result of convergent evolution.
 - C. The animals are NOT closely related, and the wings are the result of divergent evolution.
 - D. The animals are NOT closely related, and the wings are the result of convergent evolution.
-

14.

Charles Darwin discovered about 20 species of finches among the Galapagos islands. He proposed that the finches all had one common ancestor that rapidly evolved into the other 19 species. This happened when finches migrated to new islands formed from volcanoes, and encountered new environmental conditions. What type of evolutionary event was responsible for the formation of the 20 finch species?

- A. adaptive radiation
 - B. directional selection
 - C. punctuated equilibrium
 - D. stabilizing selection
-

15.

Farmer Brown sprays his pole bean field with the popular insecticide, Diazinon for 10 consecutive years. Despite his efforts to kill them, Farmer Brown notices that every year, more aphids seem to appear. Why might this be happening?

- A. As a species, the aphids have developed the ability to eat the pesticide harmlessly.
 - B. Rapid evolution has created many new species of aphids that are not sensitive to the pesticide.
 - C. Farmer Brown did not kill the aphids, but only caused them to migrate. They have now returned.
 - D. Farmer Brown has killed all of the aphids that are sensitive to the pesticide, and the remaining aphids are resistant.
-

16.

Which of these ideas is most correct, with regard to the way that giraffes came to have long necks?

- A. Giraffes with longer necks tend to have an easier time feeding, and survive at higher rates than those with shorter necks.
 - B. Adult giraffes all have necks of the same length, and always have had. Giraffes with shorter necks are juvenile animals.
 - C. Giraffes chose to stretch their necks to reach leaves on tall branches. They passed this change on to their offspring.
 - D. Giraffes have long necks because all of the short-necked giraffes were not well-adapted to cold, and died in the last ice age.
-

17.

Coquina clams come in three different shell colors. Some have white shells, others have tan, and still others are dark brown.

The intermediate tan phenotype of Chesapeake Bay Coquina clams was much more common before a species of predatory jack-knife fish was introduced. However, once introduced, jack-knife fish targeted the tan clams for food. Consequently, most of the remaining clams in Chesapeake Bay are now either white or dark brown. What type of natural selection is demonstrated by this situation?

- A. directional selection
 - B. disruptive selection
 - C. random selection
 - D. stabilizing selection
-

18.

It was only very recently determined that giant pandas are much more closely related to bears, than to raccoons. Before this, many scientists believed that they were large members of the raccoon family. What is the best piece of evidence, that was probably used to re-classify giant pandas with bears?

- A. more behavioral similarities to bears than to raccoons
 - B. more similarities in appearance to bears than to raccoons
 - C. more similarities in bear DNA and giant panda DNA
 - D. a more similar habitat to bears than to raccoons
-

19.

What type of habitat might lead to the evolution of a high degree of biodiversity?

- A. cold barren tundra that has not changed in thousands of years
 - B. a tropical island chain where volcanoes constantly form new islands
 - C. a deep temperate lake with a well-developed food chain
 - D. a prairie with an immense amount of grass and other food
-

20.

Apple trees and rose bushes do not appear to strongly resemble each other. Apple trees grow to 40 feet tall and produce large fruits and simple flowers. Most varieties lack thorns. Rose bushes generally grow as shrubs, produce compound flowers, and make small useless fruit known as hips. DNA analysis shows that apple trees and rose bushes share about 98% of their DNA code. What would this imply?

- A. Apples and roses are distant relatives that no longer look alike.
 - B. Apples and roses have some similarities, but they are not close relatives.
 - C. Apples and roses are close relatives that have evolved different appearances.
 - D. Apples and roses are the same species, and their differences in appearance cannot be used to classify them as separate species.
-

21. Scientists believe that a dinosaur known as a hadrosaurus was a plant eater. Which of the following pieces of evidence supports this conclusion?

- A. Hadrosaurus fossils are found with fossils of other dinosaurs that were herbivores.
- B. Fossilized plant remains are found with the fossils of the hadrosaurus.
- C. The fossilized teeth of the hadrosaurus are flat like the teeth of modern herbivores.
- D. The regions where hadrosaurus fossils are found were heavily forested.

Biology Standard 5 (BiologyStandard5)

22. A student hypothesizes that thick leg muscles are an inherited trait in dogs. The student collects data on several dogs, and the data show that dogs that live outdoors have thicker leg muscles than dogs that live indoors. What should the student conclude?

- A. Dogs that inherit thick leg muscles may not survive indoors.
- B. Dogs with thick leg muscles may require more exercise than dogs with thin leg muscles.
- C. Inheritance alone may not account for thick leg muscles in dogs.
- D. Inheritance of thick leg muscles may be associated with coat thickness in dogs.

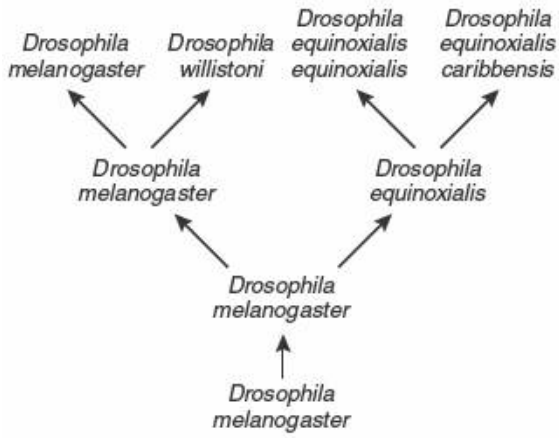
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23. Over many generations, unrelated or distantly related species may come to resemble each other due to —

- A. similar environmental factors.
- B. similar genetic mutations.
- C. homologous structural adaptations.
- D. competition with each other.

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Evolutionary Pathway



24.

Which type of *Drosophila* probably changed the *least* over time?

- A. *Drosophila melanogaster*
- B. *Drosophila willistoni*
- C. *Drosophila equinoxialis equinoxialis*
- D. *Drosophila equinoxialis caribbensis*

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Pasteur's Experiment



25.

The results of Pasteur's experiment helped Pasteur to —

- A. reject the theory of spontaneous generation.
- B. isolate the virus responsible for smallpox.
- C. produce a vaccine against rabies.
- D. convince people to cover food.

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26. Scientists hypothesize that oxygen began to accumulate in Earth's atmosphere *after* the appearance of living things with the ability to —

- A. form tissues.
- B. reproduce sexually.
- C. photosynthesize.
- D. breathe air.

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27. **Fossils help scientists classify extinct species and determine their relationships to current species.**

Fossils provide the *most* information about extinct species' —

- A. habitats
- B. structures
- C. metabolism
- D. reproduction

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Answer Key

1. B) mutates much more rapidly
2. A) Primitive whales had teeth as adults.
3. D) fertilize eggs to produce offspring.
4. D) The current cheetah populations are less likely to be able to adapt to environmental changes.
5. A) Flattened tails are better for swimming than rounded tails.
6. C) differences in the beaks of similar finches in the Galapagos islands
7. B) convergent evolution
8. B) Most organisms reproduce only to the carrying capacity of the environment if they are left alone.
9. B) Over time, the use of penicillin killed off weaker Strep bacteria, and most of what survives is now resistant to penicillin.
10. B) Over a long period of time, different environmental conditions will cause two species of turtles to evolve.
11. B) the chicken and the iguana
12. D) vestigial structures
13. D) The animals are NOT closely related, and the wings are the result of convergent evolution.
14. A) adaptive radiation
15. D) Farmer Brown has killed all of the aphids that are sensitive to the pesticide, and the remaining aphids are resistant.
16. A) Giraffes with longer necks tend to have an easier time feeding, and survive at higher rates than those with shorter necks.
17. B) disruptive selection
18. C) more similarities in bear DNA and giant panda DNA
19. B) a tropical island chain where volcanoes constantly form new islands
20. C) Apples and roses are close relatives that have evolved different appearances.
21. C) The fossilized teeth of the hadrosaurus are flat like the teeth of modern herbivores.
22. C) Inheritance alone may not account for thick leg muscles in dogs.

Biology Standard 5 (BiologyStandard5)

23. A) similar environmental factors.

24. A) *Drosophila melanogaster*

25. A) reject the theory of spontaneous generation.

26. C) photosynthesize.

27. B) structures