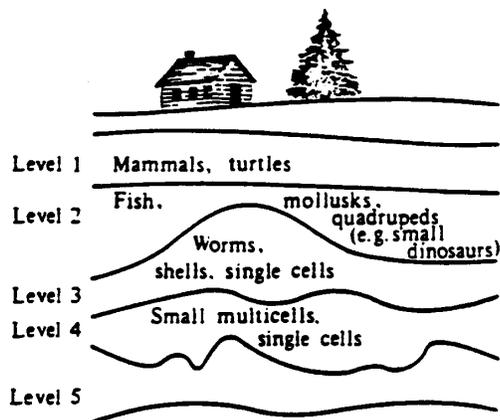


1. Five hundred cockroaches of one species were sprayed with a new insecticide. Twenty-four hours later nearly all the cockroaches were dead. A few, however, survived. This outcome illustrates which one of Darwin's key ideas?
- A. All living things come from preexisting living things.
 - B. Animals adapt to new environments.
 - C. There is variation among individuals within a species.
 - D. New species develop from survivors.

2. The drawing shows a side view of rock layers containing various kinds of fossils. Which of the following can you conclude from the drawing?



- A. Organisms at level 1 are older than those at level 2 because their fossils are smaller.
- B. Organisms at level 2 are youngest because their fossils have shapes similar to those of modern organisms.
- C. Organisms at level 4 are the oldest because they are in the lowest layer that contains fossils.
- D. There are no organisms in level 5 because there has not been enough time for fossils to sink to that level.

3. Which of the following is most consistent with the modern theory of evolution?

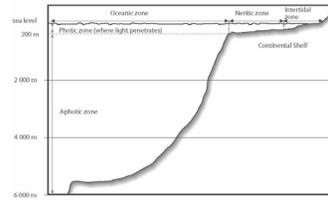
Parents pass their physical traits to their offspring; those offspring with traits that help them survive in the environment are able to reproduce.

- A. Parents change their physical traits in order to survive in the environment, then those parental traits are passed to their offspring.
- B. Life on this planet came from
- C. another planet far out in space.
- D. Living organisms have not changed for hundreds of millions of years.

4. The fossils that are found in the oldest layers of sedimentary rock were formed from which types of organisms?

- A. only organisms that lived in the sea
- B. only organisms tht lived on land
- C. only organsims tht lived in the air
- D. organisms that lived on the land, in the sea and in the air

5. The following diagram shows a cross-section through an ocean. A number of organisms (plants and animals) live in the different regions of the ocean and depend on one another and on the Sun for survival.

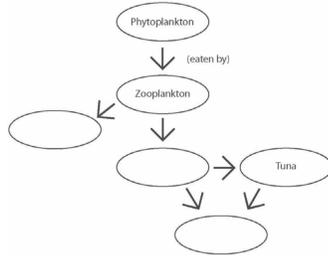


Look at the list of organisms (plants and animals) below. They all live in the Neritic Zone.

Organism	Description
Phytoplankton	Microscopic plants that photosynthesize
Zooplankton	Microscopic animals that feed on phytoplankton
Tuna	Medium sized fish that feeds on small fish
Herring	Small fish that feeds on zooplankton
Shark	Large fish that feeds on other fish
Whale	Large mammal that feeds on zooplankton

a) Complete the food web on the chart below to include all the organisms listed in the table. Write the name of one organism in each circle.

The information given about each organism will help you. Three organisms have been placed on the chart for you. The arrows show the direction that energy flows through the food web.



b) One year tuna becomes scarce because of over-fishing. State what is most likely to happen to the population of sharks and explain your answer.

6. Geologic activity on an island physically separates a population of animals into two populations. Many generations later, when the two populations are no longer separated, they do not interbreed. What was the result of natural selection during this period of separation?

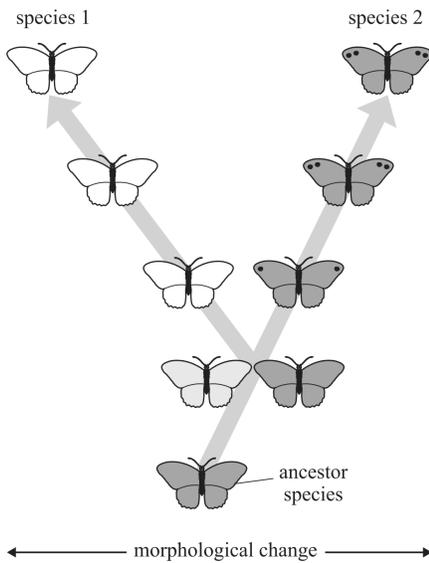
A. a decrease in variation

B. a decrease in diversification

C. an increase in extinction

D. an increase in speciation

7. The illustration below shows the morphological change of two species.



Which statement explains why species 1 and species 2 are different?

- A. An individual changed itself to suit the environment.
- B. Natural selection can cause gradual speciation changes.
- C. Interbreeding of species 2 results in no genetic mutations.
- D. Extinction of ancestor species occurs as a result of interbreeding.

8. A termite population was sprayed with a certain brand of insecticide. After being sprayed, the number of surviving termites within the population were counted and recorded as a percentage of the total. This process was repeated until a total of six generations of termites had been sprayed. The results are shown in the table below.

Termite Generation	Percentage of Surviving Termites After Spraying
1	5%
2	10%
3	25%
4	40%
5	60%
6	80%

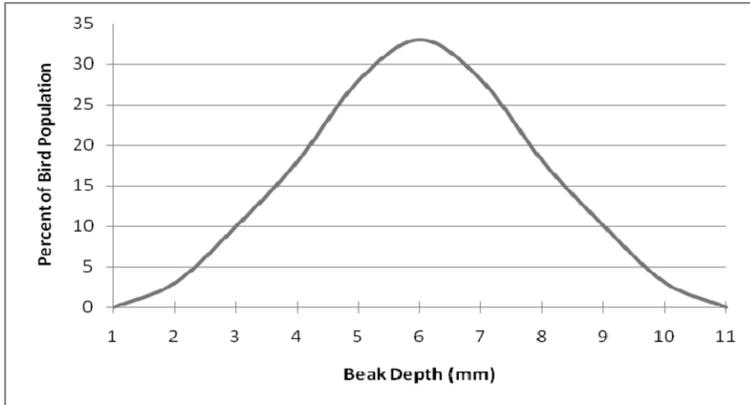
Which statement *best* explains why later generations had higher percentages of termites that survived?

- A. Earlier generations had several members that were old and weak.
- B. Earlier generations had smaller numbers of termites than later generations.
- C. Later generations were able to live through the spraying because they were used to it.
- D. Later generations were the offspring of termites that were more resistant to the spraying.

9. Which statement about fossils could be used as evidence that evolution by natural selection has been in effect for millions of years?
- A. Fossils found in higher layers of rock are older than those found in lower layers.
 - B. Fossils found in lower layers of rock are more complex than those found in higher layers.
 - C. Fossils of current species have been found throughout rock layers that are billions of years old.
 - D. Fossils of species that no longer exist but are ancestors of current species have been found in rock layers.

10. A tree frog population lives in the canopy of a tropical rain forest. In this tree frog population, a mutation occurs that results in a new allele for skin coloration causing stripes on their legs. Which of the following factors has the *greatest* effect on whether leg stripes will become more common in the tree frog population?
- A. if the reproduction rate of the tree frog population remains constant over time
 - B. if the new allele for stripes is dominant or recessive in the tree frog population
 - C. if the new allele for stripes increases the survival of the tree frogs in their environment
 - D. if enough food and water is available in the rain forest canopy for the tree frog population

11. On a small isolated island, there is a single species of seed-eating birds. Individual birds are able to eat seeds that are within 2 mm (larger or smaller) of their beak depth. The distribution of individuals is shown in the figure below.



A long drought caused the plant species that produce seeds between 3–9 mm in size to go extinct. What does the Theory of Natural Selection predict will happen to the population of seed-eating birds over time?

- A. It will permanently shrink to approximately 25% of its current size.
 - B. It will go extinct because there aren't enough seeds to support all of the individuals.
 - C. It will diverge into two species: one that eats small seeds and one that eats large seeds.
 - D. It will adapt and the birds that ate the medium sized seeds will learn to eat fish, insects, or other animals.
12. Which of the following is a source of genetic variation within a species?

- A. cloning B. mutation C. selective breeding D. natural selection

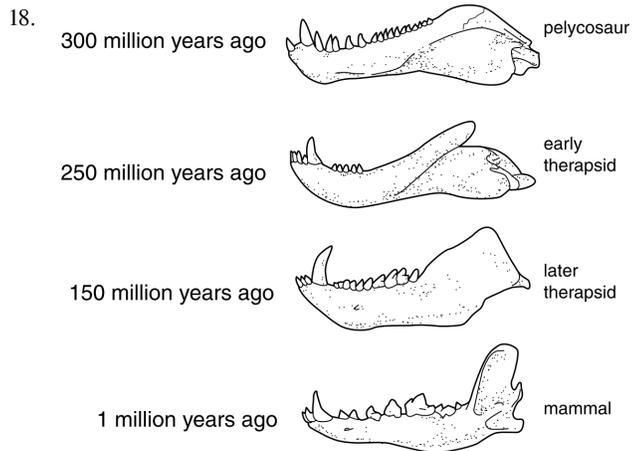
13. Rainfall in a tropical region is below average for 10 consecutive years. Insect species adapted for dry conditions are much more plentiful at the end of the 10 years. Which of the following statements best explains the increase in the population of these insects?
- A. Biodiversity in the region has increased due to the dry conditions.
 - B. Insects with a high tolerance for dry conditions have migrated out of the region.
 - C. Natural selection has favored insect species with a high tolerance for dry conditions.
 - D. Natural selection has selected against insect species that are adapted for dry conditions.

14. Which of these *best* illustrates natural selection?
- A. An organism with favorable genetic variations will tend to survive and breed successfully.
 - B. A population monopolizes all of the resources in its habitat, forcing other species to migrate.
 - C. A community whose members work together utilizes all existing resources and migratory routes.
 - D. The largest organisms in a species receive the only breeding opportunities.

15. Earth has undergone some catastrophic changes from time to time. Which of these *most* likely explains why life on Earth continued following these catastrophes?
- A. Dominant species had a slow mutation rate.
 - B. Many species filled the same niche.
 - C. A strong species had many different characteristics.
 - D. A wide diversity of species existed.

16. A single species of squirrel evolved over time into two species, each on opposite sides of the Grand Canyon. This change was *most* likely due to
- A. higher mutation rates on one side.
 - B. low genetic diversity in the initial population.
 - C. the isolation of the two groups.
 - D. differences in reproductive rates.

17. Over time, new species have evolved while others have become extinct.
Which of the following *most likely* supports how giraffes evolved long necks?
- A. More long-necked giraffes survived to pass on their genes.
 - B. More short-necked giraffes survived to pass on their genes.
 - C. Short-necked giraffes modified their diets to evolve into a new species.
 - D. Short-necked giraffes grew longer necks to reach higher leaves.



The fossilized jawbones in the diagram above show the changes in organisms over time. According to the diagrams, which of the following is a likely conclusion?

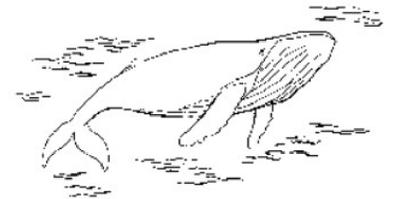
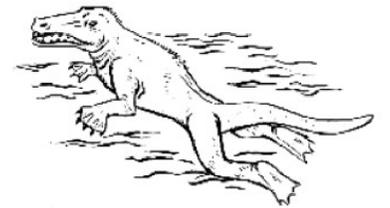
- A. These fossils provide evidence that evolution occurs rapidly.
- B. These fossils provide evidence that evolution occurs over long periods of time.
- C. These fossils belonged to organisms that were large and slow moving.
- D. These fossils lack similar characteristics in their structural design.

19. Vestigial structures, such as hip bones in whales and appendixes in humans, are those that have little or no function for the organism. What is the most likely reason for this loss of function over time?
- A. The organism is undergoing speciation.
 - B. The organism is experiencing genetic drift.
 - C. The structure was over utilized by the organism.
 - D. The structure was not highly beneficial to the organism.

20. The picture shows a prehistoric mammal called *Ambulocetus*. This animal lived almost 50 million years ago in coastal waters. It used its back legs to swim in water and front legs to crawl on land. Scientists think that the whale evolved from the *Ambulocetus*.

What information should they use to support their hypothesis?

- A. Extinction dates for the *Ambulocetus*
- B. Evidence of the *Ambulocetus* diet
- C. Comparison of the habitats of both animals.
- D. Examination of the body structures of both animals.



21. When meiosis and fertilization occur, genes from both parents are combined, producing unique offspring.

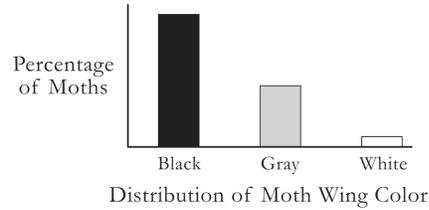
How does this benefit a species?

- A. The production of more cells leads to faster population growth.
- B. Greater genetic variation increases the chances for survival of a species.
- C. The mixing of parent genes reduces the chance of mutation in a species.
- D. The variation between individuals decreases competition for resources.

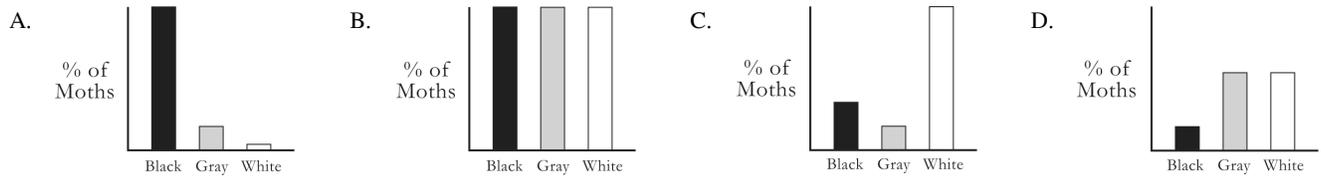
22. In which population would reproducing **asexually** be *most* advantageous?

- A. A population living in a changing environment
- B. A population too large for the available resources
- C. A population heavily hunted by many different types of predators
- D. A population living successfully in stable environmental conditions

23. Students studying a moth population in the woods in Kentucky found the distribution of moth wing color shown in the graph below. The woods contained trees with bark that was mostly black.



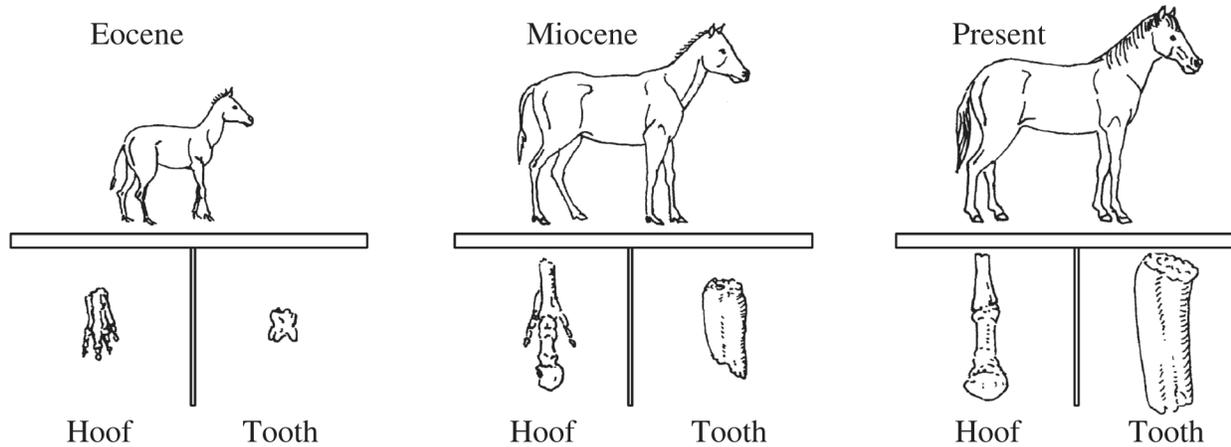
Two years later a fungus attacked nearly all of the trees in the woods and the tree bark changed from black to patches of gray and white. Which graph shows the probable distribution of moth wing color within the next few years?



24. Which example describes a behavioral adaptation?

- A. A bird builds its nest in the ash near a volcano.
- B. A whale has the ability to hold its breath for 20 minutes.
- C. A fox's hair is white in the winter and brown in the summer.
- D. A monkey has long arms that allow it to swing from one branch to another.

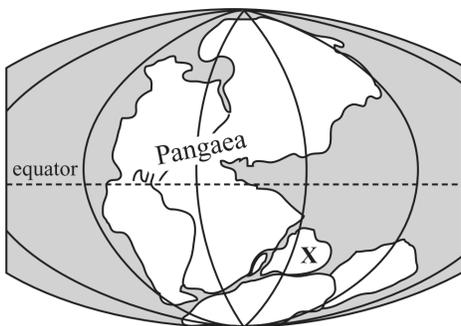
25. The diagram below represents part of the horse fossil record from three time periods. It includes illustrations of the hooves and teeth of horses from each time period.



Which of the following statements is *best* supported by the horse fossil record?

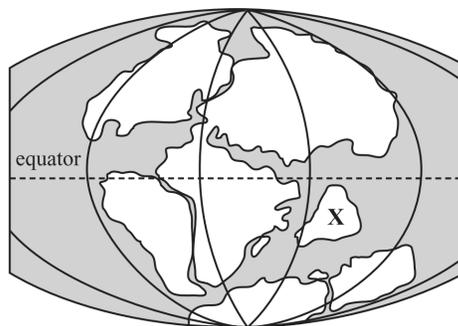
- A. The horse has been a carnivore. B. The horse has changed over time.
 C. The horse has many common ancestors. D. The horse has lived in the same ecosystem.

26. About 300 million years ago, the land of Earth was in a single mass known as Pangaea, as shown in Figure A. About 150 million years ago, Pangaea broke up into the land masses shown in Figure B.



300 million years ago

Figure A



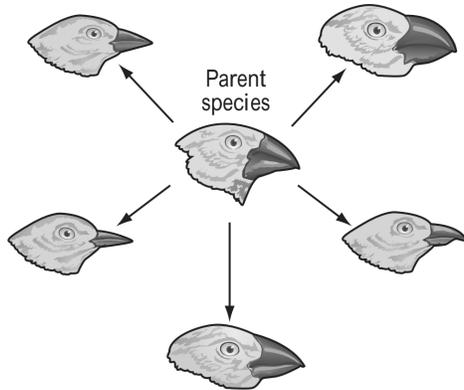
150 million years ago

Figure B

Based on the diagrams, which of the following were *more likely* to survive on continent X after the breakup of Pangaea than before it broke apart?

- A. organisms that lived in fresh water B. organisms that required warm conditions
 C. organisms that hibernated for long periods D. organisms that traveled great distances during migrations

27. The diagram below shows the beaks of five species of birds that developed over time from one parent species. The five species of birds can be found living in the same area.



Which of the following *best* explains why the beak shape of each species of bird developed differently?

- A. Each beak shape helps the birds to produce different songs.
- B. Each beak shape is an adaptation to a specific source of food.
- C. Each beak shape is designed to construct a different type of nest.
- D. Each beak shape helps protect the birds from a different predator.

28. The illustration below represents a marine iguana.

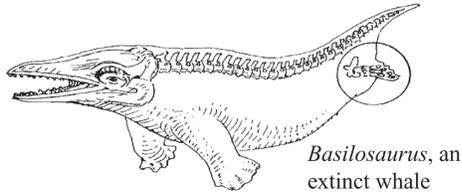
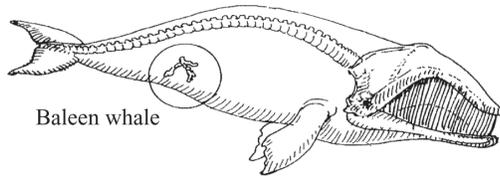


The marine iguanas of the Galápagos Islands feed on seaweed and algae. Marine iguanas have flattened tails while other species of iguanas that live inland on the Galápagos and on the South American mainland have rounded tails.

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.

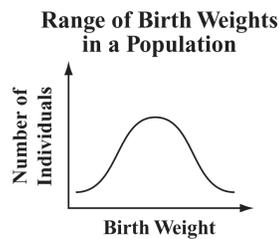
29. The illustrations below show vestigial pelvic bones of a baleen whale and vestigial hind limb bones of an extinct whale.



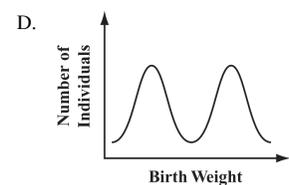
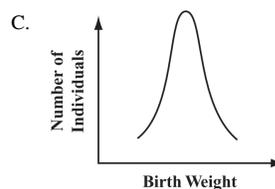
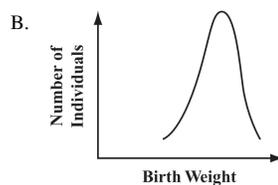
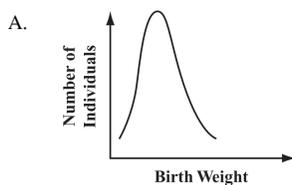
The presence of these bones in the baleen whale and extinct whale provides evidence of which of the following?

- A. Whales can travel on land when necessary.
- B. Whales evolved from four-legged animals.
- C. Whales have functional legs that are hidden by fat and skin.
- D. Whales are developing into animals with four functioning limbs.

30. The graph below represents the range of birth weights for offspring in a mammal population.



As is typical in many mammal populations, offspring with an average weight at birth have a higher survival rate than offspring with a very low or very high birth weight. Based on this information, which of the following graphs is the *best* prediction of what will happen to the range of birth weights in this population over time?



31. Evolution can be seen in the fossil record in which of the following ways?
- A. Organisms in the fossil record are identical to living organisms.
 - B. Individual species disappear and reappear in the fossil record over time.
 - C. The fossil record provides evidence that organisms have changed over time.
 - D. The fossil record provides evidence that all organisms developed at the same time.

32. According to plate tectonic theory, Australia was a part of the supercontinent Pangea. Millions of years ago Pangea divided, and eventually Australia was separated as its own continent.

Which of the following is *most likely* a result of the isolation of the Australian continent for millions of years?

- A. Australia has no fossil record of species evolution.
- B. Australia has a large number of species that are not found anywhere else.
- C. Plant populations in Australia have all evolved to be self-pollinating to maximize their chance for reproduction.
- D. Animal populations in Australia have little genetic diversity and are less likely to survive environmental changes.

33. The fossil record supports which of the following descriptions of the evolution of life on Earth?

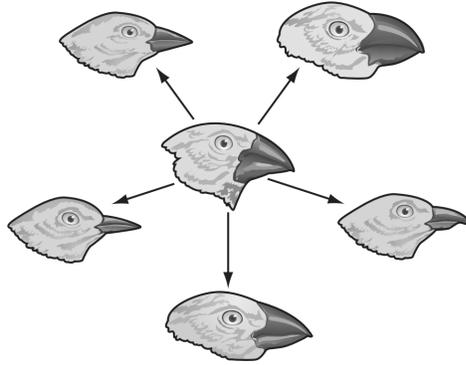
- A. Life first appeared with the diversity found today.
- B. The importance of natural selection diminished over time.
- C. Complex organisms evolved from more simple organisms.
- D. Large organisms appeared before single-celled organisms.

34. At one time, all the continents on Earth were joined in a supercontinent called Pangaea. Over time Pangaea split into separate continents.

Which of the following statements describes a result of this split?

- A. All fossil evidence of species from Pangaea was lost.
- B. Organisms on the separated continents no longer migrated for breeding.
- C. Ancestral organisms evolved into different species on the separated continents.
- D. Evolution in species proceeded more slowly on the separate continents than it had on Pangaea.

35. The diagram below shows many finch species that originated from a single ancestral finch species in the Galapagos Islands.



Which of the following statements best explains why many different finch species originated from the single ancestral species?

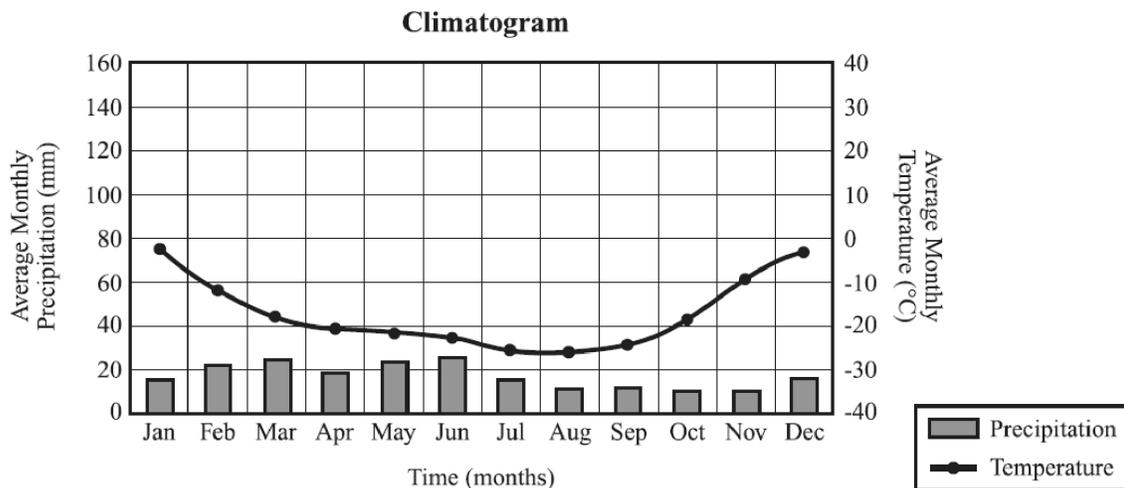
- A. Populations adapted to environmental pressures.
- B. Recessive traits in populations were eliminated over time.
- C. Individuals acquired unique characteristics during their lifetimes.
- D. Random mutation caused some individuals to have harmful traits.

36. Which type of species is *most likely* to become extinct?

- A. a species that eats a very specialized diet
- B. a species that has a high reproductive rate
- C. a species that has a high population density
- D. a species that lives in a large habitat area

37. In his book *On the Origin of Species*, Charles Darwin described how species change over time. Which of the following is *not* part of his observations that describes the mechanisms of natural selection?
- A. Organisms produce more offspring than can survive.
 - B. Disease and natural disaster will limit population growth.
 - C. Species today descended with modifications from ancestral species.
 - D. Organisms with advantages will survive and reproduce.

38. The graph below is a climatogram of a particular biome.



Which adaptation would be seen in animals in this biome?

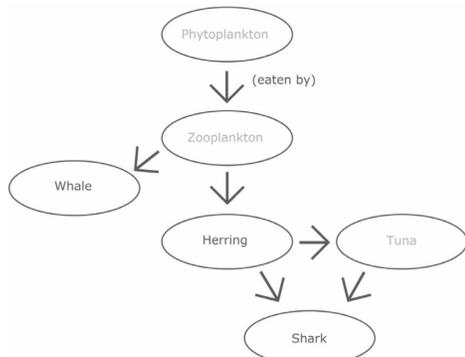
- A. Long thin bodies
- B. Strong thick hooves
- C. Thick body fat layers
- D. Dark colored feathers

39. Which statement supports the theory of evolution?

- A. All living cells come from previous cells.
- B. All plants and animals have DNA.
- C. Matter cannot be created or destroyed during chemical reactions.
- D. Fossils provide evidence that vertebrates share a common ancestor.

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- 1. Answer: C
- 2. Answer: C
- 3. Answer: A
- 4. Answer: A
- 5. Answer: ;



states that sharks will decrease.

- 6. Answer: D
- 7. Answer: B
- 8. Answer: D
- 9. Answer: D
- 10. Answer: C
- 11. Answer: C
- 12. Answer: B
- 13. Answer: C
- 14. Answer: A
- 15. Answer: D

- 16. Answer: C
- 17. Answer: A
- 18. Answer: B
- 19. Answer: D
- 20. Answer: D
- 21. Answer: B
- 22. Answer: D
- 23. Answer: D
- 24. Answer: A
- 25. Answer: B
- 26. Answer: B
- 27. Answer: B
- 28. Answer: A
- 29. Answer: B
- 30. Answer: C
- 31. Answer: C
- 32. Answer: B
- 33. Answer: C
- 34. Answer: C
- 35. Answer: A

36.
Answer: A

37.
Answer: B

38.
Answer:

39.
Answer: D