

EVOLUTION STARTS WITH?

1. E _____, or change over time, is the process by which modern organisms have descended from ancient organisms

2. A scientific I _____ is a well supported, testable explanation of phenomena that have occurred in the natural world.

3. C _____ D _____ was an English naturalist who made numerous observations during his travels on the Beagle which led him to pose a hypothesis about how life changes over time.



4. F _____ are the preserved remains of ancient organisms that provide evidence for how life has changed over time.

5. J _____ H _____ proposed that the Earth is shaped by geological forces over extremely long periods of time, and that the Earth is very old



6. I _____ M _____ predicted that the human population would grow faster than the resources needed to sustain it.



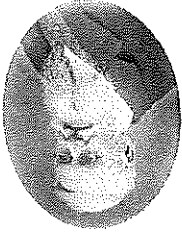
7. J _____ - B _____ proposed that the selective use or disuse of an organ led to a change the organ that was then passed on to the offspring.



8. C _____ explained that the geological processes seen happening on the Earth now have shaped Earth's geological features over long periods of time.



9. A _____ W _____ published his own theory of evolution by natural selection about the same time as Charles Darwin.



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- 10. The S _____ F _____ F _____ E _____ means that members of each species compete regularly for food and other necessary resources.
- 11. F _____ is the ability of an individual to survive and reproduce in its specific environment.
- 12. Any inherited characteristic that increases an organism's chance of survival, like webbed feet, sharp claws, or speed, is called an A _____.
- 13. The process whereby individuals that are better suited to their environment survive and reproduce more successfully is called N _____ S _____, which Darwin nicknamed S _____ O _____ I _____ F _____.
- 14. The idea that all species - living and extinct - were derived from common ancestors linked by a single "tree of life" = C _____ D _____.
- 15. Structures that have different mature forms but develop from the same embryonic tissues are called H _____ S _____.
- 16. Homologous structures that are so reduced in size that they no longer function, like the human appendix or legs in skinks, are called V _____ organs.
- 17. Choosing to breed cows that produce the most milk or the fastest horses is termed A _____ S _____.
- 18. The idea that each living species has descended with changes over time from other species is called D _____ with M _____.
- 19. Charles Darwin's observations of finches and turtles on the G _____ Islands led to his Theory of E _____.
- 20. A giraffe that stretches its neck longer by reaching for food and then passes this long-necked trait on to offspring is an example of I _____ of A _____ traits.
- 29. Dolphins, penguins, and sharks are distantly-related species that share similar characteristics which help them live in water. This is an example of C _____ evolution.
- 30. Even though the Galapagos finches share a common ancestor, they have evolved to fit the ecosystems of their individual islands. This is an example of D _____ evolution.
- 31. Another name for divergent evolution is A _____ R _____.

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Darwin's Theory of Evolution

MULTIPLE CHOICE

Circle the answer that best completes the statement.

A well supported, testable explanation of phenomena that have occurred in the natural world is called a

- A. hypothesis
- B. theory
- C. law
- D. prediction

Darwin's voyage on the H.M.S. _____ led him to propose a revolutionary hypothesis about

- A. Collie
- B. Cheeta
- C. Beagle
- D. Lion

Darwin's hypothesis about how life changes over time is now called the Theory of _____.

- A. Evolution
- B. Variation
- C. Derived characters
- D. Use and disuse

Of all the places he visited, the _____ Islands influenced Darwin's ideas about evolution the most.

- A. Hawaiian
- B. Aleutian
- C. Beagle
- D. Galapagos

In addition to observing living organisms, Darwin studied the preserved remains of ancient organisms called

- A. fossils
- B. homologous structures
- C. adaptations
- D. vestigial organs

On the Galapagos Islands, Darwin observed that the characteristics of many animals and plants

- A. all looked alike
- B. varied from island to island
- C. were acquired through use

On the Galapagos Islands, Darwin discovered birds with differently shaped beaks. What might this tell you about the eating habits of the birds on different islands? Explain your answer.

Explain how Hutton's and Lyell's ideas about the formation of the Earth influenced Darwin's ideas about Evolution.

* * * * *

_____ proposed a hypothesis to explain how living things change over time

_____ stressed that scientists can explain past events in terms of processes occurring they can observe happening now

_____ predicted that the human population will grow faster than the space and food needed to sustain it

_____ proposed that organisms acquired or lost traits during their lifetime by selective use or disuse of organs

- A. CHARLES DARWIN
- B. THOMAS MALTHUS
- C. JEAN-BAPTISTE LAMARCK
- D. CHARLES LYELL
- E. JAMES HUTTON

_____ proposed that Earth was shaped by geological forces that took place over millions of years

MATCH THE SCIENTIST with his contribution

* * * * *

Which of the following ideas, proposed by Lamarck, was later found to be incorrect?
A. All species were descended from other species
B. Acquired characteristics can be inherited.
C. Living things change over time.
D. Organisms are adapted to their environments.

Which of the following best describes how LAMARCK would explain giraffes with long necks?
A. Long-necked giraffes eat more grass than short necked giraffes so their necks grow longer.
B. Natural variation in the population produces some longer and some shorter-necked giraffes and longer necked giraffes can reach food more easily.
C. Some giraffes have acquired longer necks by stretching to reach food and passed that trait on.
D. Giraffes just started out with long necks and haven't changed.

- A. use it or lose it
- B. natural selection
- C. homologous structures
- D. struggle for existence

Because of its similarities to artificial selection, Darwin referred to the "survival of the fittest" as

- A. Darwinian
- B. Lamarckian
- C. homologous
- D. fossils

Structures that have different mature forms, but develop from the same embryonic structure are called _____ structures.

MULTIPLE CHOICE: Circle the letter of the ONE BEST answer that completes the statement.

Evolution

* * * * *

What would you predict the vegetation and rainfall are like on Pinta Island?

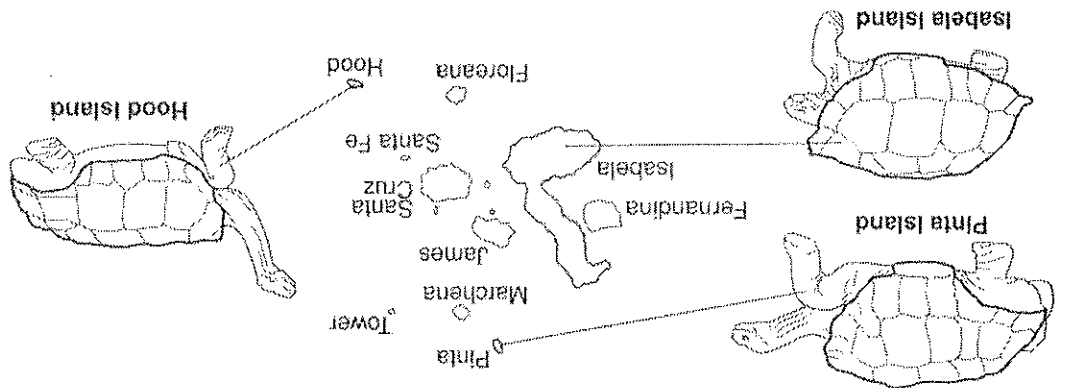
- Pinta Island
- Hood Island

Which island do you think has sparse vegetation that is hard to reach?

EXPLAIN your answer. Why did you choose the island you did?

- Isabela Island
- Hood Island

Tortoises eat plants. On one island plants grow very close to the ground. Which island do you think this is?



The idea that each living species has descended with changes from other species over time is called

- A. descent with modification
- B. struggle for existence
- C. artificial selection
- D. acquired traits

The natural differences between individuals of a species are referred to as _____

- A. fitness
- B. natural selection
- C. adaptations
- D. natural variation

When farmers select the largest hogs, the fastest hogs, or the cows that produce the most milk for breeding it is called _____

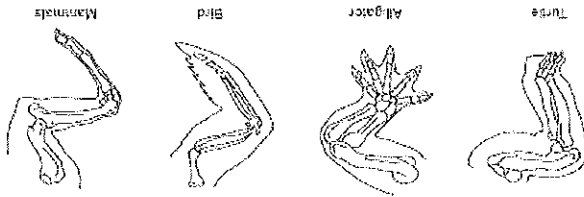
- A. natural selection
- B. artificial selection
- C. survival of the fittest
- D. homologous variation

An inherited characteristic that increases an organism's ability to survive and reproduce in its specific environment is called a(n) _____.

- A. homologous structure
- B. vestigial organ
- C. adaptation
- D. speciation

A human appendix, whale hipbones, and a skin's legs are examples of _____

- A. homologous structures
- B. embryonic mates



- A. homologous structures
- B. embryonic mates
- C. vestigial organs

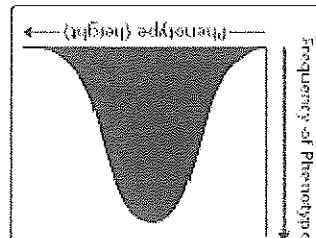
The bones in the diagram at the left are examples of _____

Which of the following best describes how DARWIN would explain giraffes with long necks?

- A. Long-necked giraffes eat more grass than short necked giraffes so their necks grow longer.
- B. Natural variation in the population produces some longer and some shorter-necked giraffes and longer necked giraffes can reach food more easily and survive to pass on their genes.
- C. Some giraffes have acquired longer necks by stretching to reach food and passed that trait on.
- D. Giraffes just started out with long necks and haven't changed.

Competition for food, space, and other resources among members of a species is called _____

- A. common descent
- B. artificial selection
- C. survival of the fittest
- D. struggle for existence



- A. single gene
- B. polygenic
- C. evolving
- D. recessive

A bell-shaped curve like the one at the left is always seen in when graphing _____ traits.

- Which of the following must be TRUE for Hardy-Weinberg to apply to a population?
- A. The population must be small.
 - B. There must be NO movement in or out.
 - C. Mutations can't happen.
 - D. Natural selection can occur.
 - E. Mating must be random.

- A. punctuated equilibrium
- B. gradualism
- C. symbiosis
- D. mass extinction

Darwin believed in the idea that evolution happened slowly over a long period of time called _____

MULTIPLE CHOICE: Circle all that are true. There may be MORE THAN ONE right answer.

PATTERNS OF EVOLUTION AND SELECTION

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Name 7 kinds of evidence that support Darwin's theory of Evolution:

- A. natural variation
- B. survival of the fittest
- C. struggle for existence
- D. inheritance of acquired traits

All of the following play a role in Darwin's Theory of Evolution EXCEPT _____

- A. fitness
- B. common descent
- C. survival of the fittest
- D. struggle for existence

The ability of an individual to survive and reproduce in a specific environment is called _____

A situation in which the allele frequencies change as a result of the migration of a small subgroup of individuals is known as the _____

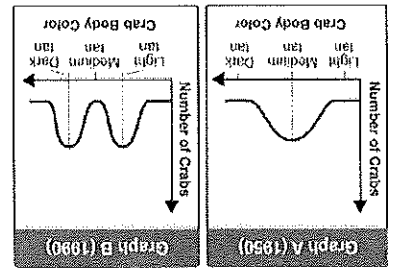
- A. genetic equilibrium
- B. founder effect
- C. Hardy-Weinberg principle
- D. polygenic evolution

Any change in the relative frequency of alleles in a population is called _____

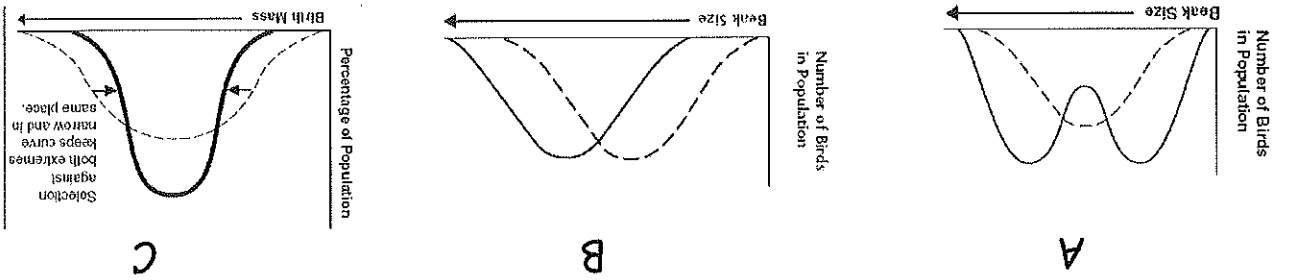
- A. punctuated equilibrium
- B. mutation
- C. evolution
- D. genetic equilibrium

Which of the following is most likely to have caused the change in the population shown in the graphs at the left?

- A. a new predator prefers dark-tan crabs
- B. a new predator prefers light-tan crabs
- C. a new beach color makes medium-tan crabs the least visible
- D. a new beach color makes medium-tan crabs the most visible



LABEL THE THREE GRAPHS BELOW SHOWING PATTERNS OF SELECTION:



MATCH THE GRAPH ABOVE WITH THE POPULATION DESCRIPTION:

_____ In which of these is the fitness of individuals at one end of the normal distribution curve higher than that of individuals in the middle or at the other end of the curve

_____ In which of these is the fitness of individuals in the middle higher than that of individuals at the extreme ends

_____ In which of these is the fitness of individuals at the extreme ends higher than that of individuals in the middle

_____ At the end of the Cretaceous period an asteroid hit the Earth causing the loss of many species including the dinosaurs

_____ The Galapagos finches evolved through natural selection from a common ancestor into a wide variety of different looking species with different kinds of beaks

_____ Horse evolution shows long stable periods of little evolution interrupted by brief periods of rapid change

_____ Hummingbirds have a beak just the right length to reach the nectar in a cardinal flower and as they feed their foreheads bump into the pollen structure. Cardinal flowers are red which hummingbirds can see but bees can't, and their pollen structure is at just the right height for the hummingbird to pick up pollen as it feeds.

E. PUNCTUATED EQUILIBRIUM

D. CONVERGENT EVOLUTION

C. MASS EXTINCTION

B. ADAPTIVE RADIATION

A. COEVOLUTION

_____ Whales, sharks, and penguins all have streamlined bodies and appendages for moving in water even though they belong in different classes of animal classes (mammals, birds, fish)

You can use them more than once!

MATCH THE PATTERN OF MACROEVOLUTION WITH ITS DESCRIPTION

_____ A population of birds lives in an area where plants with medium sized seeds are wiped out by a fungal infection. Birds with unusually large or small beaks would have higher fitness than those with medium sized beaks. Over time the population splits into two subgroups; one that eats small seeds and one that eats large seeds.

_____ In birds, feather color among males is more likely to attract a mate, but also more likely to attract a predator. Over time and many generations, the highest frequency color is for males with medium colors, while males with very dull colors and males with very bright colors became increasingly rare.

_____ The orange and black pattern of a Monarch butterfly serves as a warning to sharp-eyed birds that the Monarch is poisonous to eat and tastes bad. Individuals with the brightest color pattern were more likely to warn off birds and survive to reproduce than those with a dull or medium color pattern. Over time and many generations, the Monarch population became more brightly-colored.

_____ Birds with bigger, thicker beaks can feed more easily on larger, harder seeds. A food shortage causes the supply of small and medium seeds to run low, leaving only larger seeds. Birds with bigger beaks show greater fitness than birds with medium or small beaks. Over time more birds with bigger beaks survive and reproduce.

_____ Human babies born smaller than average are likely to be less healthy and less likely to survive. Larger than average babies are likely to have difficulty being born. The fitness of these larger or smaller weight babies is lower than average-sized babies so human babies tend to born of average size.

- _____ Ostriches are native to the savannahs of Africa, while penguins live in the polar regions. Although ostriches and penguins are closely-related, they look very different.
- _____ Ostriches and giraffes are both native to the savannahs of Africa. They share the same characteristic of a very long neck.
- _____ Also called divergent evolution