

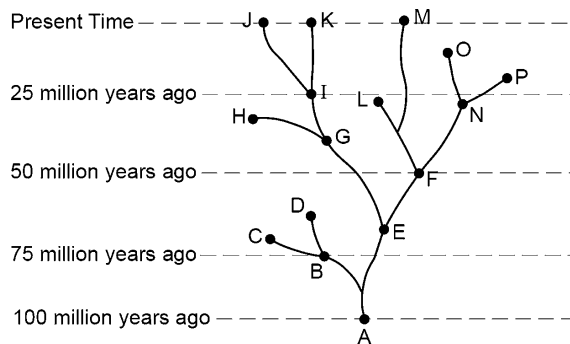
Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Which statement about the rates of evolution for different species is in agreement with the theory of evolution?
  - A. They are identical, since the species live on the same planet.
  - B. They are identical, since each species is at risk of becoming extinct.
  - C. They are different, since each species has different adaptations that function within a changing environment.
  - D. They are different, since each species has access to unlimited resources within its environment.

2. Which concept is not a part of the theory of evolution?
  - A. Present-day species developed from earlier species.
  - B. Some species die out when environmental changes occur.
  - C. Complex organisms develop from simple organisms over time.
  - D. Change occurs according to the needs of an individual organism to survive.

3. The diagram illustrates a proposed evolutionary path of certain organisms, based on the theory of evolution.



Which statement could best be inferred from the information in this diagram?

- A. Evolution does not involve gradual change.
- B. Evolutionary changes can result in extinction.
- C. Evolution begins with plants.
- D. Evolution produces organisms that all fill the same niche.

4. Which statement is most closely related to the modern theory of evolution?
  - A. Characteristics that are acquired during life are passed to offspring by sexual reproduction.
  - B. Evolution is the result of mutations and recombination, only.
  - C. Organisms best adapted to a changed environment are more likely to reproduce and pass their genes to offspring.
  - D. Asexual reproduction increases the survival of species.

5. Which statement is best supported by the theory of evolution?
  - A. Genetic alterations occur every time cell reproduction occurs.
  - B. The fossil record provides samples of every organism that ever lived.
  - C. Populations that have advantageous characteristics will increase in number.
  - D. Few organisms survive when the environment remains the same.

6. The extremes of dry and wet weather of the Galapagos Islands cause the food supply to constantly change. During dry years, the food is mainly large, hard seeds, and finches with large beaks are found in greater numbers.

Which statement best explains this observation?

- A. Dry environments cause mutations in finches.
- B. Finches grow larger when they have more water.
- C. Small finches become smaller during dry seasons.
- D. Large beak size is an adaptation to dry conditions.

7. Which processes lead to the greatest variety of genetic combinations?
  - A. asexual reproduction and cloning
  - B. meiosis and fertilization
  - C. meiosis and mitosis
  - D. cloning and mitosis

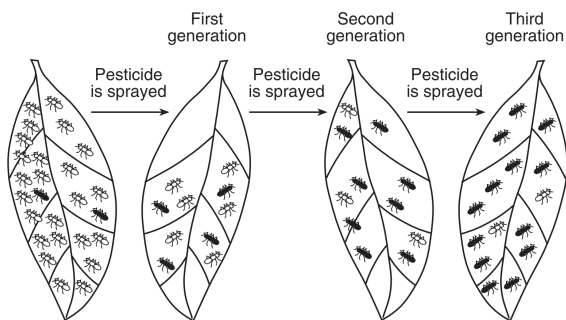
8. The variations that exist in a population of wild giraffes are usually a result of events that occur during

- A. mitotic division
- B. genetic engineering
- C. asexual reproduction
- D. sexual reproduction

9. Which situation is *least* likely to result in new inherited characteristics?

- A. altering genetic information
- B. changes in the structure of genes
- C. producing new individuals by means of cloning
- D. changes in the structure of individual chromosomes

10. The diagram below shows the effect of spraying a pesticide on a population of insects over three generations.



Which concept is represented in the diagram?

- A. survival of the fittest
- B. dynamic equilibrium
- C. succession
- D. extinction

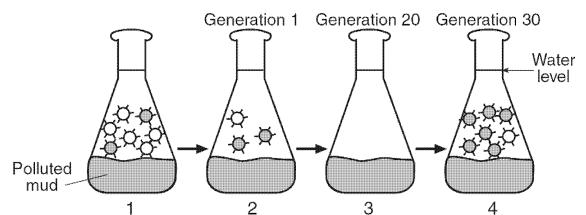
11. Which statement describes an effect of natural selection on a species?

- A. It favors the survival of certain members of the species and results in a change in the proportion of individuals with highly adaptive traits.
- B. It provides feedback mechanisms for members of a species and results in a change in the proportion of individuals with homeostatic controls.
- C. It leads to reproduction with other species, increasing the number of different adaptations.
- D. It increases competition between populations that occupy different niches, increasing the chance of extinction of the less-adapted species.

12. Base your answer(s) to the following question(s) on the information and on your knowledge of biology.

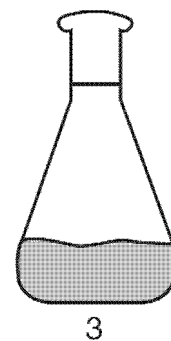
Over the last 30 years, a part of the Hudson River known as Foundry Cove has been the site for many factories that have dumped toxic chemicals into the river. Some of these pollutants have accumulated in the mud at the bottom of the river. The polluted cove water contains many single-celled organisms and simple multicellular animals. Curiously, when the same species from nearby regions with nonpolluted sediments are moved to the polluted cove water, they die.

Scientists hypothesized that the organisms living in the cove have evolved so that they are able to survive in polluted water. To test this hypothesis, biologists tried to duplicate the history of the cove in the laboratory. They took a large number of one species of simple animal from a cove with unpolluted mud and placed them in a flask that contained polluted mud from Foundry Cove (diagram 1). Most of the animals died, but a few survived (diagram 2). The scientists then bred the survivors with each other for several generations producing offspring that were descendants of the survivors. When placed in Foundry Cove, most of these descendants survived. The diagrams below represent the steps in this investigation.



○ = Pollution-sensitive individuals    ☆ = Pollution-resistant individuals

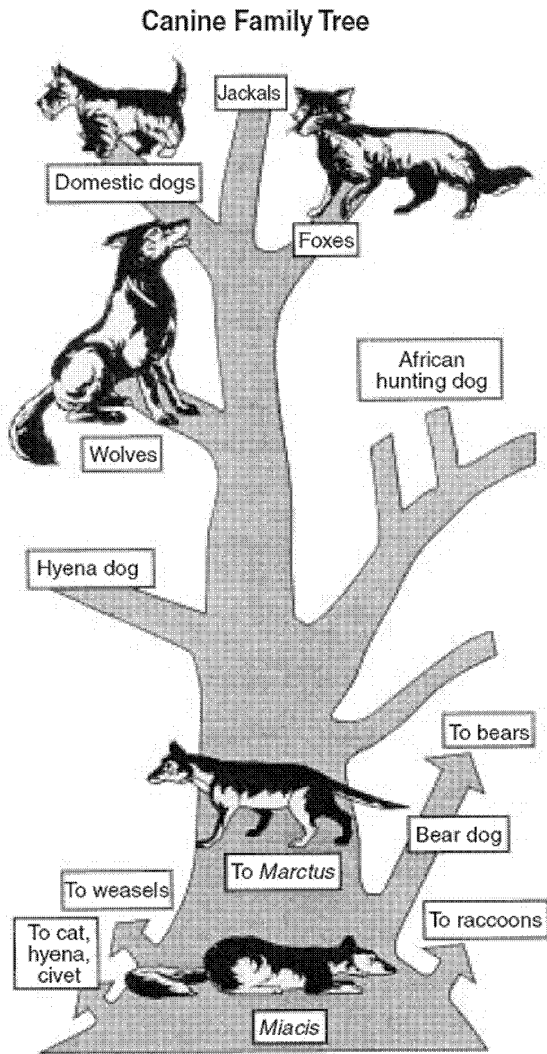
On the accompanying diagram of the flask, sketch the animals that would be present in flask 3 after several generations of breeding in the laboratory.



13. Explain how the simple animals of Foundry Cove adapted to the polluted water. Your answer must include an explanation of the role of *three* of the following in this process.

- environment
- genetic variation
- selection
- reproduction
- survival of the fittest

14. Base your answer(s) to the following question(s) on the diagram, which represents the relationships between animals in a possible canine family tree, and on your knowledge of biology.



According to the canine family tree, weasels, foxes, and domestic dogs all most likely originated from the

- A. wolf                                      B. bear dog  
C. *Marctus*                                D. *Miacis*

15. State one valid inference regarding the relationship of bears to other animals in the canine family tree.
16. The ranges of the African hunting dog and Arctic wolf are represented in the accompanying maps.



■ Range of the African hunting dog



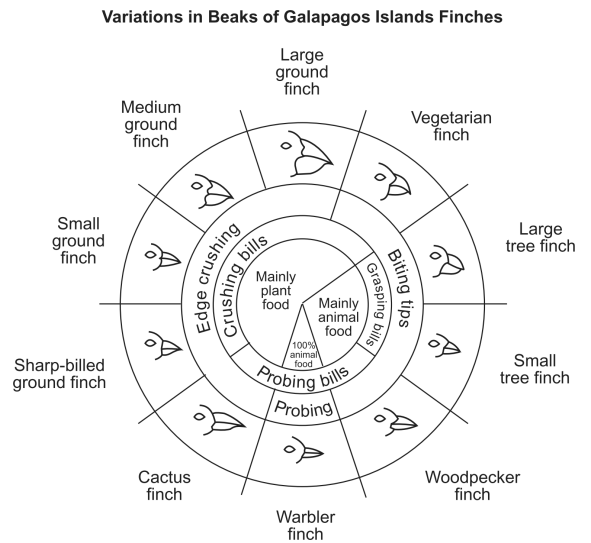
■ Range of the Arctic wolf

State a possible hypothesis that might explain why these two related animals successfully inhabit different areas of Earth.

17. Parrots are tropical birds. However, in some areas of New York City, some parrots have been able to survive outdoors year-round. These parrots survive, while most others cannot, due to

- A. overproduction of offspring  
B. extinction of previous species  
C. asexual reproduction of parrots with a mutation  
D. a variation that allows these parrots to live in colder climates

18. Base your answer to the following question on the diagram below and on your knowledge of biology.




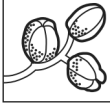
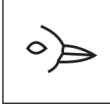
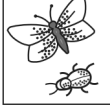


From: *Galapagos: A Natural History Guide*

There are a number of islands in the Galapagos that these finches could possibly inhabit. Explain why each island would *not* be expected to have all of the species shown.

Base your answer(s) to the following question(s) on the information and chart below and on your knowledge of biology.

The Galapagos Islands are home to many different species of finches. Three finch species, their relative beak sizes, and their food preferences are represented below. All three species live on the same island.

**Three Galapagos Finches and  
Their Sources of Nutrition**

Name	Foods
Vegetarian finch <i>Platyspiza crassirostris</i> 	Buds, leaves, fruit of trees 
Warbler finch <i>Certhidea olivacea</i> 	Flying and ground-dwelling insects 
Cactus finch <i>Geospiza scandens</i> 	Cactus flowers and nectar 

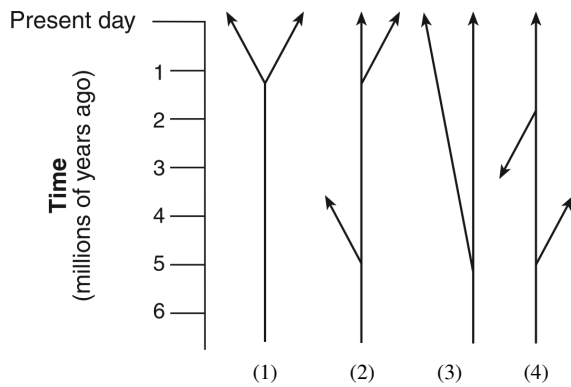
19. Identify *one* trait, other than a beak characteristic, that could affect the survival of a finch. Support your answer.
20. Base your answer(s) to the following question(s) on the information below and on your knowledge of biology.

**Yes, This Big Lizard is Pink**

A new study from the University of Rome Tor Vergata shows that a rare strawberry-tinted land iguana [rosada iguana] in the Galapagos Islands is genetically distinct from other iguanas there, having diverged from them more than five million years ago as the archipelago [a group of islands] formed. The rosada iguana-which escaped Darwin's notice-was discovered only recently, largely because it lives on the desolate slopes of an active volcano.

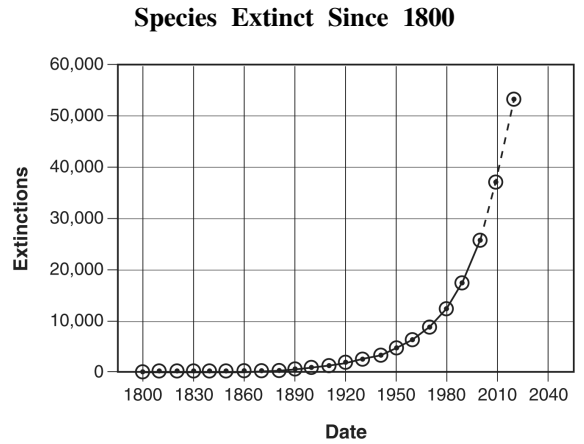
Source: Smithsonian, March 2009

Which diagram best represents the evolutionary pathway of the strawberry-tinted iguana?



- A. (1)    B. (2)    C. (3)    D. (4)

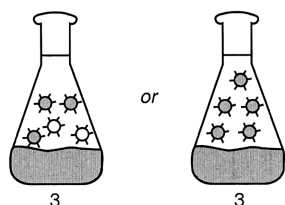
21. Base your answer(s) to the following question(s) on the graph below and on your knowledge of biology. The graph shows the number of species that became extinct from 1800 to 2000. It also shows estimates of the number of species that will become extinct between 2000 and 2020.



State *one* possible reason for the change in the number of species extinctions between 1890 and 1990.

22. The number of species that became extinct between the years 1950 and 2000 is approximately
- A. 5,000                                    B. 12,000
- C. 22,000                                    D. 37,000

1.  
Answer: C
2.  
Answer: D
3.  
Answer: B
4.  
Answer: C
5.  
Answer: C
6.  
Answer: D
7.  
Answer: B
8.  
Answer: D
9.  
Answer: C
10.  
Answer: A
11.  
Answer: A
12.  
Answer: **Examples of Appropriate Sketches**



13.  
Answer: Not all of the animals were identical. They had genetic variations.  
By reproduction, more organisms will be produced than can survive.  
Only those organisms best adapted to their environment will survive. This is known as survival of the fittest.  
Those animals that survive will reproduce and pass those favorable traits on to their offspring.  
As the environment became more polluted, the pollution caused some animals to die. This is known as selection.
14.  
Answer: D
15.  
Answer: Miacis is an ancestor of bears. OR Bears are more closely related to raccoons than to the domestic dog. OR Bears and canines share common ancestors.
16.  
Answer: The two animals adapted to different environments.
17.  
Answer: D

18.  
Answer: Acceptable responses include, but are not limited to:  
– Each island has its own set of environmental conditions which might not provide food or shelter for some of these species.  
– Different islands might have different kinds of food available.  
– too much competition
19.  
Answer: One trait, other than beak characteristic, that could affect the survival of a finch is identified.  
Coloration:  
– Camouflage would help survival.  
– attract a mate for successful reproduction  
Strength:  
– helps in competition for food  
Aggressiveness:  
– helps in competition for mate/food
20.  
Answer: C
21.  
Answer: – The species could not adapt to rapid changes in the environment. – Habitats were destroyed at a rapid rate. – new pollutants added to the environment by humans – rapid human population growth – climate change
22.  
Answer: C