

## The Origin of Species

1. Evolutionary changes that allow organisms to live successfully in new areas or under new circumstances eventually result in the formation of \_\_\_\_\_.
2. The \_\_\_\_\_ model assumes that evolution occurs in spurts, between which there are long periods in which there is little evolutionary change.
3. A \_\_\_\_\_ is a group of organisms that differs in one or more characteristics from other groups, and does not hybridize extensively if they occur together in nature.
4. Natural selection promotes divergence by favoring \_\_\_\_\_ to local habitats and in some instances by decreasing dispersal.
5. The characteristics of populations tend to diverge more or less rapidly, depending on the stresses of their particular \_\_\_\_\_.
6. Various types of reproductive isolation from other populations have been posed as initial steps in \_\_\_\_\_.
7. The factors that limit \_\_\_\_\_ arise primarily as by-products of adaptive changes in populations.
8. Recurrent isolation promotes \_\_\_\_\_ formation.
9. The phenomenon where one species diverges into many by occupying a series of different habitats within a region is called \_\_\_\_\_.
10. *Drosophila* flies found on the Hawaiian islands are considered to be the products of a single common ancestor reflecting \_\_\_\_\_ without competition. This is the most remarkable example of intensive species formation found anywhere on earth.
11. The model that assumes that evolution proceeds with slow successive change in a given evolutionary line is referred to as
  - A. successive descent model
  - B. punctuated equilibrium
  - C. gradualism
  - D. the allopatric model
  - E. the sympatric model
12. The type of speciation that geographically isolates populations and results in the divergence of distinct species is called
  - A. gradual speciation
  - B. sympatric speciation
  - C. allopatric speciation
  - D. sexual speciation
  - E. adaptive speciation

13. A type of isolating mechanism that leads to reproductive isolation by preventing the formation of hybrid zygotes is called
- hybridization isolating mechanism
  - postzygotic isolating mechanism
  - prezygotic isolating mechanism
  - adaptive isolating mechanism
  - differential isolating mechanism
14. A type of isolating mechanism that leads to reproductive isolation after a hybrid zygote has formed is called
- hybridization isolating mechanism
  - postzygotic isolating mechanism
  - prezygotic isolating mechanism
  - adaptive isolating mechanism
  - differential isolating mechanism
15. Some examples of reproductive isolating mechanisms are
- prezygotic mechanisms
  - interspecies selection mechanisms
  - gamete fusion mechanisms
  - adaptive selection mechanisms
  - competitive selection mechanisms
16. The basic unit of evolution and taxonomy is the
- hybrid
  - population
  - species
  - human being
  - zygote
17. The distinctive role of a species in nature is its
- fitness
  - adaptation
  - habitat
  - niche
  - reproductive success
18. Two groups of organisms that differ from one another in one or more characteristics and do not hybridize extensively if they occur together in nature are considered to be different
- races
  - species
  - kingdoms
  - hybrids
  - cohabitants

19. The model proposed by Eldredge and Gould for the formation of species is called the
- gradualism model
  - punctuated equilibrium model
  - adaptation model
  - natural selection model
  - common descent model
20. Which of the following statements describe the assumptions of the gradualism model?
- evolution occurs in spurts, between which there are long periods in where there is little evolutionary change
  - evolution proceeds incrementally, with successive change in a given evolutionary line
  - there is variability in the rates of evolution
  - neither a nor b are correct
  - both a and b are correct
21. If populations within a common area split into species, the process is known as
- sympatric speciation
  - allopatric speciation
  - racial speciation
  - ecotypical speciation
  - reproductive speciation
22. Natural selection promotes divergence by
- favoring adaptation to local habitats
  - decreasing dispersal
  - not involving many genes
  - a, b, and c
  - a and b
23. To ensure that individuals mate with their own species a variety of cues have evolved, including
- vocalizations
  - pheromones
  - visual signals such as body colors
  - visual signals such as rituals, dances
  - all of the above
24. Once species have formed, they keep their identity by
- developmental differences
  - genetic blocks
  - isolating mechanisms
  - somatic mutations
  - structural modifications

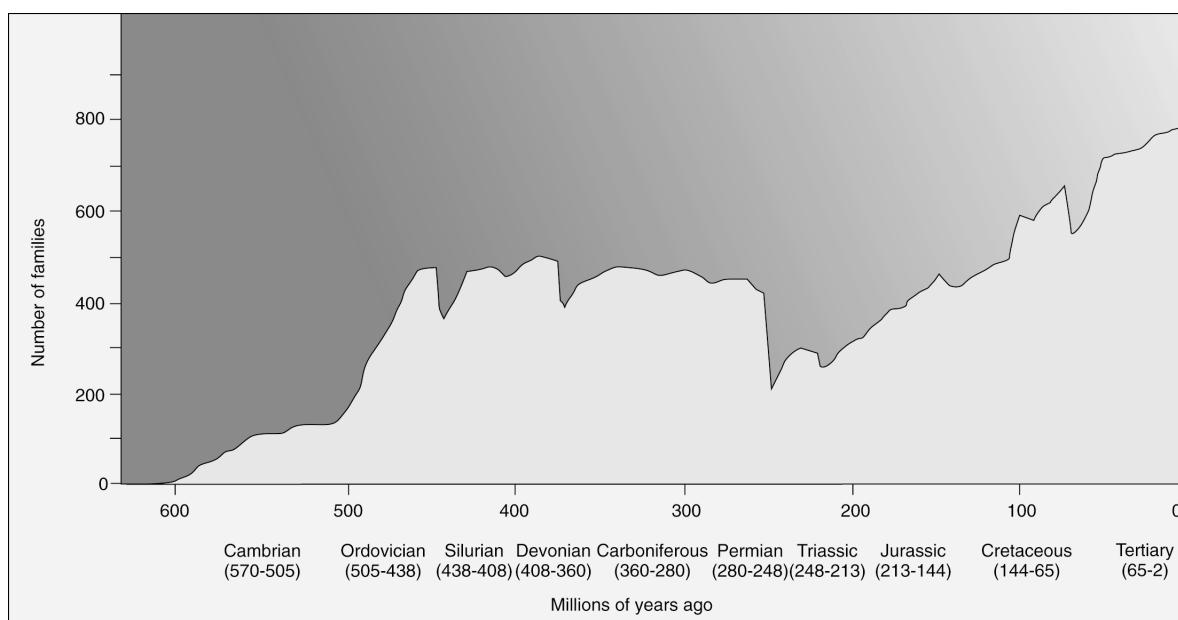
25. Many species might coexist in a particular environment by occupying different areas called
- A. biomes
  - B. habitats
  - C. scented areas
  - D. domains
  - E. residences
26. Prezygotic mechanism examples are
- A. ecological and behavioral
  - B. geographical and temporal
  - C. mechanical and prevention of gamete fusion
  - D. a, b, and c
  - E. a and b
27. Prezygotic mechanisms lead to reproductive isolation by preventing the formation of
- A. mating pairs
  - B. fertile eggs
  - C. fertile sperm or pollen cells
  - D. somatic cells
  - E. hybrid zygotes
28. In the southeastern U.S., two species of wild lettuce (*Lactuca*) do not usually form hybrids, because they bloom at different seasons. The means of isolation appears to be
- A. behavioral
  - B. temporal
  - C. geographical
  - D. mechanical
  - E. ecological
29. One of the main isolating mechanisms among hundreds of species of *Drosophila* in Hawaii appears to be
- A. behavioral
  - B. temporal
  - C. geographical
  - D. mechanical
  - E. none of the above
30. The isolating mechanism that prevents hybridization between horses and donkeys is
- A. behavioral
  - B. prevention of gamete fusion
  - C. prezygotic
  - D. postzygotic
  - E. natural selection

31. Postzygotic isolating mechanisms cause hybrid zygotes to
- fail to develop
  - develop abnormally
  - fail to become established in nature
  - a and b
  - a, b, and c
32. Adaptive radiation is likely to produce several to many
- ecotypes
  - species clusters
  - sterile hybrids
  - immature germline cells
  - malignant tumors
33. A classical example of adaptive radiation is seen in
- dark colored moths
  - mules
  - Darwin's finches
  - Hawaiian finches
  - mainland birds
34. Very rapid speciation occurred when cichlid fishes were isolated in Lake Victoria. Widespread extinction was dramatically seen when
- artificial selection stopped
  - predatory fish were added
  - hybridization stopped
  - fishing was prohibited
  - insect larvae stocks were depleted
35. Species formation among alpine buttercups in New Zealand was promoted by
- mechanical isolation
  - gametic isolation
  - periodic isolation by glaciation
  - temporal isolation
  - all of the above
36. Chemical signals used by some species to signal sexual readiness are called
- autocues
  - behaviorisms
  - chemosynthetic cues
  - pheromones
  - chemodisplays

37. The production of new species through hybridization is especially important in
- A. finches
  - B. fruit flies
  - C. humans
  - D. plants and shrubs
  - E. mules
38. The production of new species through hybridization is sometimes made easier in plants by
- A. adaptation
  - B. meiosis
  - C. parthenogenesis
  - D. hybrid sterility
  - E. polyploidy
39. All of the following describe species except
- A. all hybrids tend to be fertile
  - B. they are groups of organisms that differ from each other in one or more characteristics
  - C. they do not hybridize freely with other species
  - D. individuals within a given species can interbreed freely
  - E. they share gene flow
40. Select the best answer from the choices listed that describes punctuated equilibrium proposed by Eldredge and Gould in 1972. It is an evolutionary process that involves
- A. gradual change observable in the fossil record with very little if any stasis
  - B. “spurts” of change observable in the fossil record followed by periods of stasis
  - C. gradual change observable in the fossil record followed by periods of stasis
  - D. “spurts” of change observable in the fossil record with very little if any stasis
  - E. none of the above
41. The biological species concept proposed by Ernst Mayr emphasizes
- A. the erection of breeding barriers
  - B. the adaptations of the different populations to different environment
  - C. hybridization between different species
  - D. metazygotic barriers
  - E. metasynaptic barriers
42. Sympatric species are species that
- A. are distinct entities that are separated by a barrier (e.g., a mountain range)
  - B. are genotypically the same, utilize different aspects of the habitat, and behave separately
  - C. are distinct entities that are phenotypically different, but genotypically the same, utilize different aspects of the habitat, and behave separately
  - D. are distinct entities that are phenotypically different, utilize different aspects of the habitat, and behave separately

43. A virgin pine forest covers a valley, and one of the inhabitants is a red squirrel species. A large volcanic eruption occurs and separates the valley with a huge volcanic dike that the squirrels cannot cross, thus producing and isolating two populations of squirrels. What change needs to occur for the two populations of squirrels to become separate species?
- The two squirrel populations must eat distinct species of plants.
  - The area that the squirrel populations occupy changes so that the squirrel populations exist in distinct habitats.
  - The fur color of the two squirrel populations must become distinct.
  - The two squirrel populations select mates using the same sexual behavior.
  - The two squirrel populations become reproductively isolated and cannot interbreed.

Use the following graph to answer Questions 44-45



44. Diversity through time is represented by the following graph. Select the statement that presents an accurate interpretation.
- There were more families of organisms during the Ordovician than the Tertiary.
  - There were more families of organisms during the Cambrian than the Carboniferous.
  - There were more families of organisms during the Jurassic than the Tertiary.
  - There were more families of organisms during the Cretaceous than the Tertiary.
  - There were more families of organisms during the Tertiary than the Cambrian.

45. Following periods of extinction the total numbers of families of organisms
- usually recovered within a million years or less, showing remarkable adaptive radiation
  - usually recovered within about ten million years, and have increased since the beginning of life
  - usually recovered within about ten million years, indicating the mechanism is probably punctuated equilibrium
  - usually did not recover at all—the total numbers gradually decline over time
46. Which of the following choices correctly presents only prezygotic isolating mechanisms?
- geographical isolation, ecological isolation, behavioral isolation, and hybrid sterility
  - temporal isolation, mechanical isolation, hybrid adults die before mating, geographical isolation
  - ecological isolation, geographical isolation, mechanical isolation, hybrid sterility
  - geographical isolation, temporal isolation, behavioral isolation, mechanical isolation
47. Adaptive radiation is best described as
- existence of groups of closely related species recently evolved from a common ancestor
  - existence of groups of distantly related species recently evolved from a common ancestor
  - existence of groups of closely related species recently evolved from different ancestors through hybridization
  - existence of individuals of closely related species that originated in different areas within diverse habitats, but that have rejoined as a single species
48. Speciation is a two-part process. Of the choices given, select the one that reflects the two-part process.
- Initially identical populations must mate and maintain reproductive isolating mechanisms.
  - Initially identical populations must diverge and evolve reproductive isolating mechanisms to remain separate.
  - Initially evolve reproductive isolation, then and only then move to different habitats.
  - Initially evolve mechanisms to diverge, and then remain closely related by reproductive isolating mechanisms that fail.
49. Lake Victoria is famous for its variety of cichlid fishes. In fact, they offer the most diverse assembly of vertebrates presently known to science. One trait that scientists have focused on, as one possible reason for their adaptability is
- a second set of scales that lie beneath the top outermost scales
  - a second set of jaws in their throats
  - gill arches that are not covered by an operculum, which prevents hiding places for gill parasites
  - digestive tracts that are able to process most substrates, which has eliminated the need for feeding specialization
  - ability to change color in relationship to their environment

50. Match each of the following

- |          |  |
|----------|--|
| _____ A. | The basic unit of evolution and taxonomy; 1. ecotypes<br>in animals they are groups of interbreeding<br>individuals that do not interbreed with<br>other species       |
| _____ B. | Products of adaptive radiation in newly available habitats; examples are Darwin's finches and Hawaiian fruit flies. 2. subspecies                                      |
| _____ C. | Local populations of a species becomes adapted to their local habitat; often they are the first step in species formation. 3. species                                  |
| _____ D. | Infrequently individuals of two different species might mate to produce offspring with characteristics of both species; usually these are sterile. 4. species clusters |
| _____ E. | These arise when ecological races begin to exhibit reproductive isolation. 5. hybrids  |

## **Answer Key**

No. on Test	Correct Answer
1	species
2	punctuated equilibrium
3	species
4	adaptation
5	environment
6	speciation
7	hybridization
8	species
9	adaptive radiation
10	adaptive radiation
11	C
12	C
13	C
14	B
15	A
16	C
17	D
18	B
19	B
20	B
21	A
22	D
23	E
24	C
25	B
26	D
27	E
28	B
29	A
30	D
31	E
32	B
33	C
34	B

35	C
36	D
37	D
38	E
39	A
40	B
41	A
42	D
43	E
44	E
45	B
46	D
47	A
48	B
49	B
50	1-C, 2-E, 3-A, 4-B, 5-D