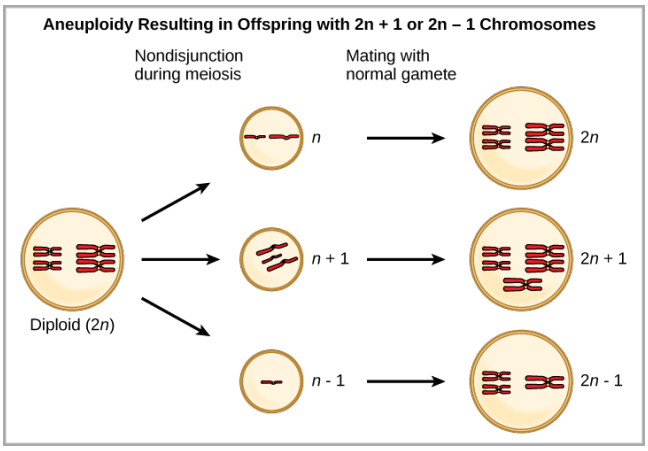
Biology 2e
Unit 4: Evolutionary Processes
Chapter 18: Evolution and the Origin of Species

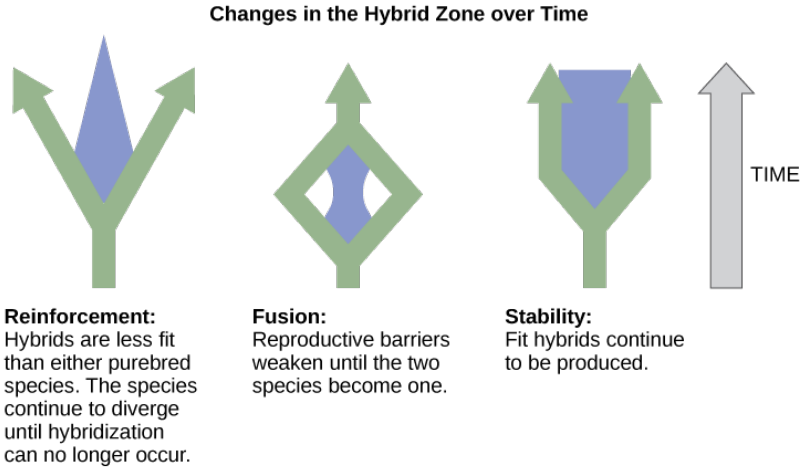
Visual Connection Questions

1. Which is most likely to survive, offspring with 2*n*+1 chromosomes or offspring with 2*n*-1 chromosomes?



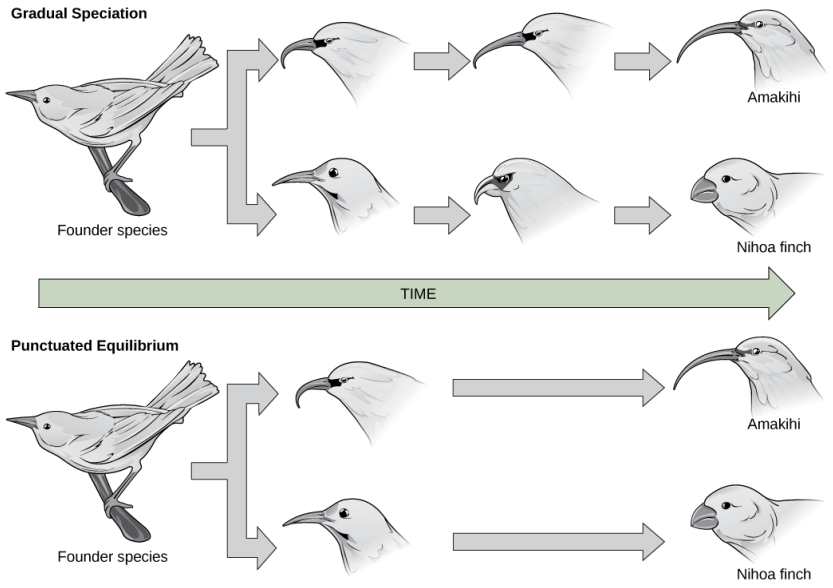
Loss of genetic material is almost always lethal, so offspring with 2*n*+1 chromosomes are more likely to survive.

2. If two species eat a different diet but one of the food sources is eliminated and both species are forced to eat the same foods, what change in the hybrid zone is most likely to occur?



Fusion is most likely to occur because the two species will interact more and similar traits in food acquisition will be selected.

3. Which of the following statements is false?



b. Punctuated equilibrium is most likely to occur in a large population that lives in a stable climate.

Review Questions

4. Which scientific concept did Charles Darwin and Alfred Wallace independently discover?

b. natural selection

5. Which of the following situations will lead to natural selection?

d. all of the above (the seeds of two plants land near each other and one grows larger than the other, two types of fish eat the same kind of food, and one is better able to gather food than the other, male lions compete for the right to mate with females, with only one possible winner)

6. Which description is an example of a phenotype?

d. both a and c (a certain duck has a blue beak and most cheetahs live solitary lives)

7. Which situation is most likely an example of convergent evolution?

d. all of the above (squid and humans have eyes similar in structure, worms and snakes both move without legs, some bats and birds have wings that allow them to fly)

8. Which situation would most likely lead to allopatric speciation?

a. flood causes the formation of a new lake.

9. What is the main difference between dispersal and vicariance?
b. One involves the movement of the organism, and the other involves a change in the environment.

10. Which variable increases the likelihood of allopatric speciation taking place more quickly?
b. longer distance between divided groups

11. What is the main difference between autopolyploid and allopolyploid?
c. the source of the extra chromosomes

12. Which reproductive combination produces hybrids?
c. when members of closely related species reproduce

13. Which condition is the basis for a species to be reproductively isolated from other members?
c. It does not exchange genetic information with other species.

14. Which situation is *not* an example of a prezygotic barrier?
d. Two species of insects produce infertile offspring.

15. Which term is used to describe the continued divergence of species based on the low fitness of hybrid offspring?
a. reinforcement

16. Which components of speciation would be least likely to be a part of punctuated equilibrium?
c. ongoing gene flow among all individuals

Critical Thinking Questions

17. If a person scatters a handful of garden pea plant seeds in one area, how would natural selection work in this situation?
The plants that can best use the resources of the area, including competing with other individuals for those resources will produce more seeds themselves and those traits that allowed them to better use the resources will increase in the population of the next generation.

18. Why do scientists consider vestigial structures evidence for evolution?
Vestigial structures are considered evidence for evolution because most structures do not exist in an organism without serving some function either presently or in the past. A vestigial structure indicates a past form or function that has since changed, but the structure remains present because it had a function in the ancestor.

19. How does the scientific meaning of “theory” differ from the common vernacular meaning?
In science, a theory is a thoroughly tested and verified set of explanations for a body of observations of nature. It is the strongest form of knowledge in science. In contrast, a theory in

common vernacular can mean a guess or speculation about something, meaning that the knowledge implied by the theory is very weak.

20. Explain why the statement that a monkey is more evolved than a mouse is incorrect.
The statement implies that there is a goal to evolution and that the monkey represents greater progress to that goal than the mouse. Both species are likely to be well adapted to their particular environments, which is the outcome of natural selection.

21. Why do island chains provide ideal conditions for adaptive radiation to occur?
Organisms of one species can arrive to an island together and then disperse throughout the chain, each settling into different niches and exploiting different food resources to reduce competition.

22. Two species of fish had recently undergone sympatric speciation. The males of each species had a different coloring through which the females could identify and choose a partner from her own species. After some time, pollution made the lake so cloudy that it was hard for females to distinguish colors. What might take place in this situation?
It is likely the two species would start to reproduce with each other. Depending on the viability of their offspring, they may fuse back into one species.

23. Why can polyploidy individuals lead to speciation fairly quickly?
The formation of gametes with new *n* numbers can occur in one generation. After a couple of generations, enough of these new hybrids can form to reproduce together as a new species.

24. What do both rate of speciation models have in common?
Both models continue to conform to the rules of natural selection, and the influences of gene flow, genetic drift, and mutation.

25. Describe a situation where hybrid reproduction would cause two species to fuse into one.
If the hybrid offspring are as fit or more fit than the parents, reproduction would likely continue between both species and the hybrids, eventually bringing all organisms under the umbrella of one species.