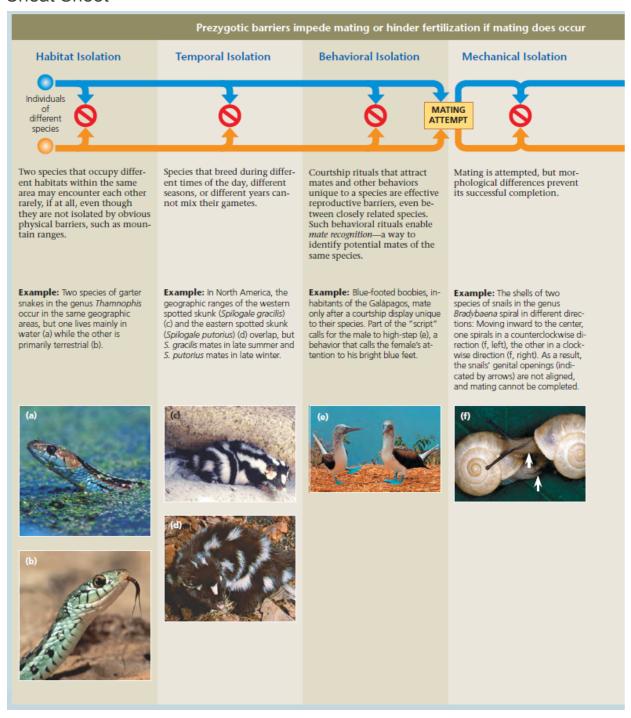
Cheat Sheet



Postzygotic barriers prevent a hybrid zygote from developing into a viable, fertile adult

Gametic Isolation

Reduced Hybrid Viability

Reduced Hybrid Fertility

Hybrid Breakdown







VIABLE, FERTILE OFFSPRING

Sperm of one species may not be able to fertilize the eggs of another species. For instance, sperm may not be able to survive in the reproductive tract of females of the other species, or biochemical mechanisms may prevent the sperm from penetrating the membrane surrounding the other species' eggs.

Example: Gametic isolation separates certain closely related species of aquatic animals, such as sea urchins (g). Sea urchins release their sperm and eggs into the surrounding water, where they fuse and form zygotes. It is difficult for gametes of different species, such as the red and purple urchins shown here, to fuse because proteins on the surfaces of the eggs and sperm bind very poorly to each other.

The genes of different parent species may interact in ways that impair the hybrid's development or survival in its environment.

Example: Some salamander subspecies of the genus *Ensatina* live in the same regions and habitats, where they may occasionally hybridize. But most of the hybrids do not complete development, and those that do are frail (h).

Even if hybrids are vigorous, they may be sterile. If the chromosomes of the two parent species differ in number or structure, meiosis in the hybrids may fail to produce normal gametes. Since the infertile hybrids cannot produce offspring when they mate with either parent species, genes cannot flow freely between the species.

Example: The hybrid offspring of a male donkey (i) and a female horse (j) is a mule (k), which is robust but sterile. A "hinny" (not shown), the offspring of a female donkey and a male horse, is also sterile.



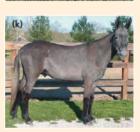
Some first-generation hybrids are viable and fertile, but when they mate with one another or with either parent species, offspring of the next generation are feeble or sterile.

Example: Strains of cultivated rice have accumulated different mutant recessive alleles at two loci in the course of their divergence from a common ancestor. Hybrids between them are vigorous and fertile (I, left and right), but plants in the next generation that carry too many of these recessive alleles are small and sterile (I, center). Although these rice strains are not yet considered different species, they have begun to be separated by postzygotic barriers.











Chapter 24 Questions

- 1. What is speciation?
- 2. What is Phalacrocorax harrisi?
- 3. What are microevolution and macroevolution?
- 4. According to the biological species concept, what is a species?
- 5. What is reproductive isolation?
- 6. What are hybrids?
- 7. Describe the 5 prezygotic barriers and 3 postzygotic barriers.
- 8. What is the morphological species concept?
- 9. What is the ecological species concept?
- 10. What is allopatric speciation?
- 11. What is Gambusia hubbsi?
- 12. What is the Alpheus genus?
- 13. What is sympatric speciation?
- 14. What is Hyla versicolor?
- 15. What percent of plants are polyploid?
- 16. What is an autopolyploid?
- 17. What is an allopolyploid?
- 18. What is the genus *Tragopogon*?
- 19. What is *Triticum aestivum*?
- 20. What is one of Earth's hot spots of animal speciation?
- 21. What are Pundamilia pundamilia and Pundamilia nyererei?
- 22. What is Rhagoletis pomonella?
- 23. What is a hybrid zone?
- 24. What are Bombina variegata and B. bombina?
- 25. What are Poecile atricapillus and P. carolinensis?
- 26. What are Glaucomys volans and G. sabrinus?
- 27. What is reinforcement?
- 28. What are Ficedula hypoleuca and F. albicollis?
- 29. What are Anopheles gambiae and A. coluzzi?
- 30. What is fusion?
- 31. What is punctuated equilibria?
- 32. What is Helianthus anomalus, H. annuus, and H. petiolaris?
- 33. What is the genus Euhadra?
- 34. What are Mimulus cardinalis and M. lewisii?

Chapter 24 Answers

- 1. Process by which one species splits into two or more species
- 2. Flightless cormorant
- 3. Changes over time in allele frequencies in population Broad pattern of evolution above the species level
- 4. A group of populations whose members have the potential to interbreed in nature and produce viable, fertile offspring (do not produce fertile offspring with other species)
- 5. Existence of biological barriers that impede members of two species from interbreeding and producing viable, fertile offspring
- 6. Offspring that result from an interspecific mating
- 7. See picture
- 8. Distinguishes species by body shape/other structural features
- 9. Species defined in terms of its ecological niche
- 10. Gene flow interrupted when a population is divided into geographically isolated subpopulations
- 11. Mosquito fish
- 12. Genus of shrimp (snapping shrimp)
- 13. Speciation occurs in populations that live in the same geographic area
- 14. Polyploid gray tree frog
- 15.80%
- 16. Individual that has more than two chromosome sets all derived from one species
- 17. Fertile polyploid resulting from the self-pollination of a infertile hybrid
- 18. Goatsbeard plants introduced by humans, now common weeds in U.S.
- 19. Wheat used for bread, allohexaploid (two sets from each of three species)
- 20. East Africa's Lake Victoria
- 21. Cichlids in Lake Victoria
- 22. North American apple maggot fly, pest of apples
- 23. Region where members of different species meet and mate
- 24. Yellow-bellied toad and fire-bellied toad
- 25. Black-capped chickadees and Carolina chickadees
- 26. southern flying squirrel, northern flying squirrel
- 27. Natural selection strengthening prezygotic barriers
- 28. pied flycatcher and collared flycatcher
- 29. malaria-carrying mosquitoes
- 30. Two species hybridize extensively, leading to them becoming a single species
- 31. Periods of apparent stasis punctuated by sudden change
- 32. Hybrid of last two, all are sunflowers
- 33. Japanese snails
- 34. Monkey flowers