

CHAPTER 23 REVIEW

(Pages 780–781)

Part 1

1. C
2. C
3. D
4. 3, 2, 1, 4

Part 2

5. (a) camouflage
(b) mimicry
(c) toxic sting
(d) painful prick
6. Birds that prey on insects would only taste one orange-and-black butterfly and then ignore others. Note that many stinging insects are yellow and black.
7. The loss of predators leads to a rapid increase in prey populations, which can deplete resources for the prey population, causing a population crash and possibly extinction.

8.	Similarities	Differences
	<ul style="list-style-type: none">• need living organisms as a food source• interaction is beneficial to one organism and harmful to another	<ul style="list-style-type: none">• predators kill and consume their prey; parasites are usually harmful but not lethal to the host (if a parasite were lethal, the parasite would likely die also as it depends on the host for food and shelter)

9. If the foxes eat herbivores, then the population size of those herbivores is reduced. Since there are fewer herbivores to eat the vegetation, then the population sizes of the plant species will increase, but only up to the carrying capacity of the ecosystem. Since caribou feed on vegetation, their food supply should increase, providing that they eat the same plants as the fox's prey.
10. Evidence of interspecific competition between coyotes and wolves is supported by the changed predatory behaviours of the coyotes as wolves are introduced. Coyotes change from solitary to group tactics to hunt larger animals after wolves recolonize; coyotes became less active when wolves were most active; and the coyote population decreased significantly after wolf reappearance: these all support the fact that the niches of coyotes and wolves overlap.
11. Coyotes are able to reduce the wolves' predation rate by changing from a more solitary existence to pack presence. The individuals in a pack are more able to avoid predation due to the protection that the larger numbers provide. In addition, by changing their pattern of activity in the winter months when prey is scarcer and wolves would be more inclined to prey upon coyotes, the coyotes are able to largely avoid wolves in their most active times.
12. In part, the coyotes take advantage of the wolves' denning instincts by becoming increasingly active during optimum times for their own predatory needs. Since wolf density is quite small, coyotes can avoid proximity to wolf dens in their range and enjoy the improvement in prey availability in the early morning and late evening hours. As well, during summer months, there is generally more prey available, and wolves would be less likely to target coyotes as prey.

13. The cowbird may have evolved like most other birds in terms of nesting behaviour if bison herds remained for a sufficiently long enough period in a given area. By building its own nests and caring for the eggs and young on their own, cowbirds would likely improve the probability of survival of their offspring, and this behaviour would, over time, have produced a species of cowbirds that exhibited the common nesting behaviour.
14. Clear-cutting increases the amount of open-field space; consequently, this favours an increase in the number of nests available for cowbirds to deposit their eggs. As well, with more open-field space, more bison herds and their associated insects are available for the cowbirds' commensal relationship. This would also contribute to more resources for the cowbird species and hence a rise in their population size.
15. (a) Lampreys have a low population density as they are parasites on large, slowly maturing fish. The sea lamprey larvae's fundamental thermal niche is between 17 °C and 22 °C. They occupy a niche in stream systems, where they filter microscopic plants and animals from bottom sediments and are prey to several fish and birds. They are borne in freshwater streams, migrate to oceans, and return to freshwater to spawn (from July to October, they enter streams with water at about 10 °C to 15 °C to spawn). Their range is from Baja California to the Bering Sea. They entered the Great Lakes in 1920. Their realized niche is now close to their fundamental niche. A period of rapid population increase severely decreased the food resources. Starvation and aggressive predation by humans lowered the lamprey population significantly.
- (b) Native to coasts of both sides of the Atlantic; lamprey may have entered the upper Great Lakes via the Welland Canal around 1921.
- (c) The lampreys rapidly decreased the population of larger fish, especially lake trout. The removal of the top predator allowed the populations of smaller species of fish to rapidly increase, which depleted their food resources and caused the crashing of their populations.
- (d) Lakes Ontario and Erie had large commercial fishing fleets based in both Canadian and American ports. These have virtually all disappeared, although walleye fisheries have been rebuilt on Lake Erie. Since 1956, the Sea Lamprey Control Program implemented by the Great Lakes Fishery Commission (with U.S. and Canadian cooperation) has been successful. However, the present focus is on reducing the use of lampricide through alternative control methods, such as the construction of barriers in streams to deny them entry and experimental programs to decrease spawning by sterilizing male sea lampreys; these have so far been successful in allowing the re-emergence of many freshwater fishes.
16. (a) By 1908, initial colonizers, probably algae, ferns, and grasses (as the primary producers); small flying insects (as consumers); and bacteria and fungi (as decomposers) had already colonized most of the island, which supported 16 species of birds, 2 species of reptiles, and some 192 species of invertebrates (insects, etc.).
- (b) The process of succession was rapid. By 1921, mixed forests dominated the island, and 47 species of birds, 5 species of reptiles, 2 species of mammals (bats), and more than 620 species of insects were present. By 1933, the forest started to include some species that are normally found in tropical rainforests, and more than 1100 species of animals (including invertebrates) of various kinds were present.
- (c) Answers may vary. The ash may be a rich source of nutrients for plants. However, if it were too thick, it may also inhibit the available oxygen or water supply and have a less than optimal pH (ash tends to be basic in pH).