

Section 22.1

1. A. organism B. Population C. Community D. Ecosystem
2. A. any 3: prairie dog, black-footed ferrets, burrowing owls, badgers, specific kind of hawks, and eagles, and various kinds of grasses, worms, fungi, and bacteria B. any 4: soil, rocks, sunlight, oxygen, water, temperature
3. Ecology is the study of how living things interact with each other and with their environment
4. Ecosystem
5. Habitat
6. Species
7. Population
8. Community

Section 22.2

1. 168 toads
2. Increase: through the birth of offspring or immigration; Decrease through deaths or emigration
3. 1992-1994 and 1997-1999
4. 1994-1997
5. 1994; about 225 squirrels
6. A population can change in size when new members enter the population or when members leave the population
7. *Food*: if food is limited, the population will not increase beyond the number that the food supply can support. *Space*: without sufficient space, organisms may not be able to reproduce or may not get enough of the things they need to survive, such as water, sunlight and nutrients. *Weather*: both normal seasonal changes in temperature or rainfall and severe weather conditions can kill many members of a population.
8. The number of individuals per unit of area
9. The largest population that an environment can support
10. Moving into a population

Section 22.3

1. Organisms with characteristics that are well suited to their environment survive to reproduce and pass those characteristics along to their offspring. The offspring also survive and reproduce. In this way, successful characteristics are passed on through generations. Organisms that are poorly suited to their environment generally do not survive and reproduce, and their characteristics may disappear from the population. Over time, this process produces adaptations in a species.
2. A niche is an organism's role in the ecosystem - the food it eats, how it obtains food, which organisms eat it, how it reproduces and so forth.
3. Organism's adaptations enable them to specialize in obtaining food, shelter, and other ecosystem resources so they do not compete directly with other species.
4. The lynx increased too because they had more food

5. The hares decreased because they were more lynx to prey on them
6. Lack of food or shelter; disease; predation by other predators such as coyotes, wolves, and eagles
7. With the lynx population decreasing, the hare population would increase again, resulting in another increase in the lynx population
8. *Predation*: an interaction between organisms in which one organisms kills and eats the other organism. *Predator*: the organisms that does the killing. *Prey*: the organism being killed. Answers may vary, Sample: lion (predator)/antelope (prey); cat (predator)/mouse (prey), wolf (predator)/ moose (prey).
9. *Mutualism*: a relationship between two species in which both species benefit.
Commensalism: a relationship in which one species benefits and the other is neither helped nor harmed. *Parasitism*: a relationship in which one species benefits and the other is harmed.
10. The struggle between organisms to survive in a habitat with limited resources.

Section 23.1

1. The mouse; is a first-level consumer when it eats grass or alfalfa and a second-level consumer when it eats a grasshopper.
2. There are many different food chains in the web. Examples
 - a. Grass - mouse - hawk
 - b. Alfalfa - grasshopper - mouse - coyote
 - c. Grass - rabbit - hawk
3. Your diagram should have the producer at the bottom and top-level consumer at the top. Levels should be labeled in 10% increments - producer 100%, first-level consumer - 10%, second-level consumer 1%, third-level consumer 0.1%
4. Producers
5. Consumers
6. Decomposers
7. Carnivores
8. Herbivores
9. Omnivores
10. scavengers

Section 23.2

1. Sun
2. It soaks into the soil and becomes groundwater or runs off the land and flows into a river or ocean
3. Plants take in carbon dioxide in the air, use carbon to make their own food in photosynthesis, and release oxygen as a waste product. Animals take in oxygen in the air, use it in their life processes, and release carbon dioxide as a waste product.
4. Other organisms cannot use “free” nitrogen in the air. Nitrogen-fixing bacteria combine “free” nitrogen with other elements to form nitrogen-containing compounds that other organisms can use.

5. The water cycle
6. A. evaporation from oceans, B. evaporation from plants. C. evaporation from lakes, D. condensation, E. precipitation

Section 23.4

1. It is mostly the climate conditions - temperature and rainfall - that determine the plants that live in a region. The plants determine the animals, and both determine the ecosystems.
2. Hibernation, thick fur
3. Estuaries have shallow, sunlit water where photosynthesis can occur and a large supply of nutrients carried in by the rivers.
4. Intertidal zone: is sometimes (at low tide) completely exposed to sunlight; neritic zone: water is shallow enough to allow sunlight to penetrate for photosynthesis; surface zone: light penetrates to a depth of a few hundred meters, allowing photosynthesis; deep zone: no sunlight, completely dark
5. Deciduous forest
6. Desert
7. Boreal forest
8. Tropical rain forest
9. Tundra
10. Grassland

Section 23.5

1. Mosses and lichen are usually the pioneer species. As they grow on bare rock, they help break up the rocks to start forming soil. When they die, they provide nutrients that enrich the thick layer of soil that is forming, allowing plant seeds to grow.
2. First small weeds grew, then larger weeds and pine seedlings. As the pines grew, a pine forest developed. Then seedlings of deciduous trees began to grow. Finally a forest of mature deciduous trees replaced the pines
3. Secondary succession
4. Primary succession
5. Secondary succession

Section 24.3

1. Area, climate, and niche diversity
2. Coral reefs provide many different niches for organisms, so more species can live there than in more uniform ecosystem
3. A species with a diverse gene pool is better able to resist diseases and parasites and to adapt to disturbances
4. The species were no longer in danger of becoming extinct in the near future because their populations increased when they were protected by the 1973 Endangered Species Act.

5. Laws and treaties protect biodiversity by making it illegal to import, trade, or sell endangered species or products made from them. Captive breeding and raising animals in zoos or wildlife preserves and then releasing the young animals into the wild. Habitat preservation protects biodiversity by preserving entire habitats
6. A species that influences the survival of many other species in an ecosystem
7. The disappearance of all members of a species from Earth
8. Species that are in danger of becoming extinct in the near future
9. Breaking larger habitats into smaller, isolated pieces
10. The illegal killing or removal of wildlife species.