**Biodiversity Review Sheet**

**L.17.8** *Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.*

The variety of organisms, their genetic differences, and the communities and ecosystems in which they occur is termed biodiversity. Biodiversity is a measure of both the number of different species in a community (species richness) and the relative numbers of each of the species (species diversity). Some of the most diverse communities are those living in tropical rainforests.

Over the last 50 years, about half of the world’s tropical rainforests have been burned to make pasture and farmland or have been cut for timber. Many thousands of square miles more will be destroyed this year. The people responsible, often poor farmers, view the forest lands as a resource to be developed, much as Americans viewed North American forests a century ago.

The problem is that as the rainforests disappear, so do their inhabitants. No one knows how many species are being lost. To find out, scientists carefully catalogue all of the residents of one small segment of forest and then extrapolate their data. That is, scientists use what they know to predict what they do not know. The resulting estimates vary widely, but it is clear Earth is losing many species. Some ten percent of well-known species teeter on the brink of extinction. Worst-case estimates are that we will lose up to one-fifth of the world’s species of plants and animals—about one million specie— during the next 50 years. An extinction of this size has not occurred in at least 65 million years, since the end of the age of dinosaurs.

The tragedy of extinction is that as species disappear, so do our chances to learn about them and their possible benefits. This situation is comparable to burning a library before reading the books—we lose forever the knowledge we might have gained. Also, experiments have clearly demonstrated that an ecosystem’s biodiversity and productivity are related. That is, increased species richness leads to greater productivity.

**Invasive species**

An exotic species is a species that is not native to a particular region. Humans often accidentally introduce nonnative species from one ecosystem to another when they transport goods. For example, insects that live on crop plants are often transported along with fruits and vegetables imported from other countries. Some nonnative species are introduced to an ecosystem on purpose. For example, people often cultivate exotic plants for decoration or as crops. Other nonnative species may be introduced to a region as household pets. These pets may later escape or be released into the wild. Still other exotic species might be introduced on purpose in an attempt to control native populations.

Exotic species can often thrive in their new homes and, thus, are often called invasive species. They may not have natural predators in their new environments. Or, they may out-compete native species for limited resources. They may even prey upon native organisms that did not have many native predators before the invasion. When these invaders thrive, they can often cause devastating problems for native species. For example, Burmese pythons brought to Florida as pets have invaded the Florida Everglades—a wetland region that is home to many threatened plant and animal species. The exotic pythons have few natural predators and are reproducing rapidly in their new home. Their presence is a nuisance in part because they have been known to prey upon native species, such as the endangered Key Largo wood rats.

1. Many human activities threaten the biodiversity of ecosystems.
2. What is biodiversity?
3. Describe one way that a decrease in species diversity can affect an ecosystem.
4. Imagine that a certain animal becomes extinct due to human activity. What effect, if any, would this have on the animal’s prey and on its predators?
5. What would happen to a forest ecosystem if a fire killed most of its producers?
6. The kudzu vine is a plant native to Japan. It was brought over to the United States in the late 1800s as a decorative plant that also helps prevent soil erosion. It has since spread throughout the southeastern United States, covering native shrubs and trees with its green, leafy vines.
7. What term describes such a species that is not native to a region?
8. How could the kudzu vine cause problems for native species in the US?
9. Some exotic species do not thrive in their new homes. How would such unsuccessful exotic species likely affect an ecosystem?
10. Through the process of biomagnification certain pollutants build up at each link of a food web. The food web below is located next to a factory which makes the river heavily polluted.



Which of these organisms is likely to be most affected by biomagnification of toxins? Explain your answer.

1. Acid rains form when air pollution combines with moisture in the atmosphere and falls to Earth as precipitation that has a low pH. Which of the following effects CANNOT be attributed to acid rain?
2. an increase in CO2 in Earth’s atmosphere
3. damage to historic buildings and monuments
4. death of aquatic organisms in lakes and streams
5. damage to trees and a decline of forest communities
6. The nonnative zebra mussel was first found in a lake near Detroit in 1988. By 1989, is had colonized all Great Lakes waterways. Which scenario is most likely true regarding the introduction of this species?
7. Native fish naturally eat zebra mussels.
8. The higher biodiversity leads to healthier lakes.
9. They compete with native mussels for food and other resources.
10. Native mussel populations are growing rapidly.
11. In recent years humans have interfered with the natural balance within deer populations in various ecosystems. The interference includes eliminating predators of the deer. Which of the following statements correctly describes the long-term outcome of this interference?
12. The deer that are the fastest and most agile will survive and reproduce.
13. The deer population will be too large to be supported by producers.
14. Other browsing species will thrive and outcompete the deer.
15. The producers will evolve into species that are less palatable to the deer.
16. Imagine that a city located in a desert environment has grown significantly over the last few decades. Which statement BEST describes how the growth of the metropolitan city would impact the desert environment in the area?
17. Biodiversity would decrease in the area but increase in the desert beyond the city.
18. By destroying habitat to build homes and highways, the growth of the city would decrease the biodiversity in the desert.
19. The growth of the city would have little impact on the environment, because few animals likely lived there before growth happened.
20. By bringing in water, the growth of the city would improve the entire desert environment and increase the biodiversity.
21. Tropical rain forests receive as much as 450 cm of rain per year. They are the richest biome in terms of number of species. Which statement BEST explains how destruction of tropical rain forests could affect the carbon cycle?
22. Destroying rain forest trees would cause carbon dioxide levels in the atmosphere to drop dangerously low.
23. A loss of rain forest trees would have only a small effect on the carbon cycle, because they are green all year long.
24. Rain forest destruction would cause only a small increase in carbon dioxide levels if the roots were left to remove carbon dioxide from the air.
25. Cutting down rain forests could increase atmospheric carbon dioxide levels, because trees that could take up carbon dioxide would be removed.
26. A native species and a non-native species are competing for resources within the same ecosystem. The non-native species is more likely to survive than the native species in which of the following situations?
27. Both the native species and the non-native species thrive on the same food source.
28. The native species is immune to certain pathogens in the ecosystem.
29. Predators prey on both native and non-native species.
30. The non-native species has no natural enemies in the ecosystem.