LS2 Capstone Review Answer Key!

1. **Define carrying capacity. What are factors that may result in a species reaching its carrying capacity?**

Carrying capacity- the maximum number of a species an area can sustain
Factors- any density independent or density dependent limiting factors

2. **Sketch a *logistic growth* curve below. How does this relate to carrying capacity?**

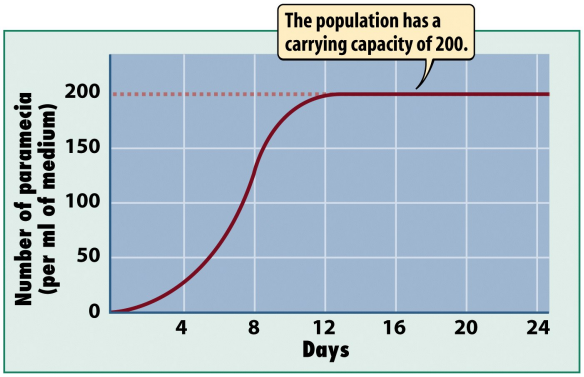

Figure 34-6 part 1 Discover Biology 3/e
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Where the curve levels off shows the carrying capacity

3. **What is the difference between density dependent and density independent factors? Give 2-3 examples of each.**

Density dependent limiting factors are factors that influence a population based on size. They include things like herbivory, predation, parasitism/disease, stress from overcrowding, and competition. Density independent limiting factors are factors that influence a population no matter what the size. They affect all populations equally. They include natural disasters like volcanoes, hurricanes, tornados, etc.

4. **Describe a scenario in which density independent factors may lead to density dependent factors.**

For example- when a drought occurs (a density independent limiting factor) water is scarce. This means that animals must compete for water (and competition is a density dependent limiting factor).

5. **Which density dependent factor do you think is most detrimental to populations?**

Anything you think as long as you can support it! Remember density dependent limiting factors are herbivory, predation, parasitism/disease, stress from overcrowding, and competition.

6. **Define and give examples of the following terms:**
   a. **Primary succession**
      Primary succession is a type of succession that takes place on previously uninhabited, barren land. Primary succession would take place after a volcano, a glacier, or anywhere there is no soil.

   b. **Secondary succession**

Secondary succession is a type of succession that takes place somewhere that soil has already existed. This would occur after a forest fire, deforestation, or anywhere that has soil.

c. **Pioneer species**
A pioneer species is the first species that colonizes the area. Pioneer species are typically lichens.

d. **Climax community**
A climax community is the population that is stable following succession. This would be the large oak trees found in a forest for example.

7. Compare and contrast primary and secondary succession. How can you tell the difference?

Primary and secondary succession, are similar in that they are both process where an ecosystem is rebuilt. In the case of primary succession, there is no soil so the process is long (up to 1000 years). During secondary succession there is soil so it is much quicker (only about 100 years). The easiest way to tell the difference is by determining if there is or is not soil present!

8. What is the progression of species that you see in succession?

Lichens → Mosses → Grasses → Shrubs → Small trees → Large trees

9. Explain why forests typically have more biodiversity than the tundra.

Forests have a temperate (warm) climate and an adequate amount of water. These two factors allow plant growth, which is necessary because they are the primary producers for the ecosystem. Having these plants allows for food and shelter for other species. In the tundra the climate is much colder meaning there are fewer species that survive well, including plants. When there are fewer plants in an area, there are fewer species that can live there.

10. Identify 2-3 scenarios that lead to primary succession and 2-3 scenarios that lead to secondary succession.

Primary succession- glacier, volcano
Secondary succession- tornado, hurricane

11. Why are there fewer smaller organisms, such as shrubs and grasses, in climax communities?

Tall trees populate climax communities, and these trees tend to block out part of the light from reaching the forest floor. This means that the species living on the ground must be hardy and able to survive with minimal light. There are not as many of these species, so there are fewer smaller organisms in the climax communities.

12. Describe the process of desertification. What can be done to prevent desertification?

When an area with a dry or drier climate is used rapidly for farmland or is overgrazed the soil becomes dry. This can then lead to desert like conditions. An example of this occurred in the U.S. Great Plains in the 1930s.

13. What is global climate change? Describe the process and explain how CO_2 contributes to climate change.

Global climate change is the gradual changing of earth's climate. The sun emits heat energy, which reaches earth. This energy enters the atmosphere and some energy is absorbed by earth while some is reflected back to space. The atmosphere is like a blanket, so some of the reflected energy is then reflected back down to earth again, while some is allowed to leave. Increasing CO_2 is like putting a thicker blanket around the earth. More CO_2 increases the thickness of the atmosphere, increasing the amount of energy that is reflected back to earth, increasing the temperature.

14. Describe how the following could lead to habitat destruction:

a. Invasive species

Invasive species can kill off native species. When this happens, the entire ecosystem can be off balance because most invasive species do not have natural predators. They eat a great amount of prey, which can cause major species loss.

b. Pollution

Pollution (especially CO_2) emissions can lead to climate change, which over time will lead to habitat destruction. In the short term, pollution of water and soil can prevent growth of primary species like plants, which would destroy the habitat.

c. Deforestation

Cutting down trees reduces a resource used for food for species and trees are often the habitat of species. By cutting many down there are not enough resources for species or enough places for them to live, leading to habitat destruction.

d. Overexploitation

When a resource is used to the point it will not return, it can lead to habitat destruction. One example would be deforestation where trees are cut down so much that the habitat is destroyed. Killing too much of one type of animal can lead to habitat destruction if too many species are consumed and there is not enough food for other species.

15. What is biodiversity?

Biodiversity is the amount of variation of life in an area.

16. What type of ecosystem has the most biodiversity? Why?

Tropical rain forest! The tropical rainforest is warm and wet so many plant species are able to grow in the area. This provides the support necessary for other species to live in the area.

17. What type of ecosystem has the least biodiversity? Why?

Arctic tundra! The arctic tundra is cold and does not receive much moisture. This means that there are few primary producers that can live there. Without many primary producers, other forms of life are limited.

18. How can you reduce your carbon footprint? Explain your answer.

Recycling, using less gas, unplugging electronics, taking shorter showers, etc.