Biosphere Energy Flow

Quiz Review

1. What is the primary source of energy on Earth? How does this source generate so much energy?
2. What are the two Laws of Thermodynamics? How does the Second Law in particular apply to efficiency and trophic levels?
3. How do producers obtain their energy? What is the equation showing this process? How does this process differ from species that live where no light is present?
4. Name the four major types of heterotrophs, and explain what each type eats.
5. Construct a food web using the following organisms: SMALL BIRD, SUN, WORM, TREE, SQUIRREL, EAGLE. Using this food web, choose one possible food chain, labeling the role each organism has, and what percentage of energy they could possible absorb.
6. How does an organism’s niche differ from its habitat?
7. How does a fundamental niche differ from its realized niche? Why does this occur?
8. What is an organism’s ultimate goal? What conditions allow this goal to be fulfilled? Why would a panda have a more difficult time doing so than a cockroach? Use appropriate vocabulary in your answer.
9. Organisms compete with one another for limited resources. What are the two major forms of competition amongst organisms, and explain the difference between the two?
10. What are the three major forms of adaptation to a competing species? Show these adaptions using bell curves.
11. A species of fish thrives in moderate levels of salinity. A competing species of fish also thrives in moderate salinity levels.
    1. Show using a bell curve how the first fish species would adapt, labeling the type of adaption occurring.
    2. Why can this type of selection end up causing speciation?
    3. Why can this type of selection create more specialists, and therefore more problems later on?
12. A species of bacteria thrives in neutral pH levels. Acid rain has now become a pressing issue in this particular area.
    1. How is acid rain caused? What can that do to the pH of the soil?
    2. What are two of the main causes of acid rain? Explain.
    3. Show using a bell curve how the bacteria species must adapt to the changing environment, labeling the type of adaption occurring.
13. Name four other ways that organisms can adapt to their surroundings to avoid being eaten?
14. There are three major types of relationships amongst organisms. What are they, and explain how they work?
15. Why can you consider the predator and prey relationship to be a negative feedback loop?
16. Geographic isolation can be a major reason why speciation occurs. Explain what geographic isolation is, using Marsupials as an example.
17. How do Darwin’s finches display adaptive radiation?
18. What is a population bottleneck, and how can this cause speciation? Use elephant seals as an example.
19. How does the genetic variation on an island differ from that of the mainland? Explain why these differences are seen. Also explain the trend as the location of the island is further away from the mainland.
20. How do environmentalists define productivity? Name three places considered to be the most environmentally productive on Earth and why they would be classified as such.
21. What is the difference between primary and secondary ecological succession?
22. What is a pioneer species? Give one example and how this organism helps begin primary succession.
23. How do the following change from the early successional periods to the later periods: complexity of trophic structure, nutrient recycling, resilience of species and productivity.
24. What are the two major types of secondary succession, giving two examples of each and why you chose them.
25. How do diversity and abundance differ?
26. Show, using pictures, how organisms can be distributed in a particular place, and give one reason why they are distributed this way.
27. What are three major signs of stability? Why are species living in ecotones prone to disturbances? In your answer, give one example of an ecotone, and how this ecotone can be disrupted.