

Name: \_\_\_\_\_

*Please keep your answers brief and to the point. If you have any questions, please ask.*

Fill in the Blank (each blank is worth 2 points; this section totals 30 points)

1. Studying the effects of Tropical Storm Isabel on a forest community in North Carolina would be an example of a \_\_\_\_\_ experiment.
  
2. In the \_\_\_\_\_ reactions of photosynthesis, \_\_\_\_\_ is split to generate oxygen.
  
3. Temperature at any given location on Earth is primarily determined by \_\_\_\_\_.
  
4. The least nitrogen efficient photosynthetic pathway is \_\_\_\_\_.
  
5. The \_\_\_\_\_ prevents water loss via osmosis to the atmosphere from stem and leaf cells of the plant.
  
6. Most nitrogen on Earth is found in (the) \_\_\_\_\_; most phosphorus on Earth is found in (the) \_\_\_\_\_.
  
7. Two major factors that determine the type of soil that occurs in a particular region are \_\_\_\_\_ and \_\_\_\_\_.
  
8. The three elements that make up most of the mass of a plant are \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
  
9. To maximize nutrient uptake, a plant's roots should be \_\_\_\_\_.
  
10. There are \_\_\_\_\_ species of bristlecone pines.

Short Answer

11. Define/describe: (3 each)

a) light compensation point

b) rhizosphere

c) genet

d) frost ring

12. Give three distinct reasons why plants are crucial for life on Earth as we know it. (6)

13. Answer the following questions related to water potential:

a) name and briefly describe the two components of water potential as presented in lecture (4)

b) how is a water potential gradient established in a plant? (5)

c) how is transpiration related to water potential? (3)

14. Why is phenotypic variation crucial for evolution to occur? (5)

15. The results from Wilson et al. (2001) above are all for the annually burned plots. What do you conclude from these results about the importance of mycorrhizae for these three species? (5)

Short Essay (follow the instructions and answer two questions below; 2-3 paragraphs for each; each answer is worth 15 points)

Choose ONE of the following two questions (16 and 17). Be creative, but realistic, in your answer.

16. In the morning on your way to school you notice that all the Texas sage plants along the interstate are flowering, but individuals of the same species in flowerbeds on campus are not flowering. Write a hypothesis based on this observation, and describe an experiment you would conduct to test this hypothesis. Include in your answer the type of data you would collect, and the results you would need to accept your hypothesis.

17. Describe what you would do to follow up on the Wilson et al. (2001) study we read for discussion (see question 15 for a reminder of their results). Give a hypothesis you would start with and an experiment you would conduct to test that hypothesis. Include in your answer the type of data you would collect, and the results you would need to accept your hypothesis.

Choose ONE of the following three questions (18, 19, and 20).

18. Describe photorespiration. Include in your answer the environmental conditions that favor photorespiration, which photosynthetic pathway(s) is/are more likely to experience photorespiration, and why. How does the occurrence of photorespiration influence the distribution of plants of the three photosynthetic pathways?

19. Compare and contrast the symbiotic relationships between nitrogen fixers and plants and between mycorrhizae and plants. Include the types of organisms involved in each, the types of plants, and the exchange of materials between the organisms in your answer.

20. Why must conservationists be concerned with population size? Include in your answer at least two factors that can increase and at least two that can decrease variation among populations, and how population size is related to these factors.

