

# Ecology Test (Tesoro)

Student Names \_\_\_\_\_  
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Team Name \_\_\_\_\_

Team Number \_\_\_\_\_

Please do not open until time begins. You have 50 minutes to complete this test.



9. Define niche partitioning and describe how two specific organisms from the desert biome demonstrate this phenomenon. (4 pts)

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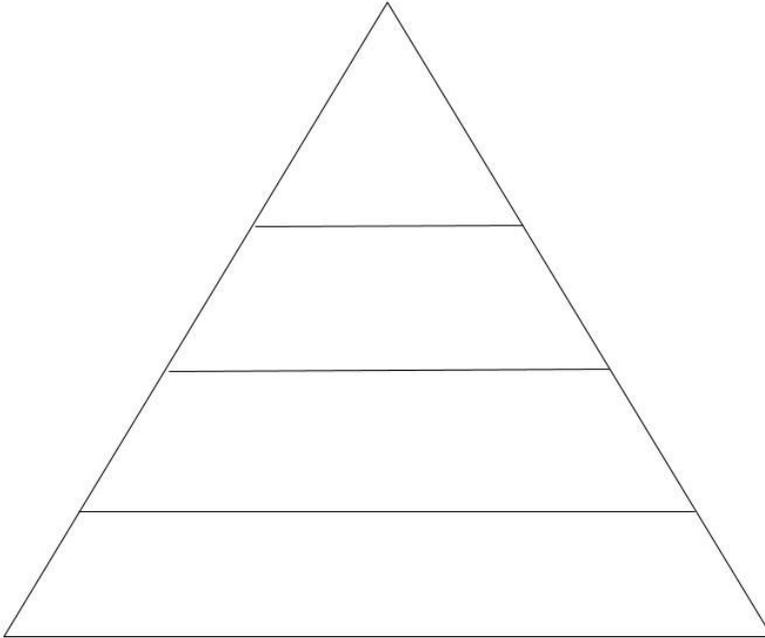
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10. In the space below, sketch the three types of selection that result from changes in population genetics, and give brief explanations of what each means. (6pts)

Disruptive selection	Stabilizing selection	Directional selection
Graph	Graph	Graph
Explanation	Explanation	Explanation

11. From the paragraph below, fill in the trophic pyramid below that represents the community. Include all of the flora and fauna in italics. (5 pts)

In a temperate grassland, *ravens* are commonly found feeding on *pacific tree frogs*, which feed on *Edith's checkerspot*s. Animals like *pikas*, *prairie dogs*, and *gophers* can commonly be found hiding in the grass. With an abundance of food, ungulates like *bison* and *elk* roam the lands. The most feared predators such as *mountain lions* and *red-tailed hawks* feed on other animals such as *rattlesnakes* and ring-tailed cats. After a recent fire, *purple needlegrass*, *buffalo grass*, and *wild oats* have sprouted.



12. Suppose that a prairie dog population of 20,001 at time = 0 year in a grassland grows exponentially because humans eradicated coyotes in the area. After three years, the population is 90,003. What is the growth rate of the population? (2 pt)

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13. In the prairie dog example, the population eventually cannot grow any higher, what is the reason of this? Explain with both words and a graph. (4pt)

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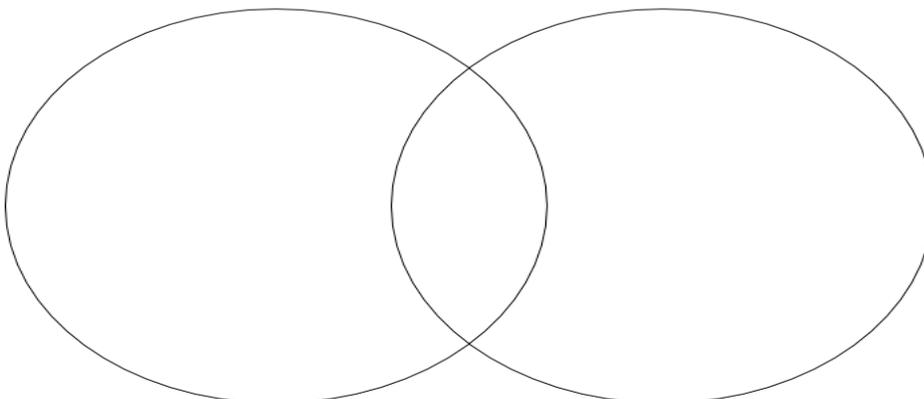


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14. In the venn diagram, place the following terms on the correct side.  
 availability of food, flash flooding, predation, disease, earthquakes, migration (3 pts)

Density Dependent

Density Independent



15. The development of biotic communities in an area where the natural vegetation has been removed or destroyed but where soil is present is best described as: (1 pt)
- A) Primary Succession
  - B) Secondary Succession
  - C) Biological Succession
  - D) None of the above
16. Attempts by two or more organisms of a single species to use the same limited resources in an ecosystem is best described as: (1 pt)
- A) Intraspecific Competition
  - B) Interspecific Competition
  - C) Species Specific Competition
  - D) All of the above
17. The Orangutan is a species in the tropical rainforest. Orangutans disperse seeds, which helps maintain the diversity of the rainforest, as the still air of the rainforest prevents pollination by wind. From the information given, the Orangutan is best described as what type of species? (1 pt)
- A) Sustainability Species
  - B) Endangered Species
  - C) Keystone Species
  - D) Indicator Species
18. Several species of parrots can live in the same tree only because they: (1pt)
- A) Have different habitats within the tree
  - B) Eat different foods within the tree
  - C) Occupy different niches within the tree
  - D) Compete with each other
19. In a natural ecosystem the biomass of herbivores will be \_\_\_\_\_ the biomass of Carnivores. (1 pt)
- A) Independent of
  - B) Greater than
  - C) Less than
  - D) The same as
20. In the nitrogen cycle, which process removes nitrogen from the atmosphere? (1 pt)
- A) Eutrophication
  - B) Nitrogen fixation
  - C) Denitrification
  - D) None of the above
21. In the water cycle, how is water moved to the atmosphere? (1 pt)
- A) Sublimation
  - B) Evapotranspiration
  - C) Evaporation
  - D) All of the above

22. Which of these do NOT add carbon dioxide to the atmosphere? (1 pt)
- A) Animal respiration
  - B) Plant respiration
  - C) Decomposition of dead matter
  - D) None of the above
23. Why can't phosphorus be found in the atmosphere? (1 pt)
- A) At normal temperatures and pressure, phosphorus is at a liquid state
  - B) All phosphorous is found inside rocks
  - C) The sun evaporates it
  - D) It doesn't combine well with the other elements
24. Ozone depletion happens as a result of which of the following gases? ( 1pt)
- A) Nitrous Oxide
  - B) Carbon Dioxide
  - C) Chlorofluorocarbons
  - D) Methane
25. In all biomes, which of the following conditions will cause the most rapid chemical Weathering? (1 pt)
- A) Hot and humid
  - B) Hot and dry
  - C) Cold and dry
  - D) Cold and humid
26. The pyramid of numbers in a tree should be (1 pt)
- A) Upright
  - B) Inverted
  - C) Spindle Shaped
  - D) None of these
27. Which of the following ecological pyramids is always upright? (1 pt)
- A) Pyramid of energy
  - B) Pyramid of numbers
  - C) Pyramid of biomass
  - D) None of these

## Part 2 ( \_\_\_/50)

1. Which of the following species would you not see in a grasslands ecosystem? (1 pt)
  - A) Dickcissel
  - B) Long Billed Curlew
  - C) Collared Peccary
  - D) Swift Fox
2. A North American Bison, a primary consumer, eats some grass, a producer, in a grasslands ecosystem. What is the percentage of the grass's energy that is passed to the Bison? (1 pt)
  - A) 15 %
  - B) 10 %
  - C) 20 %
  - D) 25 %
3. In what continent will you not find temperate grasslands? ( 1 pt)
  - A) North America
  - B) Africa
  - C) South America
  - D) Asia
4. When a wildfire burns through a tallgrass prairie, and new flowers bloom, what kind of succession is this? (1 pt)
  - A) Secondary
  - B) Tertiary
  - C) Primary
  - D) All of the above
5. How much rainfall does a grassland receive annually? ( 1pt)
  - A) 10-20 cm
  - B) 20-40 cm
  - C) 40-100 cm
  - D) 20-100 cm
6. What is the range of temperature of a grassland throughout a year? (1 pt)
  - A) Negative 10 to positive 10 degrees celsius
  - B) Negative 5 to positive 20 degrees celsius
  - C) 0 to 20 degrees celsius
  - D) Positive 5 to positive 20 degrees celsius

7. Which type of grassland requires more water? (1 pt)
- A) Tallgrass prairie
  - B) Shortgrass prairie
  - C) Shrubland prairie
  - D) None of the above
8. Which of the following are indicator species for a grassland? (1 pt)
- A) Purple needlegrass
  - B) Blazing stars
  - C) Plantain herb
  - D) Both A and B
9. What is the most detrimental process(es) that damages grasslands? (1 pt)
- A) Conversion to agriculture
  - B) Drought
  - C) Heavier rain
  - D) Both B and C
10. If considering ALL types of grasslands, which continent does not have any grasslands?(1 pt)
- A) Arctic
  - B) Australia
  - C) Antarctic
  - D) South America
11. How many types of deserts are there?(1 pt)
- A) 1
  - B) 2
  - C) 3
  - D) 4
12. In what latitudinal range are most deserts found in the world? Make the range as small as possible. (1 pt)
- A) 15°N to 15°S
  - B) 30°N to 30°S
  - C) 45°N to 45°S
  - D) 60°N to 60°S
13. Cacti are common plants found in deserts. Most of their stems are\_\_\_\_\_ to help retain more water. (1 pt)
- A) Smooth
  - B) Flat
  - C) Rough
  - D) Corrugated

14. What are defenses that cacti develop? (1 pt)
- A) Coating of trichomes
  - B) Allelopathy
  - C) Spines
  - D) Both B and C
15. What is a/are common trait(s) found in desert fauna? (1 pt)
- A) Nocturnal lifestyle
  - B) Lives in trees
  - C) Consumes large amount of water
  - D) Both B and C
16. Which of these basic necessities that plants need to thrive does the desert lack? (1 pt)
- A) Nutrients
  - B) Water
  - C) Sunlight
  - D) Both A and B
17. Which of these organisms would you not find in the Mojave Desert, California? (1 pt)
- A) Saguaro
  - B) Rock Hyrax
  - C) Inland taipan
  - D) Lichen
18. The desert biome and the tundra biome are very similar in every aspect except for: (1 pt)
- A) Different amounts of carbon in the ground
  - B) Average rainfall
  - C) Average temperature
  - D) Both A and C
19. Unlike other type(s) of deserts, temperate deserts have an average temperature of below:  
(make answer as specific as possible) (1 pt)
- A) 15 degrees celsius
  - B) 10 degrees celsius
  - C) 5 degrees celsius
  - D) 0 degrees celsius
20. Spikes on cacti help the plants with everything except for: (1 pt)
- A) Water retention
  - B) Physical defense
  - C) Slowed evapotranspiration
  - D) None of the above

21-23. The salt cedar is a deciduous plant with very small flowers that overtakes riparian zones along river channels, irrigation canals, and other wetland habitats, eliminating native species by outcompeting them for water, increasing soil salinity, and decreasing habitat values. The plant is highly common across the United States, and the Mojave Desert is especially threatened because it naturally lacks water.

21. From the description above and general knowledge, what are the two possible ways a salt cedar spreads its seeds? Offer explanations for your hypotheses. (5 pt)

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22. According to a field guide by the USDA, if one wishes to eradicate salt cedars, the following methods work: Excavation, grubbing, root plowing/raking, cut stump treatment, and aerial application (the last two are methods of herbicide application). Define the 5 methods. ( 5 pts)

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23. Ecologists from Columbia University have predicted that introducing saltcedar leaf beetles can help the environments affected by the salt cedar. Do you agree with this? Why or why not? Give 2 specific reasons to support your answer. ( 5 pt)

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24. In the North American temperate grasslands, bison are recognized as a keystone species due to its role in the environment. List 3 ways that bison support the grasslands. (3 pt)

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25. How have humans negatively affected the temperate grasslands of North America? List three examples. (3 pt)

- A.
- B.
- C.

26. There are numerous types of grasslands with different names, list 5 of them and what general region they are found. (5 pt)

- A.
- B.
- C.
- D.
- E.

27. Wildfires play a central role in regulating the grassland biomes. Explain (3 pt)

A) Why fires are important to the environment?

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B) Why fires are important to the people living near wildfires?

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C) What would happen if no wildfire happens as a result of human interference?

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28. Ventenata grass, a superweed capable of outcompeting cheatgrass- a common superweed-easily, threatens grasslands. Why is this species of grass capable to wreaking havoc upon a biome that is known for the plentitude of grass? ( 1 pt)

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### Part 3 ( \_\_\_/50)

1. List three pros and three cons of alternative energy sources in the table below (6 pts)

Pros	Cons
1.	1.
2.	2.
3.	3.

2. Which of the following is NOT a greenhouse gas? (1 pt)

- A)  $\text{CO}_2$
- B)  $\text{O}_3$
- C)  $\text{C}_6\text{H}_6$
- D)  $\text{CH}_4$

3. Nitrogen Oxides ( $\text{NO}_x$ ) and \_\_\_\_\_ are the primary causes of acid rain. (1 pt)

- a. Carbon Dioxide ( $\text{CO}_2$ )
- b. Sulfur Hexafluoride ( $\text{F}_6\text{S}$ )
- c. Sulfur Dioxide ( $\text{SO}_2$ )
- d. Methane ( $\text{CH}_4$ )

4. Define biotic potential. (2 pt)

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5. All of the following are methods of seed dispersal EXCEPT (1 pt)

- a. Fire
- b. Water
- c. Animals
- d. Tension

6. True or False: Nitrate Aerosols, an air pollutant, reflects light back into space, cooling the atmosphere. (1 pt)

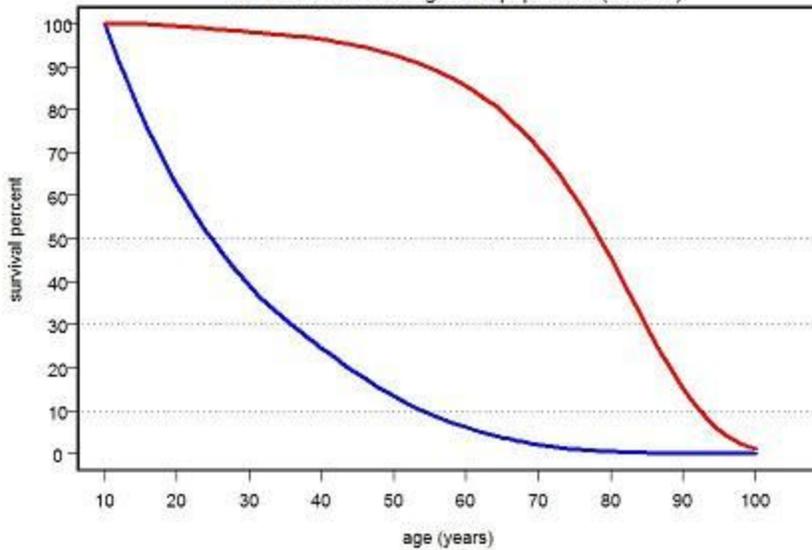
7. Name four ways in which humans affect the Nitrogen Cycle (4 pt):

- a. \_\_\_\_\_

- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_

8. Name three anthropocentric actions and their effects on the environment (6 pt)

- a. >
- b. >
- c. >



9. Use the above graph for the following questions (2 pt total)

- a. True or False: the 10-year-old male (blue) has a greater chance of survival than the general male U.S. population (red).
- b. What is the name of this particular graph that shows survival percentage for a specific group?

10. A cosmopolitan species \_\_\_\_\_ (1 pt)

- a. Has ranges that stretch over several continents.
- b. Has ranges that are isolated in a particular area within a continent.
- c. Has ranges that stretch across multiple biomes.
- d. Has ranges that stretch across a continent.

11. List the three goals of conservation biology (6 pts)

- a.
- b.
- c.

12. Humans cause erosion at a rate how many times faster than all natural processes combined? (1 pt)
- 2
  - 5
  - 10
  - 20
13. What is nonpoint source pollution? (2 pt)
14. List one environmental impact of alternate energy for each (3 pts)
- Wind power:
  - Solar power:
  - Geothermal energy:
15. List three methods for invasive species control (3 pts)
- - 
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16. What are the four main categories of pollution? (2 pts)
- - 
  - 
  -
17. Habitat fragmentation and destruction results in: (3 pts)
- - 
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18. About what percent of endangered or threatened species are at risk because of non-native, invasive species? (1 pt)

19. What are two broad categories of non-renewable energy sources? (2 pt)

20. How does a buffer for acid rain work? (2 pt)