

Team Name \_\_\_\_\_ Team # \_\_\_\_\_



# Green Generation

Rustin Invitational

January 25, 2014



Welcome to Green Generation! Before you get started, here are a couple reminders:

1. Teams are only permitted ONE 8.5" X 11" page of notes and any kind of calculator. Teams may not use any other resources, or risk disqualification.
2. You may separate the test, but make sure to reattach the test before sending it in and/or putting the team name and number on top of all pages. Otherwise you risk your test being separated, which may prevent parts of your test from being graded.
3. Tiebreakers will be selected questions within the test. They will be labeled in bold on the test. Further tiebreakers will start at the end of the test and go toward the beginning (that is, Tiebreaker #6 will be question 42, Tiebreaker #7 will be question 41, etc.)
4. You will have **50 minutes** to complete the test. You may turn your test in early, but time turned in will not be used as a tiebreaker.
5. Make sure to plan out your time wisely. There are three parts to the test; try not to spend all of your time on just one part. Time management is important!
6. Good luck!

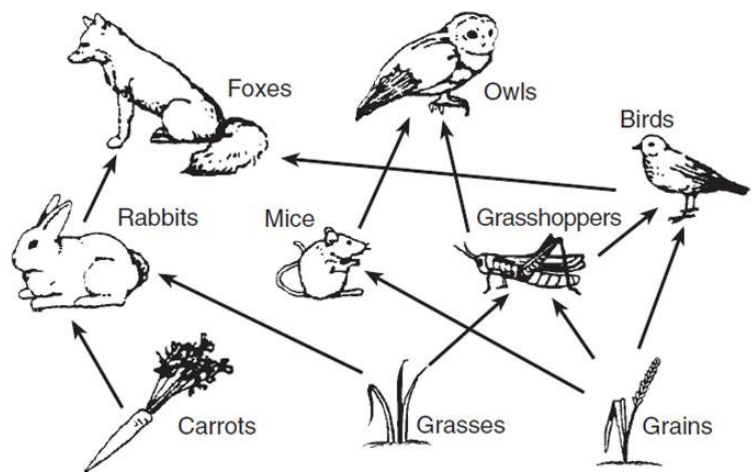
Score \_\_\_\_\_

Place \_\_\_\_\_

**Part I: Review of the General Principles of Ecology (20 pts)**

**Multiple Choice (all questions worth 1 pt)**

1. What is the primary difference between a freshwater and a marine ecosystem?
  - a. Temperature
  - b. Salinity
  - c. Biological Oxygen Demand
  - d. Turbidity
2. Fixation is a key part of which ecological process?
  - a. Carbon cycle
  - b. Phosphorus cycle
  - c. Nitrogen cycle
  - d. Sulfur cycle
3. Lichens are a good indicator species. What can the type of lichen present in an environment indicate?
  - a. Amount of air pollution
  - b. Soil quality
  - c. Alkalinity
  - d. Moisture
4. Which of the following is NOT a name that can refer to an estuary?
  - a. Bay
  - b. Inlet
  - c. Cove
  - d. Shelf
5. In the following food web, what do birds act as?
  - a. Producers
  - b. Primary Consumers
  - c. Secondary Consumers
  - d. Both b and c

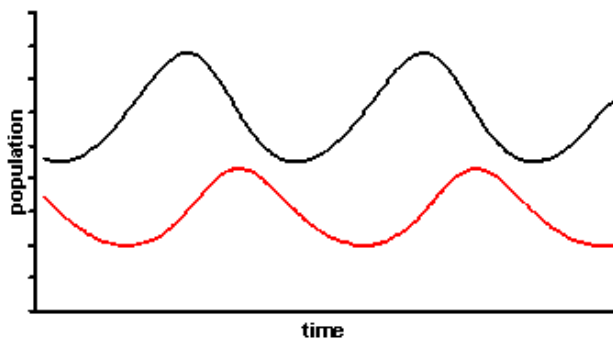


(Not drawn to scale)

6. Which type of forest has the greatest diversity of species?
  - a. Boreal forest
  - b. Temperate forest
  - c. Thermal forest
  - d. Tropical forest
7. An ecological interaction in which one species is helped, while the other is neither helped nor hurt, is called what?
  - a. Mutualism
  - b. Commensalism
  - c. Parasitism
  - d. Competition
8. A species that has an unusually important role in the structure of an ecological community is known as what?
  - a. Keystone species
  - b. Foundation species
  - c. Founder species
  - d. Indicator species

**Fill-In-The-Blank (all blanks worth 1 pt)**

9. In a trophic pyramid, the \_\_\_\_\_ decreases by a factor of \_\_\_\_\_ as you go up the pyramid.
10. Estuaries are characterized by \_\_\_\_\_ water, which is saltier than freshwater, but not as salty as seawater. This type of water has a salinity of about \_\_\_\_\_ %.
11. A grassland with scattered individual trees is known as a(n) \_\_\_\_\_.  
(HINT: This type of grassland covers nearly half of Africa.)
12. The following image displays a prey-predator relationship. The black curve (the top one) refers to the \_\_\_\_\_ (prey/predator).



Team Name \_\_\_\_\_ Team # \_\_\_\_\_

**Short Answer (points vary for each question)**

13. **Tiebreaker #4:** Draw a trophic pyramid with four layers, and label each layer of the pyramid with the trophic level it represents. (Do NOT include decomposers/detritivores as a level in the diagram) (4 pts)

14. Briefly explain how a lack of species diversity could negatively affect an ecosystem. (2 pts)

**Part II: Problems resulting from human impacts on the quality of our environment (28 pts)**

**Multiple Choice (all questions worth 1 pt)**

15. Which greenhouse gas is the main gas responsible for ozone depletion?
- a. Carbon dioxide
  - b. Methane
  - c. Nitrous oxide
  - d. Chlorofluorocarbons

16. The Great Green Wall is a project in Africa that consists of planting a wall of trees to try to prevent the spread of a particular environmental problem. Which is the main problem the Great Green Wall is aiming to prevent?
- a. Deforestation
  - b. Soil pollution
  - c. Air pollution
  - d. Desertification
17. The United States is monitoring its western coast for effects of radiation pollution. Which event is the primary concern for these concerns?
- a. Three Mile Island
  - b. Chernobyl
  - c. Fukushima Daiichi
  - d. Goiania
18. Air quality is measured by the Air Quality Index (AQI). In this scale, a value in the range of 151-200 corresponds to what type of air quality condition?
- a. Unhealthy for Sensitive Groups
  - b. Unhealthy
  - c. Very Unhealthy
  - d. Hazardous

**Fill-In-The-Blank (all blanks worth 1 pt)**

19. \_\_\_\_\_ is, generally, the most abundant greenhouse gas in the atmosphere.
20. The liquid that results after passing through a landfill, which contains dissolved and suspended materials, is referred to as \_\_\_\_\_.
21. Hypoxia refers to a lack of \_\_\_\_\_ in the water. It is more commonly referred to as a(n) \_\_\_\_\_.
22. Rain that has unusually high concentrations of hydrogen ions is called \_\_\_\_\_, and it has a pH \_\_\_\_\_ (less than/equal to/greater than) 7.

Team Name \_\_\_\_\_ Team # \_\_\_\_\_

**Short Answer (points vary for each question)**

23. Name two possible negative consequences that can result from overfishing. (2 pts)

24. On March 10, 2005, the Environmental Protection Agency (EPA) issued the Clean Air Interstate Rule (CAIR). This rule caps the emissions of two greenhouse gases in a particular region of the United States. Name the gases and the region. (3 pts)

25. Explain one problem with iron fertilization. (2 pts)

Team Name \_\_\_\_\_ Team # \_\_\_\_\_

26. **Tiebreaker #5:** Briefly name and describe three **environmental** techniques for responding to an oil spill. (3 pts)

27. What is a riparian buffer, and what is its main purpose in farming? (2 pts)

28. Hydraulic mining, a form of surface mining, was widely used during the California Gold Rush in the 1850s, but it is now heavily regulated. Name two environmental effects of hydraulic mining that helped lead to its regulation. (2 pts)

29. **Tiebreaker #3:** The 20 year Global Warming Potential (GWP) of methane is 56, and nitrous oxide traps 5 times as much heat as methane, if both are at equal concentrations. If 800 thousand metric tons of nitrous oxide were emitted in the past year, convert the emissions of nitrous oxide in the past year to metric tons of CO<sub>2</sub> equivalent. (4 pts)

**Part III: Solutions to reversing/reducing human impacts that harm our environment (24 pts)**

**Matching (each match is worth 1 pt)**

- |                   |  |
|-------------------|--|
| 30. Solar         | a. Is a nonrenewable energy source                         |
| 31. Wind          | b. Most common near boundaries between tectonic plates     |
| 32. Geothermal    | c. This type of energy is often generated offshore         |
| 33. Hydroelectric | d. Can be limited by clouds                                |
| 34. Natural Gas   | e. The most common renewable energy source in the US today |

**Fill-In-The-Blank (all blanks worth 1 pt)**

35. \_\_\_\_\_ is the type of composting where red worms are placed in bins with organic matter to break it down into a high-value compost. This high-value compost is also called \_\_\_\_\_.
36. The maximum speed for wind turbines is called the \_\_\_\_\_.



Team Name \_\_\_\_\_ Team # \_\_\_\_\_

37. \_\_\_\_\_ bioremediation is when the material being treated is treated away from the site.
38. There are \_\_\_\_\_ identification codes for recyclable plastics. The most common recyclable plastic is \_\_\_\_\_.

**Short Answer (point values given for each question)**

39. What is the main purpose of the Kyoto Protocol? (2 pts)

40. **Tiebreaker #2:** Describe bioremediation and provide two example scenarios in which bioremediation could be used. (3 pts)

Team Name \_\_\_\_\_ Team # \_\_\_\_\_

41. Why is *Pseudomonas putida* preferable for bioremediation purposes over other members of the *Pseudomonas* genus, such as *Psueodomonas syringae* and *Pseudomonas aeruginosa*? (2 pts)

42. What is the general purpose of a green roof? (2 pts)

43. **Tiebreaker #1:** Everyone can make a difference in sustainability. Choose one way you could improve the sustainability of your school, and describe a step-by-step process by which you could put this plan into place. Make sure it is realistic; this should be something you could actually do. (4 pts)