

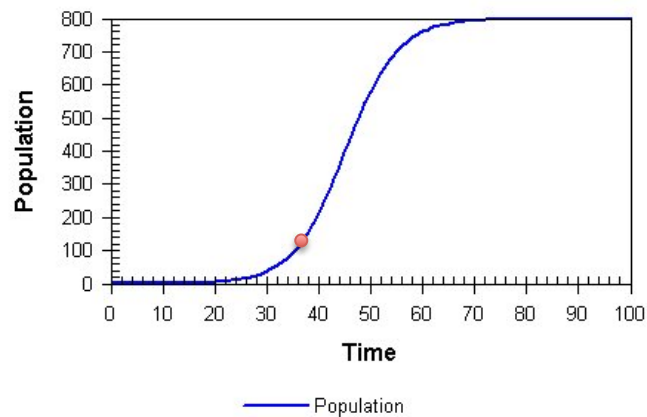
Name(s): _____

Score: ____/89

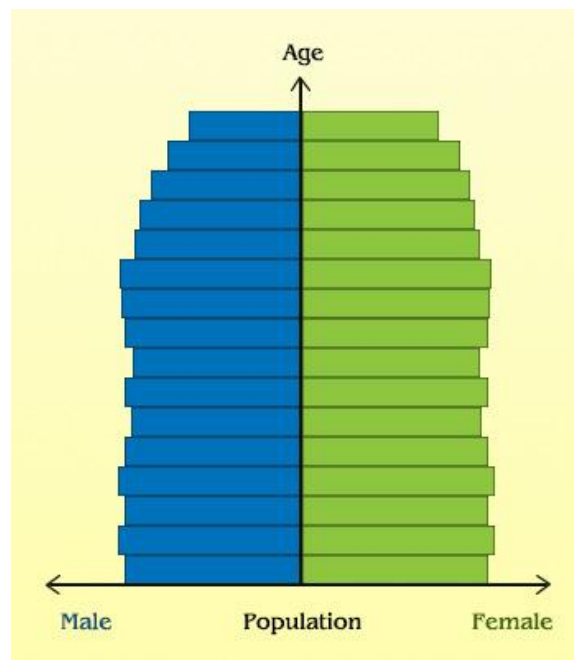
Green Generation 2016 – Key

I. General Principles of Ecology (Total Possible Points: 24)

1. (1 point) D
2. (1 point) Only ten percent of the energy makes it to the next trophic level of the pyramid.
3. (4 points) Population, community, ecosystem, biosphere
4. (4 points) Immigration, emigration, births, deaths
5. (1 point) A
6. (1 point) B
7. (1 point) See below



8. (2 points)



9. (1 point) B
10. (1 point) D
11. (1 point) C
12. (3 points) calcium, phosphorus, zinc, etc. (NOT oxygen, carbon, hydrogen, nitrogen)
13. (2 points) A food chain is linear, one-way; a food web depicts multiple paths.
14. (1 point) C

II. Problems (Total Possible Points: 25)

1. (1 point) B
2. (3 points) Chemical nature, concentration, persistence
3. (1 point) A
4. (1 point) A
5. (1 point) C
6. (1 point) D
7. (1 point) C
8. (1 point) D
9. (1 point) C
10. (2 points) Point source pollution is clearly identified; nonpoint comes from many different places.
11. (1 point) Regulated Medical Waste
12. (1 point) An open-forested area where no one is permitted to build.
13. (2 points; 1 for the example, another for explanation) In Japan, land is scarce, and incineration uses less land area than landfills do.
14. (1 point) B
15. (1 point) False
16. (1 point) They outcompete native species for resources and often have no natural predator.
17. (1 point) C
18. (1 point) D
19. (1 point) A
20. (2 points) **Possible answers:** Eutrophication/dead zones, depletion of organic matter in soil, harm to human health, water pollution, etc.

III. Solutions (Total Possible Points: 40)

- | | |
|---|-----------------|
| 1. (1 point) Sustainability is the ability to create and maintain the conditions under which humans and nature can exist in productive harmony to support present and future generations. | |
| 2. (1 point) D | 8. (1 point) B |
| 3. (1 point) G | 9. (1 point) E |
| 4. (1 point) J | 10. (1 point) C |
| 5. (1 point) K | 11. (1 point) H |
| 6. (1 point) F | 12. (1 point) A |
| 7. (1 point) I | |

13. (4 points; two for each method, one for “Prevention,” one for explanation) Prevention and clean up. Prevention is a better method because it’s a more affordable and permanent method than the clean up method.
14. (1 point) D
 15. (1 point) D
 16. (1 point) A
 17. (1 point) B
 18. (1 point) T
 19. (1 point) T
 20. (1 point) T
 21. (1 point) F
 22. (1 point) F
23. (1 point) T
 24. (1 point) T
 25. (1 point) F
 26. (1 point) F
 27. (1 point) F
 28. (1 point) F
 29. (1 point) T
 30. (1 point) T
31. (2 points) In the US there has been a mechanism for taxing polluting industries to form a Superfund to remediate abandoned sites, or to litigate to force corporations to remediate their contaminated sites.
32. (3 points) **Possible answers include:** Thermal desorption, Excavation or dredging, SEAR (surfactant enhanced aquifer remediation), Pump and treat, Solidification, Stabilization, In situ oxidation, Soil vapor extraction, Vapor condensation, Nanoremediation, Bioremediation
33. (2 points; 1 for example, 1 for explanation)

Possible answers include:

Microbial remediation uses microorganisms to either degrade organic contaminants or to bind heavy metals in more inert and less bioavailable forms. Microorganisms break down contaminants by using them as a food source or metabolizing them with a food source.

Phytoremediation works with the natural capabilities of plants to repair and regenerate toxic soils, groundwater and surface water. Plants can help bind, extract, transform and clean up many kinds of pollution including metals, pesticides, chlorinated solvents, polychlorinated biphenyls (PCBs), explosives, radionuclides and petroleum hydrocarbons. Plants clean up these forms of pollution as far down as their roots can grow. Plants also help prevent wind and rain from carrying pollution away from the site to other areas.

Mycoremediation. Fungi are powerful planetary healers and disaster responders. They are Nature’s decomposers, responsible for breaking down most of the Earth’s plant and woody material into life giving soil. Just like they break down complex carbon based plant cell structures, like cellulose and lignin, saprophytic fungi use their digestive enzymes to break down chemicals like hydrocarbons and pesticides. Fungi can break down larger hydrocarbon chains into smaller pieces, allowing for microorganisms and plants to get to work. Fungi can also extract and hyperaccumulate heavy metals, concentrating them in the fruiting body of the fungi (what we know as the visible mushroom). Using fungi for bioremediation and earth repair requires a large amount of mycelium. Mycelium refers to the ultra-fine and dense network of branching thread-like white hyphae that is the vegetative part of the fungi. It is the mycelia that send out the enzymes that break down chemicals, and that also act as a filter, among many other things. In order to do effective bioremediation work and mycoremediation installations, a lot of mycelium is needed, and this can be challenge to most grassroots bioremediators.