

AP Environmental Science Summer Enrichment

Part 1: Read the article “The Tragedy of the Commons” by Garrett Hardin from one of the websites listed below. After reading type a 500-1000 word summary and response to the article. You may use the questions below to guide you through your response.

Websites:

http://www.garretthardinsociety.org/articles/art_tragedy_of_the_commons.html

<http://www.sciencemag.org/content/162/3859/1243.full>

<http://dieoff.com/page95.htm>

Tragedy of the Commons contemplation questions:

Briefly explain "The Tragedy of the Commons presented in the article.

Describe five resources that this analogy could represent.

How does population growth, factor into The Tragedy of the Commons?

Is the freedom to breed sacred, or are there any legitimate reasons you can see for limiting fecundity?

What does Hardin mean by Mutual Coercion Mutually Agreed upon?

What does it mean when Hardin says there are no technical solutions to a particular problem?

Explain how Hardin comes up with the statement that "The optimum is, then, less than the maximum.

Explain how Hardin would seek to solve the problem of population growth; be sure to include what coercion has to do with it.

Part 2: Environmental Science Vocabulary Scavenger Hunt: For this part of your summer assignment, you will be familiarizing yourself with science terms that we will be using at different points throughout the year.

➤ **Select and “collect” 20 words/terms from the list on the next page**

When I say “collect”, I mean you should collect that item by finding it and taking a **photograph** (digital or paper printed) or making a **sketch** of that item. You will create a unique way to present your “collection” **along with corresponding explanations**. You can do a number of different ways, PowerPoint, Microsoft Word, or by creating an actual photo album.

You do not need to find the exact item on the list, say for example, if it is an internal part to an organism, but you must apply the term to the specimen you find and explain in your finished project how this specimen represents the term.

➤ **EXAMPLE:**

If you choose the term “mutualism”, you could submit a photograph you have taken of a bess beetle then explain in your project that bess beetles have a mutualistic relationship with fungus. The bess beetle chews up decaying wood and excretes it in its feces. The fungus then grows on the waste further releasing nutrients. The bess beetle then eats the further processed feces to receive the nutrients.



Figure 1: Bess Beetle chewing up decaying wood.

➤ **ORIGINAL PHOTOS/SKETCHES ONLY:**

You **cannot** use an image from any publication or the Web. You must have taken the photograph (or made the sketch) yourself. The best way to prove that is to place an item in all of your photographs that only you could have added each time. I would like for you to make a small sign of your name that will be in each photo/drawing.

➤ **NATURAL ITEMS ONLY:**

Specimens may be used for only one item/word, and all must be from something that you have found in nature. Take a walk around your yard, neighborhood, and town. **DON'T SPEND ANY MONEY!** Research what the term means and in what organisms it can be found... and then go out and find one.

➤ **TEAM WORK:**

You may work with other students in the class to complete this project, but **each student must turn in his or her own project** with a unique set of terms chosen.

Terms:

- | | | |
|---------------------------------|-----------------------------------|----------------------------------|
| 1. abiotic | 2. energy | 3. niche |
| 4. adaptation of a plant | 5. erosion | 6. nonpoint source pollution |
| 7. adaptation of an animal | 8. eutrophication | 9. overexploitation |
| 10. aerobic | 11. extinction | 12. parasitism |
| 13. affluenza | 14. feedlots | 15. pesticides |
| 16. agriculture | 17. first law of thermodynamics | 18. pH |
| 19. air pollution | 20. fossil | 21. photosynthesis |
| 22. alternative energy | 23. fossil fuel | 24. pioneer species |
| 25. anaerobic | 26. generalist | 27. point source pollution |
| 28. anthropogenic | 29. genes | 30. pollinator |
| 31. autotroph | 32. genetically modified organism | 33. predator |
| 34. biodiversity | 35. greenhouse effect | 36. primary succession |
| 37. biomagnification | 38. greenhouse gasses | 39. productivity |
| 40. biomass | 41. habitat | 42. r-strategist |
| 43. biome | 44. habitat fragmentation | 45. runoff |
| 46. carbon | 47. half-life | 48. second law of thermodynamics |
| 49. carcinogens | 50. heterotroph | 51. secondary succession |
| 52. carrying capacity | 53. immigration | 54. silviculture |
| 55. climate | 56. invasive species | 57. specialist |
| 58. commensalism | 59. irrigation | 60. speciation |
| 61. conifer leaf | 62. keystone species | 63. sprawl |
| 64. deciduous leaf | 65. K-strategist | 66. subsidy |
| 67. density dependent factor | 68. landfill | 69. sustainable development |
| 70. density independent factor | 71. mineral | 72. thermal pollution |
| 73. ecosystem services | 74. monoculture | 75. trophic cascade |
| 76. ecological/carbon footprint | 77. mutation | 78. urbanization |
| 79. ecotone | 80. mutualism | 81. watershed |
| 82. emigration | 83. natural resources | 84. weathering |

This assignment is due the second week of class. Any student handing in the assignment the first day of class will receive 10 bonus points. You can email me at cbernardelli@bcps.org if you have any questions. Enjoy your summer.