Water, Water, Everywhere

**COMPETENCIES TO MASTER**

* Can identify and explain key concepts in environmental science, such as water, carbon, nitrogen and phosphorus cycling and biodiversity
* Can identify and explain the basic principles of population ecology, such as population growth and distribution
* Can identify major environmental problems
* Can analyze and critique leading solutions to major environmental problems
* Can identify and analyze ethical issues presented by scientific and technologic developments
* Can solve practical problems using measurements such as time, temperature, distance, length and volume

**Overview**

Human activity changes the natural environment, and now there are more humans than ever. In fact, there are over seven billion people in the world, and people make, use and throw out a lot of stuff. How does all of that affect the environment, and what, if anything, should we do about it? In this Project, you will create a report that addresses these questions by tracking the journey of a single use water bottle from its beginnings as raw materials all the way through its transportation and consumption to its disposal.

**Directions**

As office manager, you are responsible for directing what the Food Services Department supplies at breakfast and luncheon meetings. For drinking water, you can choose to purchase water bottles or serve chilled tap water and ice served in reusable water pitchers and glasses. You have already determined that the difference in cost is negligible, so you can choose based on a different factor: environmental impact. Of course, your boss will want to know how you came to your decision. So, you will produce a report, supported by research and mathematical calculations.

First, complete the Water Bottle Tracking Worksheet. Then, create a report in which you discuss effects of human actions on the environment related to the water bottle life cycle. The calculations you make on the worksheet will give you some ideas and figures to supplement your discussion specific to transportation; other resources will offer different angles of approach for your analysis. You may include charts, diagrams or other graphics to enhance your materials, but be sure to write in your own words and cite sources as necessary.

In your report:

1. Describe the cycles of four chemicals essential to life on earth: water, carbon, nitrogen and phosphorus. Be sure to use appropriate key terms and explain them in your own words. Consider:
   1. How do the cycles normally function?
   2. How does the production cycle of water bottles change each of the cycles?
2. Explain biodiversity and how it is affected by human transportation (that is, transportation-related systems such as trucking and manufacturing) as detailed in the worksheet and other resources.
3. Explain the logisitic population-growth model. How do humans live in relation to this model? How does this affect the environment?
4. Select four different variations from the normal processes identified in parts 1, 2 and 3 above. Offer at least one possible restorative measure for each variation, explaining how each measure could mitigate negative effects on the processes you described.
5. Analyze each restorative measure critically by addressing the following questions:
   1. What benefits would each measure have?
   2. What drawbacks might result from adopting a given intervention?
   3. What kinds of complications could make the adoption difficult?
6. Identify and discuss at least three different ethical issues that face humans (as consumers, citizens, businesses or governments) due to human population growth and/or consumption of resources. Consider the information and ideas you have developed in researching the topics above, as well as the results of the Water Bottle Tracking Worksheet.

Any sources of information are cited using APA format,

## Project Resources

**POPULATION ECOLOGY**

Click on the Population Growth link at the top of the page to find information about population ecology.

<http://web.archive.org/web/20150318003127/http://www2.estrellamountain.edu/faculty/farabee/BIOBK/BioBookpopecol.html>

**Plastic Water Bottles Causing Flood of Harm to Our Environment**

This article explores facts and misconceptions about bottled water production and use.

<http://web.archive.org/web/20150905062257/http://www.huffingtonpost.com/norm-schriever/post_5218_b_3613577.html>