Life Cycle Analysis Homework Assignment (worth 8 points)

The purpose of a Life Cycle Analysis (LCA) is to allow producers and consumers of products to understand the full environmental costs of products over their life time. LCAs result in full and honest accounting and do not allow shifting environmental impacts from one part of the life cycle to another. For example, it may appear that one product is better for the environment because it generates less solid waste than another. However, after performing an LCA, it might be determined that while one product produces more solid waste, it may be actually result in less overall environmental harm or impact—including impacts on energy, water, air, and land--over its lifetime compared to another product.

In class, we discussed the elements of a complete LCA. In this assignment, you will evaluate the completeness of two LCAs available online. Your evaluation will be based on your assessment of the comprehensiveness of the approach each analysis takes to evaluating all the potential impacts a product might have. You will fill in the chart at the end of this assignment with information provided by the LCAs on the different life cycle phases and then write a short paper.

First, evaluate the information presented for the two LCAs found at these links:

The first link is to a comparison of paper and plastic bags:
http://www.washingtonpost.com/wp-dyn/content/graphic/2007/10/03/GR2007100301385.html?referrer=emaillink

The second is a comparison of different drinking cups types:
http://www.ilea.org/lcas/hocking1994.html

Your focus should be on the completeness of the analysis approach. Recall that a complete Life Cycle Inventory (LCI) for an LCA should include analysis of these four components:

1) Raw Materials Acquisition - The harvesting of trees or the mining of nonrenewable materials are examples of raw materials acquisition. Transportation of these materials from the point of acquisition to the point of processing is also included in this stage.
2) Manufacturing - During the manufacturing stage, raw materials are transformed into a product or package. The product or package is then delivered to the consumer. The manufacturing stage consists of these steps: materials manufacture, product fabrication, and filling/packaging, and distribution.
3) Use/Reuse/Maintenance - This stage involves the consumer's actual use, reuse, and maintenance of the product. This includes energy demands and environmental wastes from product storage, use (or multiple uses), and consumption. The product or material may need to be reconditioned, cleaned, repaired, or serviced so that it will maintain its performance.
4) End of Life (Recycle/Waste Management) - The recycle/waste management stage includes the energy requirements and environmental wastes associated with disposal, recycling or reuse of the product or material.

Next, after reviewing the LCAs, **fill in the chart** (page 3).

Finally, **write a short paper** (no more than 3 pages) with these sections:

Introduction, in which you summarize the purpose of LCAs and why they are important, with a focus on globalization of materials and the transport of goods.

Body of the paper, in which you describe the completeness of the two LCAs you just reviewed. Describe them one at a time and talk about what is insightful about the analyses and what parts may be missing. For the paper versus plastic LCA, briefly discuss the largest environmental impacts of each type of bag and give any solutions presented by the LCA or that you may see when evaluating the LCA yourself.

Conclusion, in which you discuss how LCAs may play a role in the design of products to deal with life cycle impacts and how LCAs might result in changing our habits with respect to using certain products.

The paper should be typed, using 12-point font, 1-inch margins on all sides, and 1½ spacing. **Attach the chart to your paper.**

Assignment due in TWO weeks at the BEGINNING of class!

	Cup Comparison LCA	*Paper vs. Plastic LCA*
LCA Goal and Scope		
LCI: Raw Materials Acquisition		
LCI: Manufacturing		
LCI: Use/Reuse/Maintenance		
LCI: End of Life (Recycle/Waste Management)		
Impact Analysis		
Improvement Analysis		