

Life Cycle Analysis to Design a Better Product

From children's toys to coffee mugs, most products in our modern world are very complex. The raw materials they are made from come from a wide variety of places and sources. Each of these materials involves different processes, inputs, and outputs to make what we want. Each step along the way has environmental impacts. In order to determine the total impact of a product you must perform a Life Cycle Analysis.

You will be tracing a common, everyday, product from its birth (as raw materials) through to its final disposal. During this process you will research and analyze:

- the extraction of raw materials
- the design
- production of the material
- production of the various parts that make up the product
- its use
- final disposal of the product

1. What product are you going to analyze and redesign? _____.

Actually performing the life cycle analysis is made of three major steps: inventory analysis, impact analysis, and evaluation.

I. Inventory Analysis & Impact Analysis: Examine all of the inputs and outputs in a product's life cycle, beginning with what product is composed of, where those materials came from, where they go, and the inputs and outputs related to those component materials during their lifetime. It is also necessary to include the inputs and outputs during the product's use, such as whether or not the product uses electricity. The purpose of the inventory analysis is to quantify what comes in and what goes out, including the energy and material associated with materials extraction, product manufacture and assembly, distribution, use and disposal and the environmental emissions that result.

2. Fill in the following chart with information from your research. Inputs would include: gas required to mine materials, water required, manpower, danger for miners, chemicals used to make plastics, gas required to haul out trees, etc. Outputs would include pollution created from processes, water water produced, leftover wood, etc. Where possible put specific statistics about your inputs and outputs.

	Inputs	Outputs
Raw Material Extraction/Creation (mined, produced in a lab?)		

Production of the Materials & Parts (farmed, factory, etc)		
Use of the Product (does it require batteries, energy, etc?)		
Disposal of the Product (how is it disposed of by most people?)		

II. Evaluation. Using the above information, create an illustration of the life of your product. This should cover at least three pages or a small posterboard. Be sure to include all of the major steps involved in making your item and the most important inputs and outputs are each step. At each step, evaluate the environmental impact of the product.

III. Redesign. Using everything that you have learned about the product, redesign this product so that it has fewer environmental impacts. For example, if my product was a basic ball point pen, I might redesign it so that is made of a renewable resource rather than plastic.

→It is important to remember that the more complex an item is, the more difficult it is to reuse or recycle it.

→It is also important to think about source reduction and how your product will need to be disposed of. Illustrate your redesign on your poster