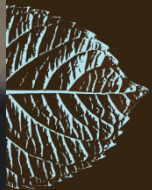
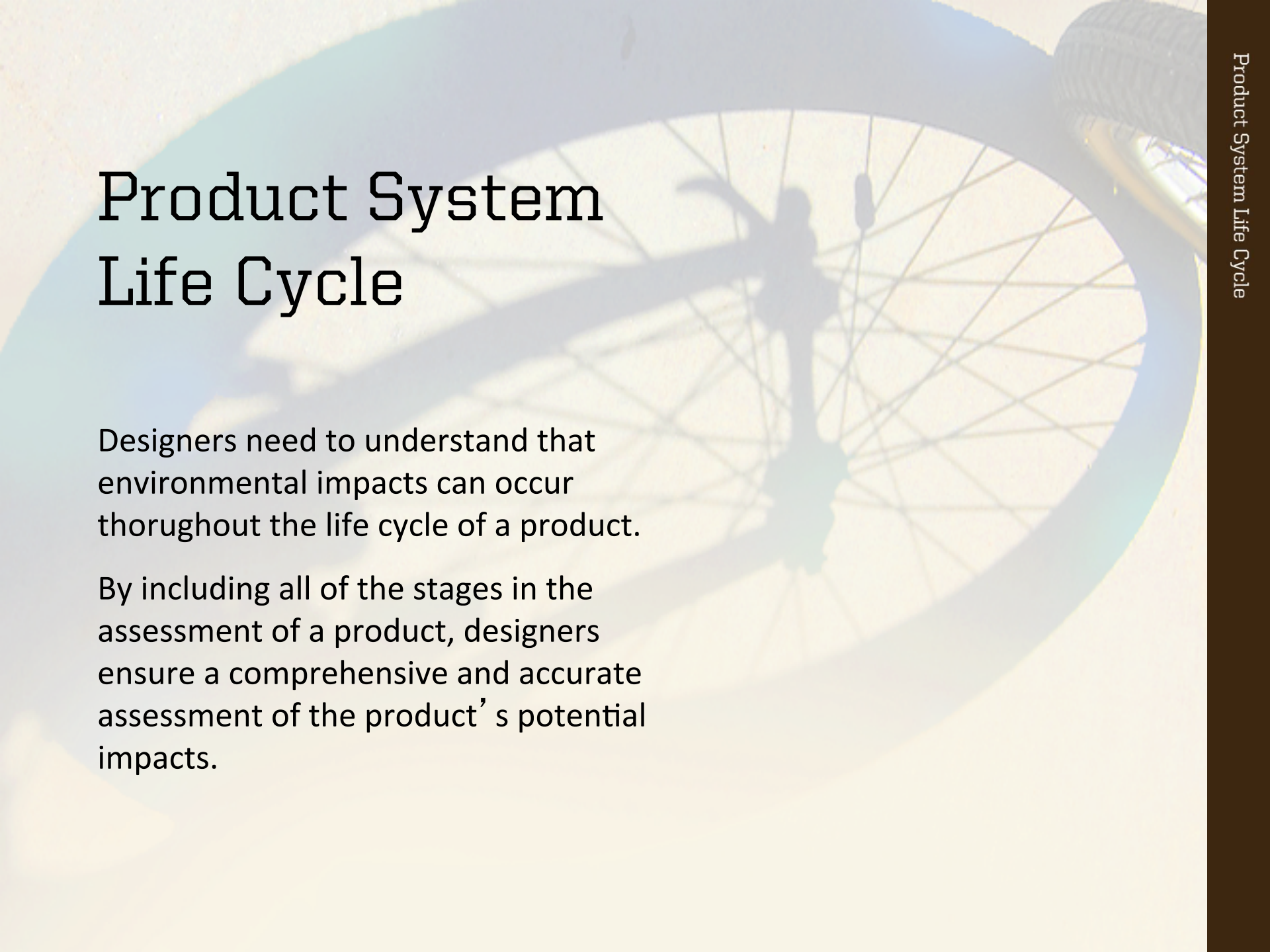




Product System Life Cycle



Okala Practitioner Chapter 1

A large, semi-transparent blue circle is overlaid on the image. Inside this circle, the shadow of a bicycle wheel and its spokes is cast onto a light-colored surface. The shadow is dark and clearly defined, showing the intricate pattern of the spokes and the hub. The background is a soft, light-colored surface, possibly a wall or floor, with a subtle texture.

Product System Life Cycle

Designers need to understand that environmental impacts can occur throughout the life cycle of a product.

By including all of the stages in the assessment of a product, designers ensure a comprehensive and accurate assessment of the product's potential impacts.

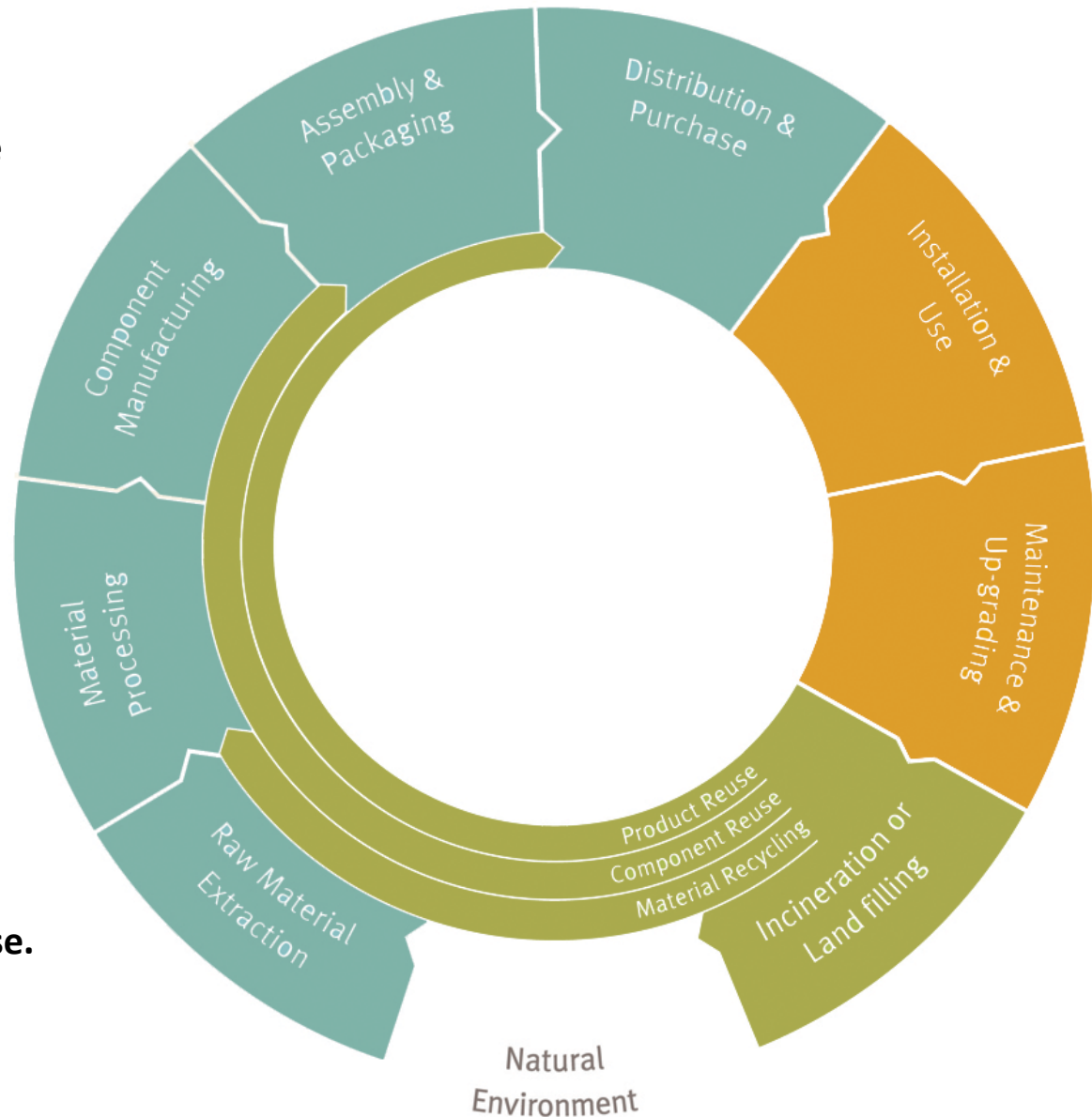
Phases in a product's life cycle

Raw material extraction	Wood from forest, oil from well, metal ore from mine, etc.
Material processing	Wood to paper, oil to plastic, ores to metal alloys, etc.
Component manufacturing	Paper printed, plastic molded, alloys into circuitry, etc.
Assembly & packaging	Product is assembled and packaged with documentation.
Distribution & purchase	Product is distributed and purchased.
Installation & use	Energy and additional materials may be used.
Maintenance & upgrading	Product cleaned, parts replaced or upgraded.
Transport (among all phases)	Via train, truck, car, automobile, sea vessel or airplane.
Reuse, recycling or composting	Product or component reuse or material recycling.
Incineration or landfilling	Product or components are burned or buried in landfill.

Phases in a product's life cycle

Every phase in the lifecycle can require energy and additional material inputs, as well as give emissions to air, water or soil.

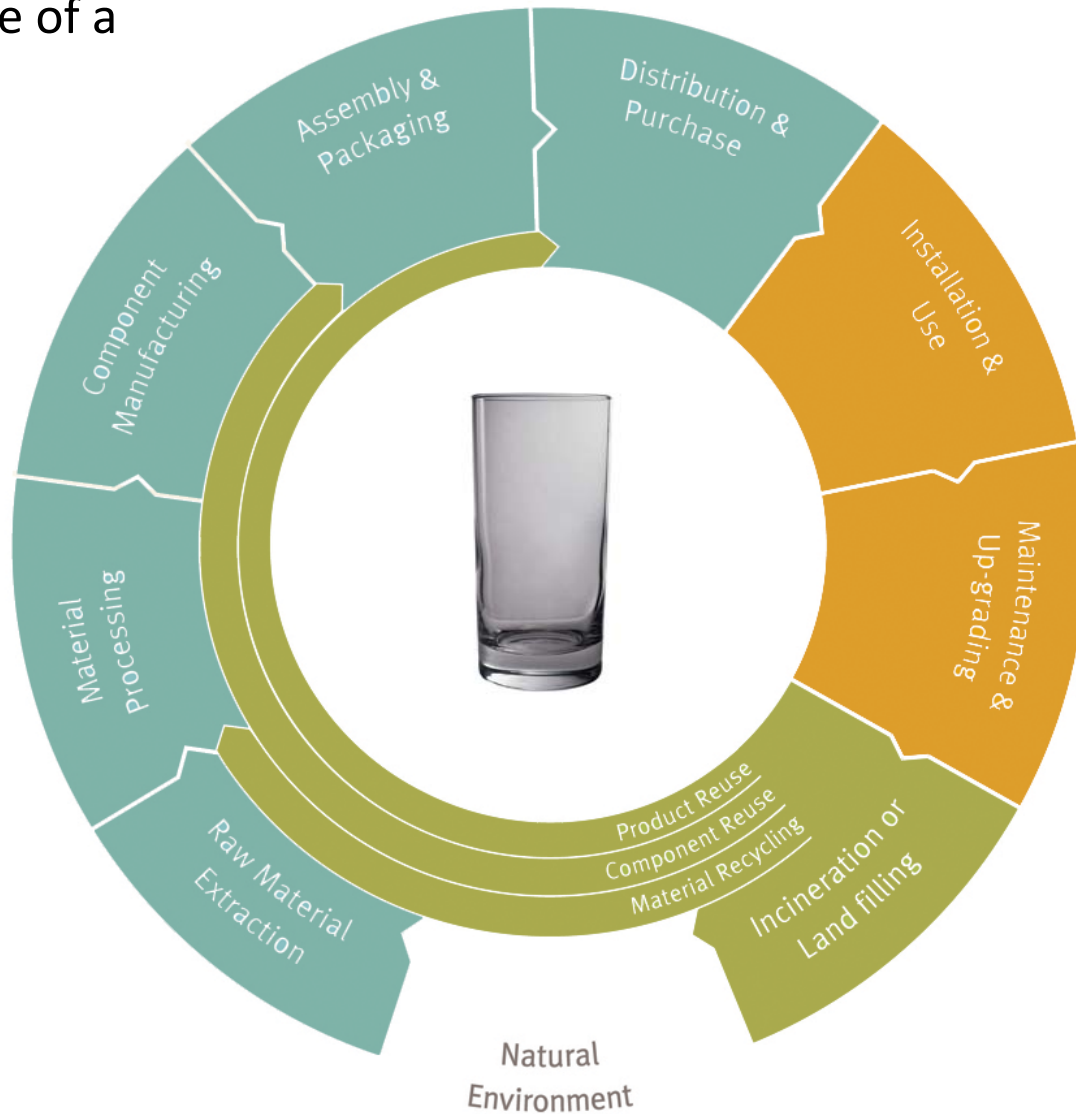
Additionally, the components or the product may be transported between phases or within each phase.



Example:

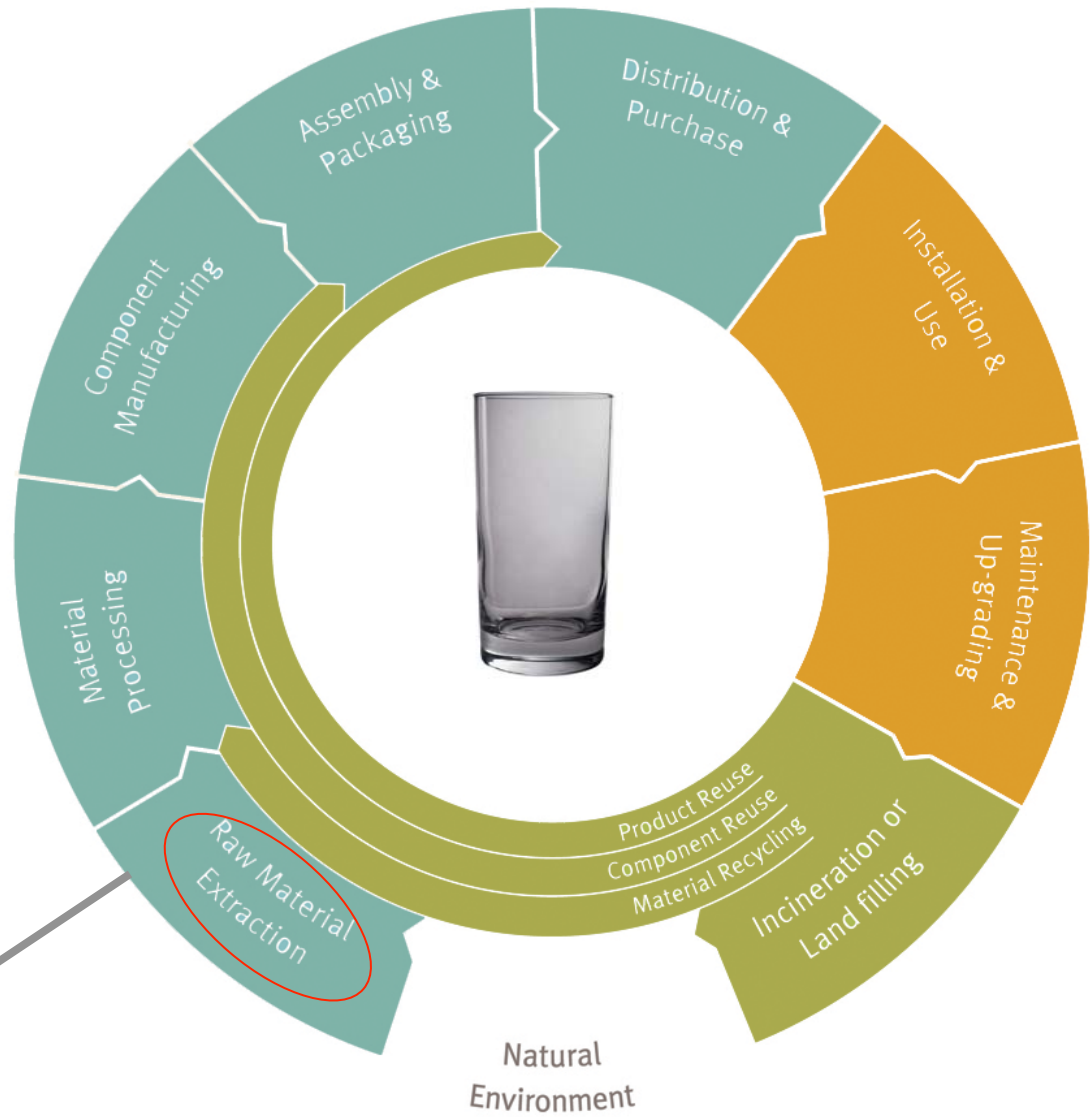
What are the phases in the life cycle of a

glass cup?



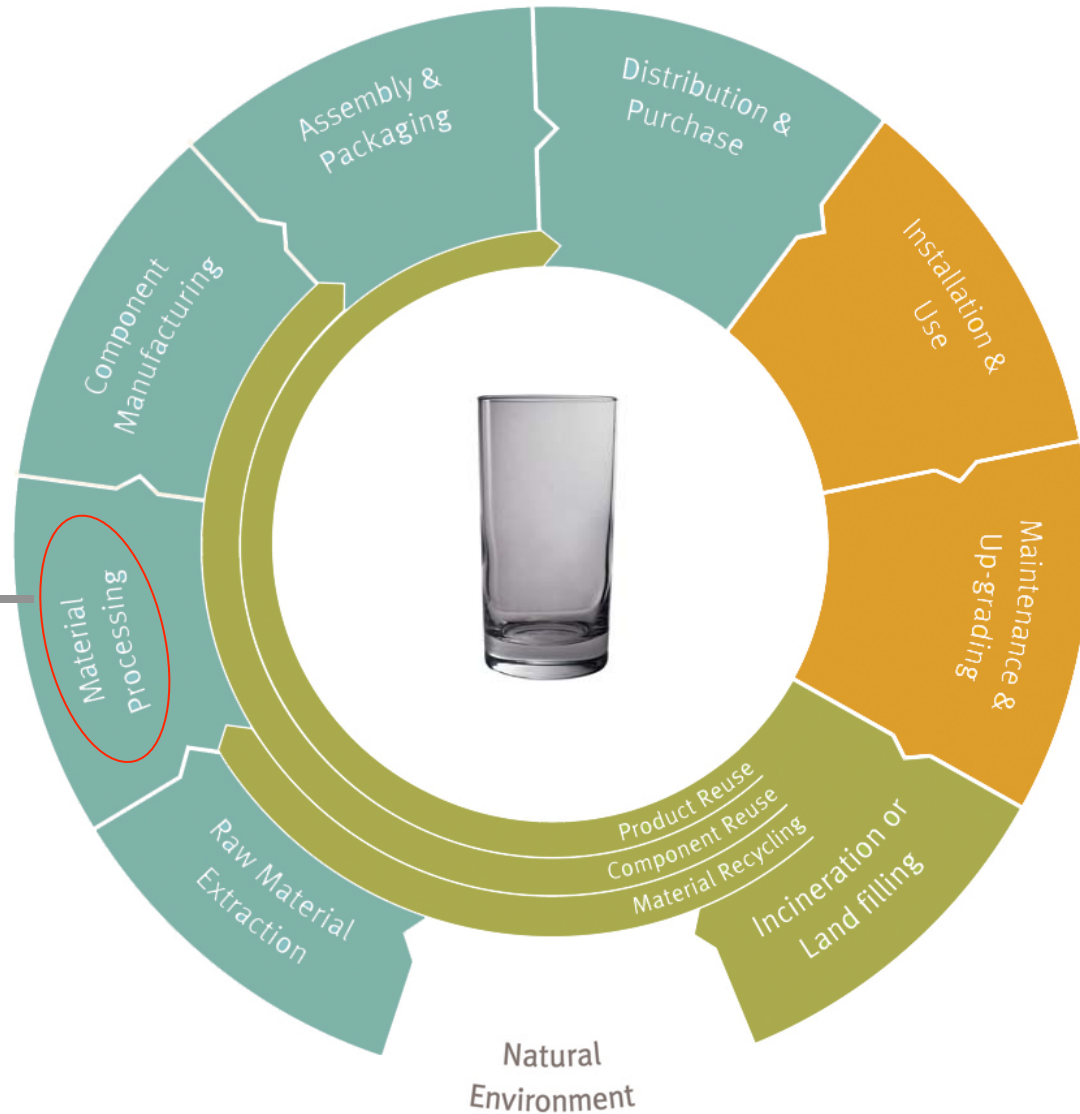
Material Extraction

Mining sand and lime from the Earth.



Materials Processing

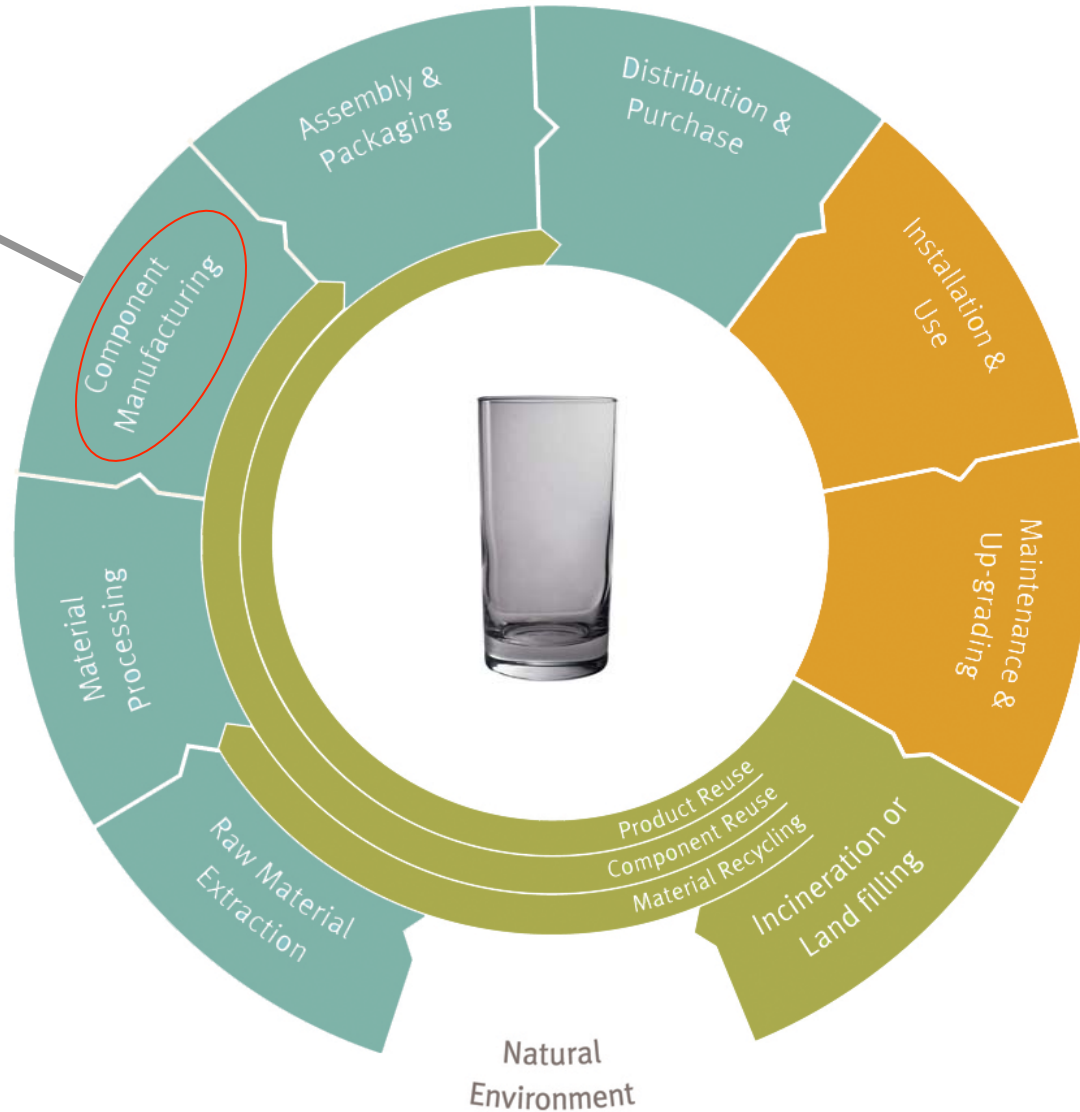
Cleaning raw materials and processing them into glass.



Natural Environment

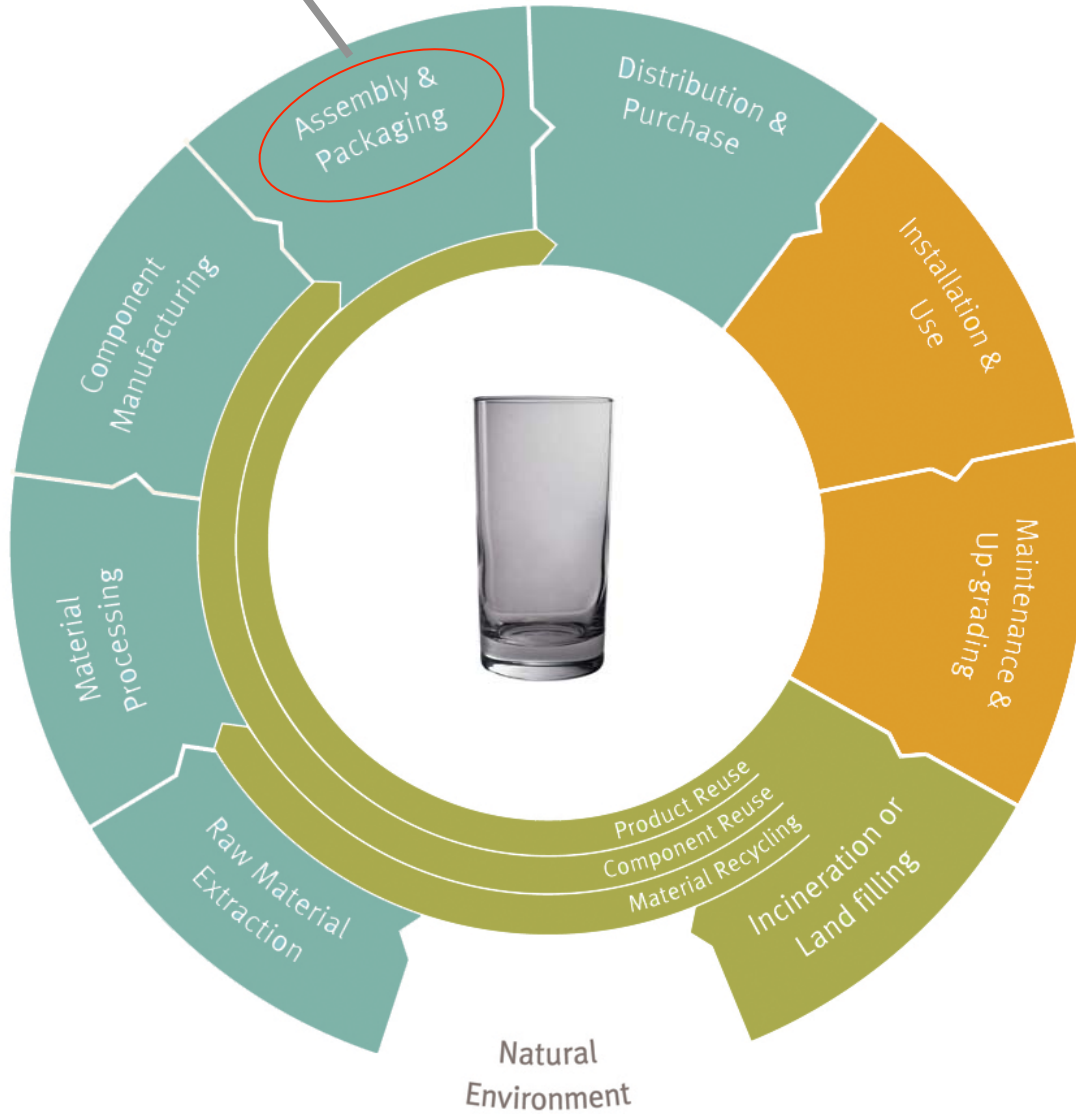
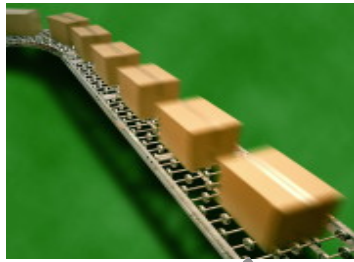
Component Manufacturing

The material is formed into a drinking glass.



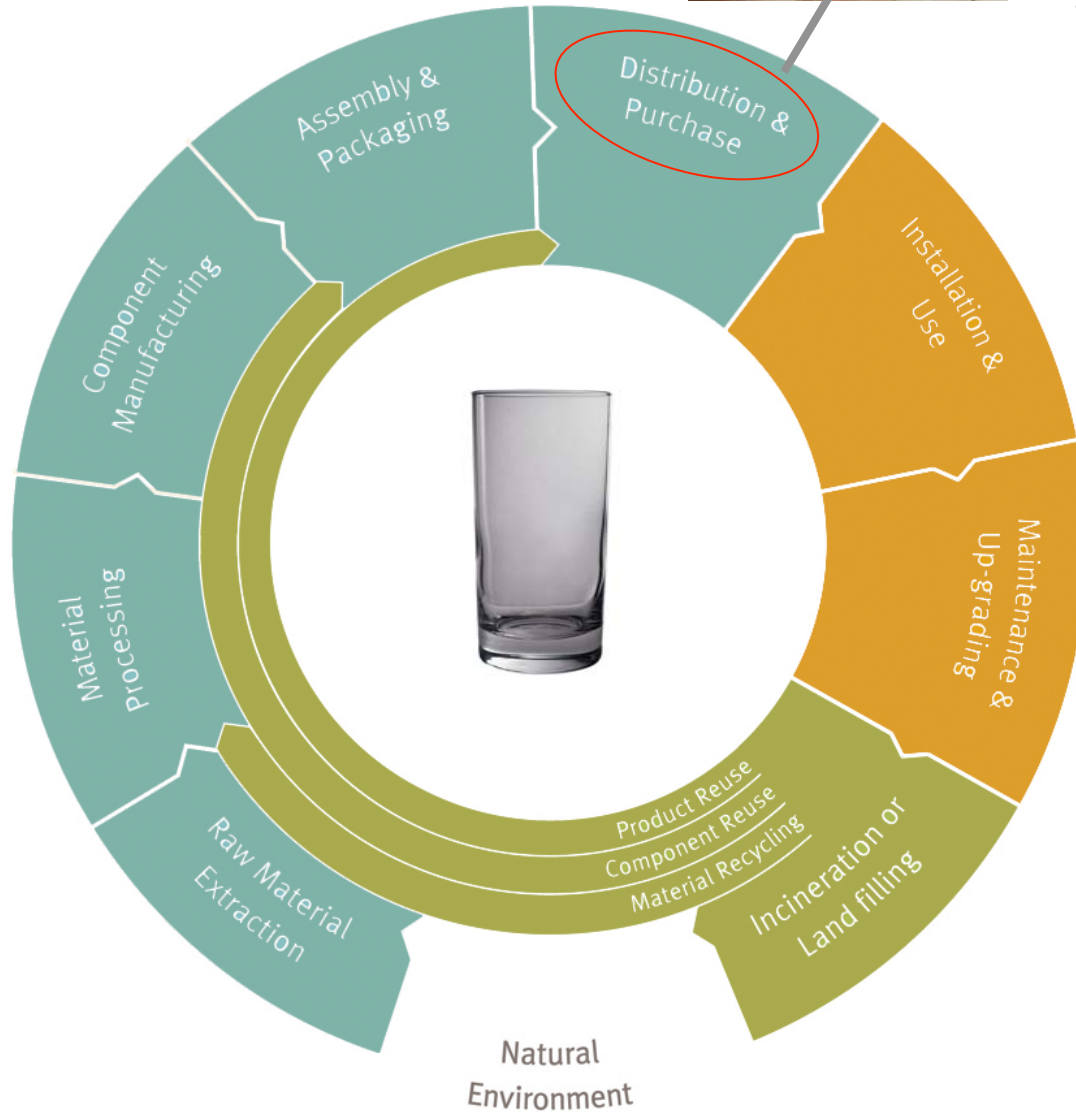
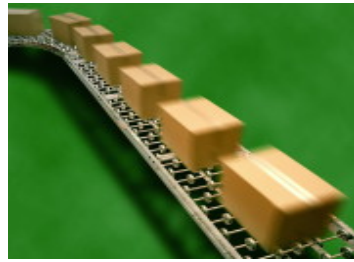
Assembly and Packaging

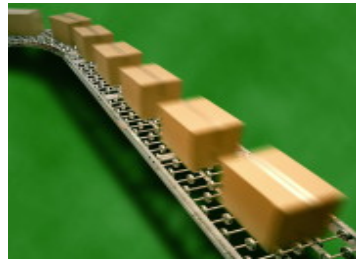
Boxing the drinking glass .



Distribution and Purchase

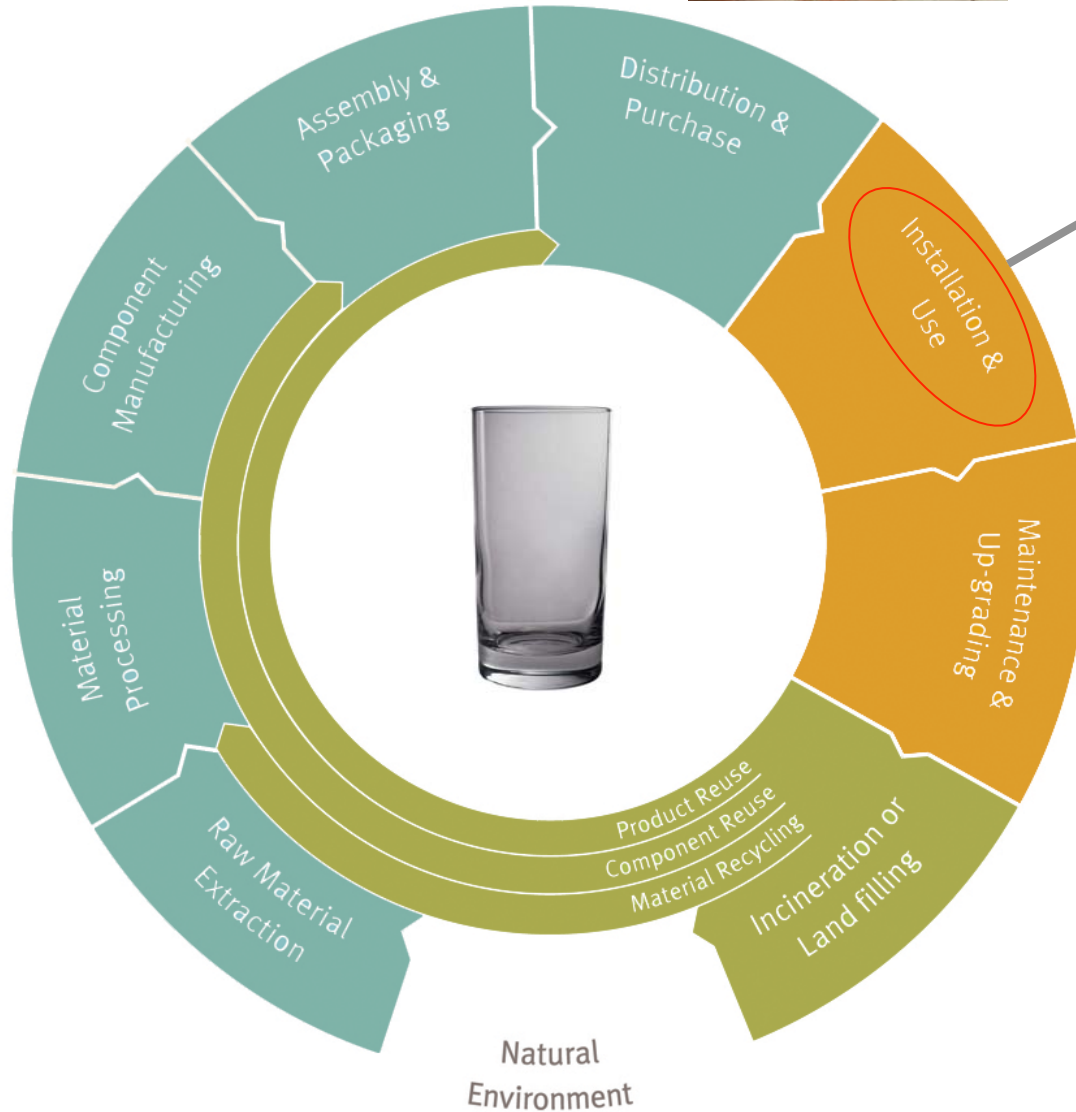
Distributing and purchasing the glass.

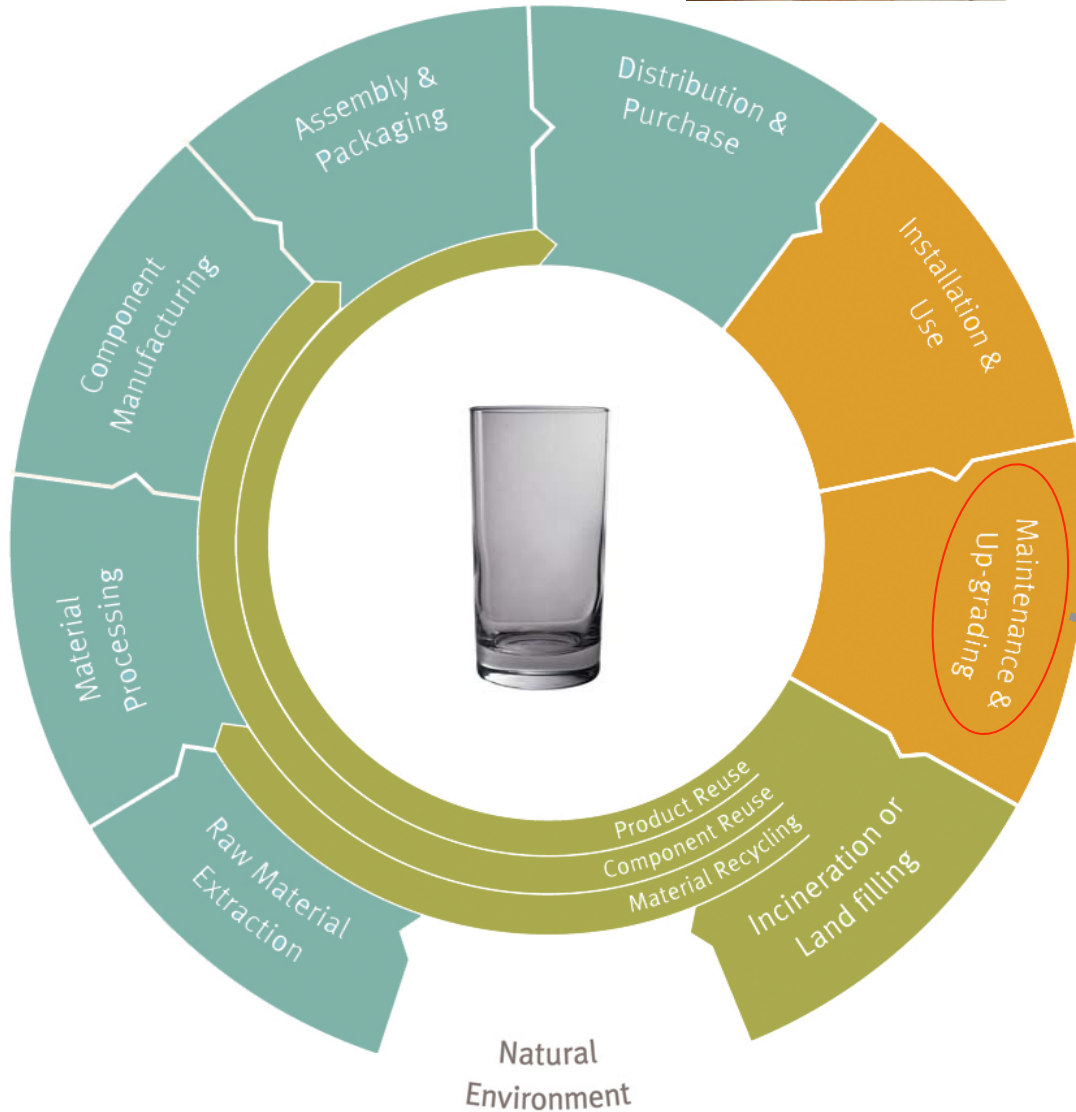
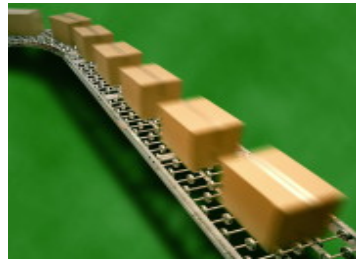




Installation and use

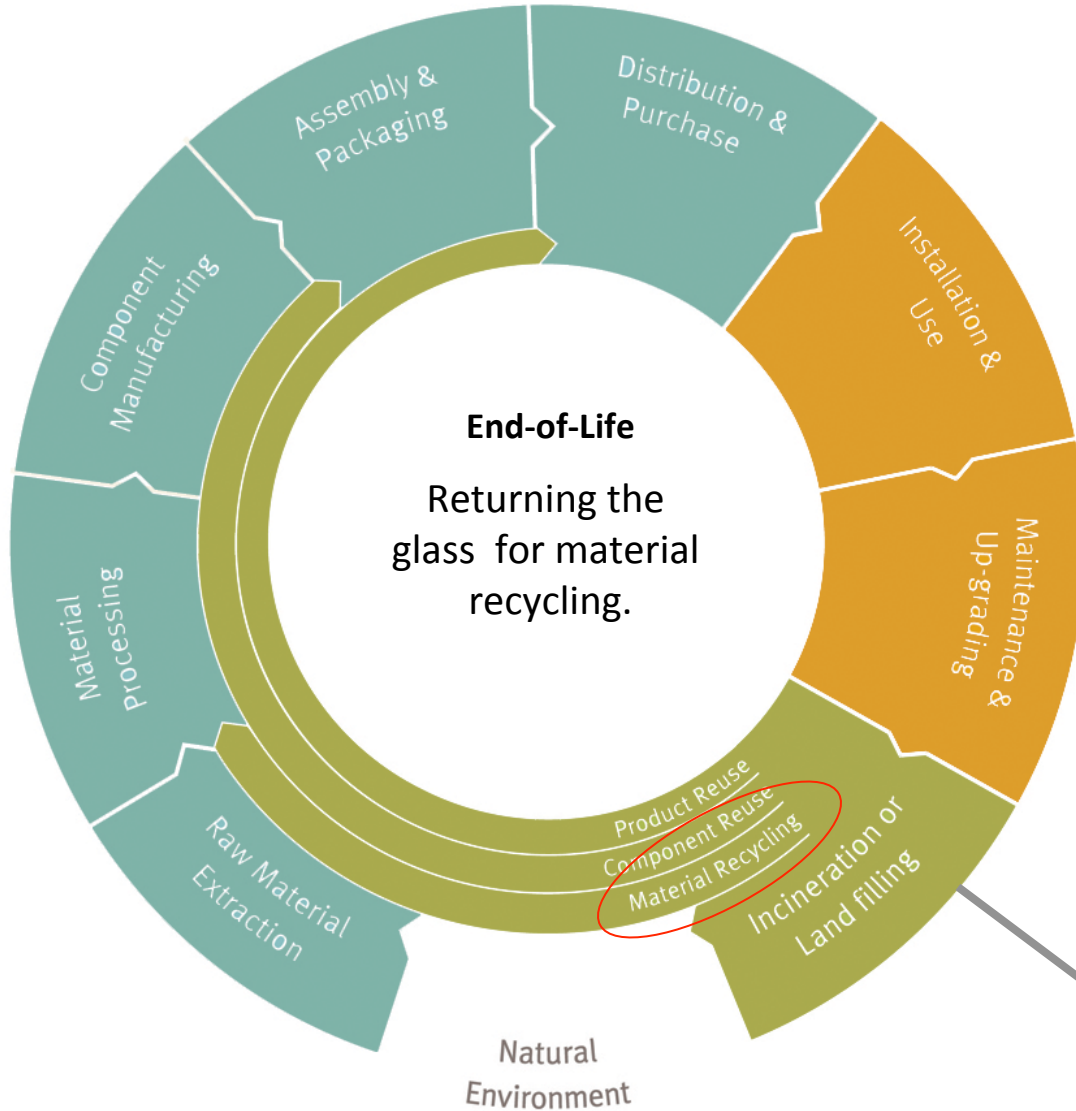
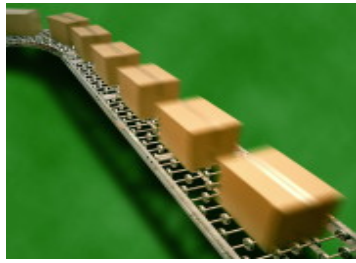
People drink from the glass.





Maintenance and upgrade

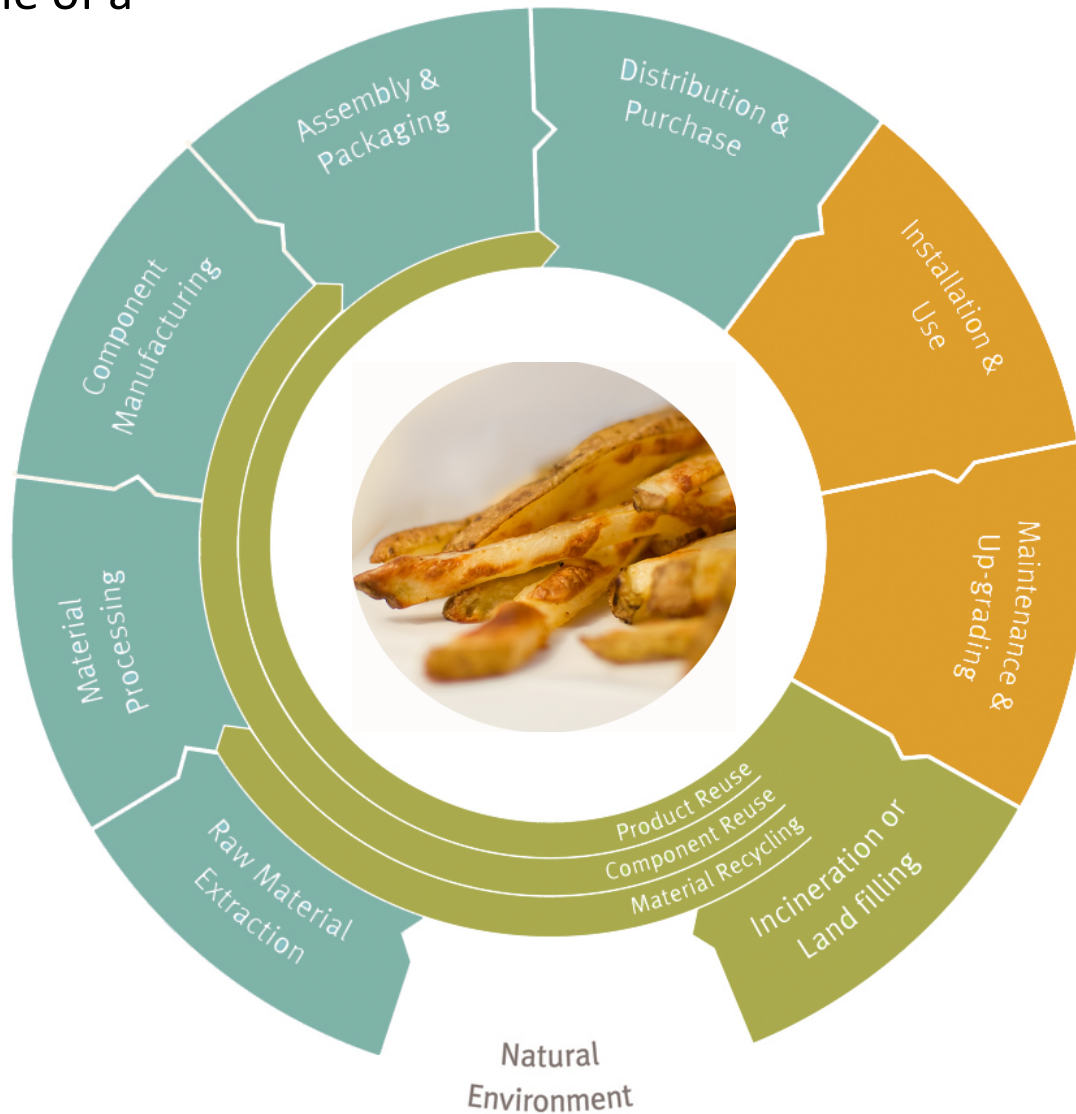
Washing and reusing the glass many times.



Discussion:

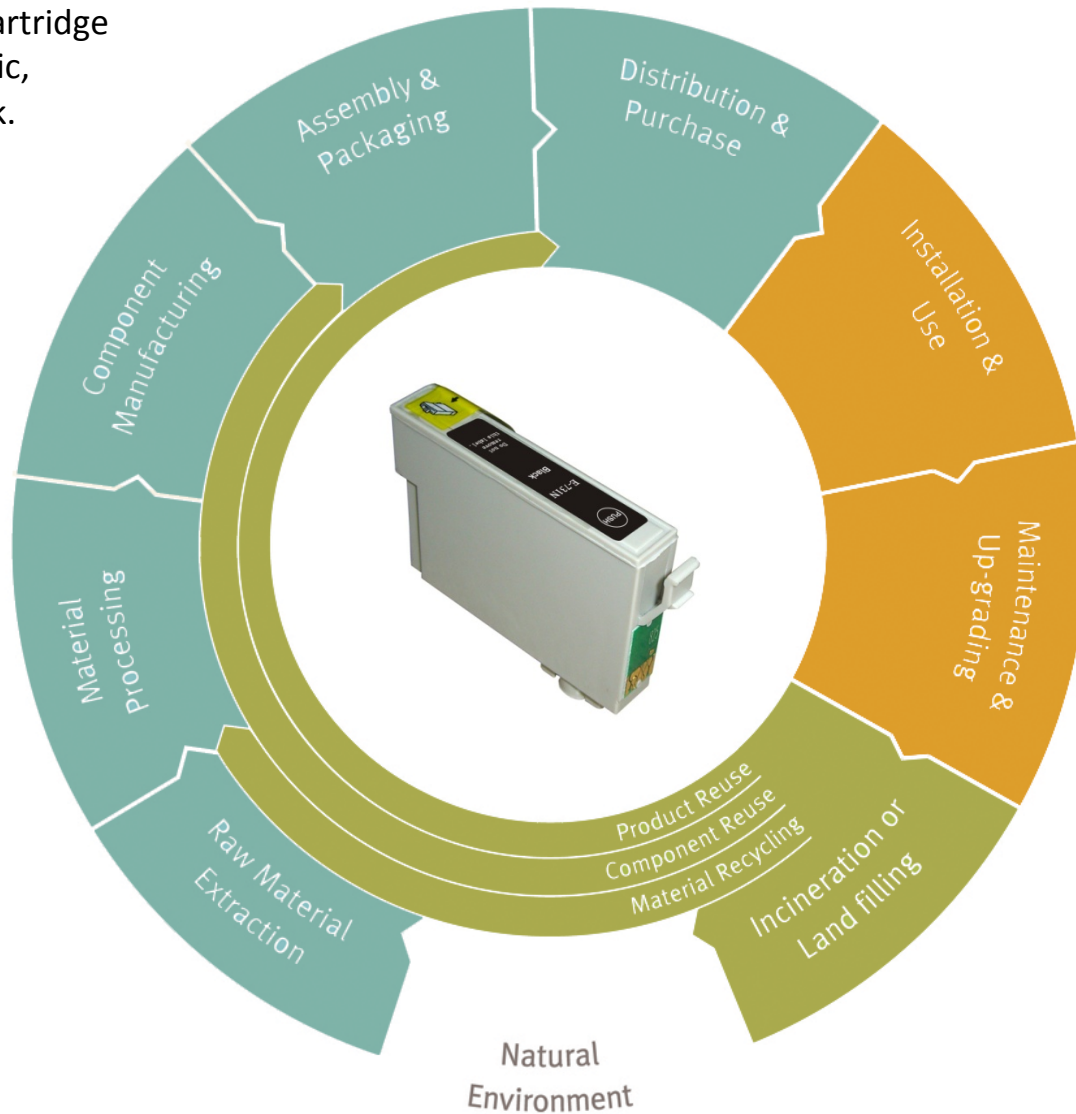
What are the phases
in the life cycle of a

French fry?



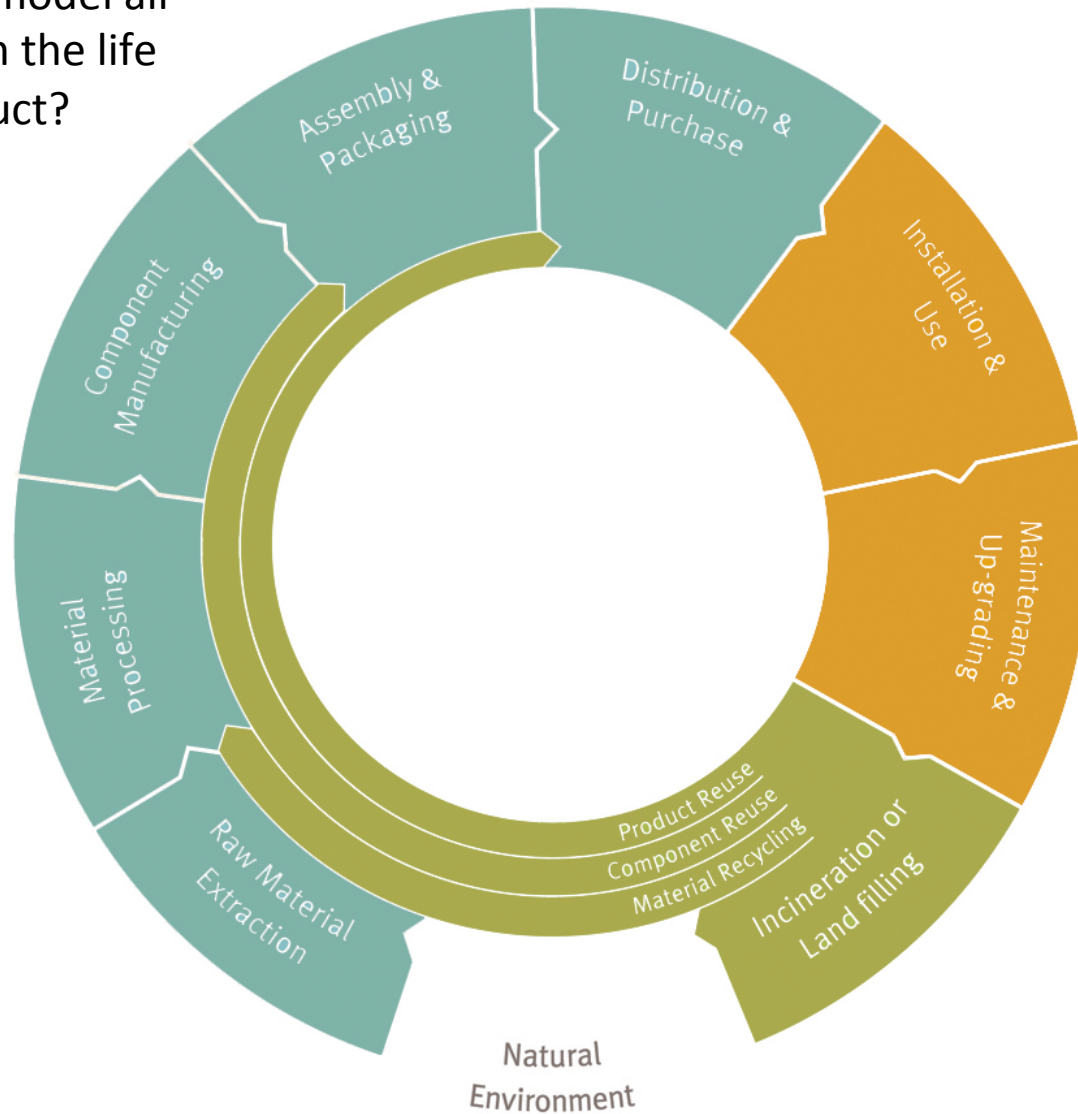
What are the phases in the life cycle of an ink cartridge?

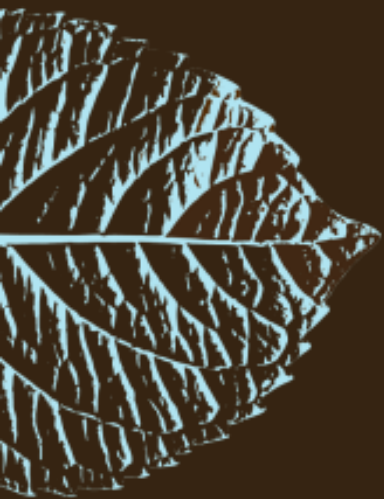
Assume that the cartridge is made from plastic, tin circuitry and ink.



Discussion:

Why should we or should we not model all of the phases in the life cycle of a product?





Okala Practitioner

Integrating Ecological Design

This presentation is part of an educational presentation series that supports teaching from the *Okala Practitioner* guide.

Okala Practitioner and these presentations were created by the Okala Team to disseminate fact-based knowledge about ecological design to the design disciplines and business.

Unless provided in the presentations, Information sources are found in the *Okala Practitioner* guide.

The Okala Team:

- Philip White IDSA Associate Professor, Arizona State University
- Louise St. Pierre Associate Professor, Emily Carr University of Art + Design
- Steve Belletire IDSA Professor, Southern Illinois University Carbondale

The Okala Team initiated the collaboration with the US EPA and the Industrial Designers Society of America (IDSA) in 2003. The team developed *Okala Practitioner* with support from Autodesk, IBM, Eastman Chemical and the IDSA Ecodesign Section.

Okala Practitioner is available through amazon.com.

More information and the free *Okala Ecodesign Strategy App* are found at Okala.net.

Copyright © 2014, Okala presentations are free for educational uses, but fully protected from unlicensed commercial reproduction or use. Okala™ is a registered trademark of the Okala Team