

The background features a complex network diagram with numerous nodes connected by thin lines, creating a web-like structure. In the top left corner, there are two large arrows: a dark blue one that curves from the left edge and a purple one pointing towards the right.

System Design for Sustainability

July-October 2023

Week 4

TA: Arti Agarwal

Lifecycle Assessment

Functional Unit (fU)

A functional unit defines the primary function of the product system being studied and provides **a clear basis for comparison**. It's a quantified measure of the function of the studied system, ensuring that comparisons are made on a consistent basis.



Drinking Water:

Functional Unit: 1 liter of potable water delivered to a consumer. This ensures that when comparing different methods of water purification or sourcing, you're always comparing the environmental impacts per liter of drinkable water produced.

Photo from [Rescript](#)

Paper:

Functional Unit: Production of 1000
A4 sheets of paper.

This allows a comparison between,
say, recycled paper and non-recycled
paper based on a set number of
sheets.



Photo by [Brett Sayles](#)



Light Bulb:

Functional Unit: 1000 hours of lighting at a luminosity of 800 lumens.

When comparing LED bulbs to incandescent bulbs, for instance, this ensures you're comparing the environmental impacts based on the same amount of light produced over the same duration.

System Boundary

System boundary is defined both spatially and temporally. It is decided by the person doing the LCA, and chosen based on the purpose of the LCA, type of product and its lifecycle.

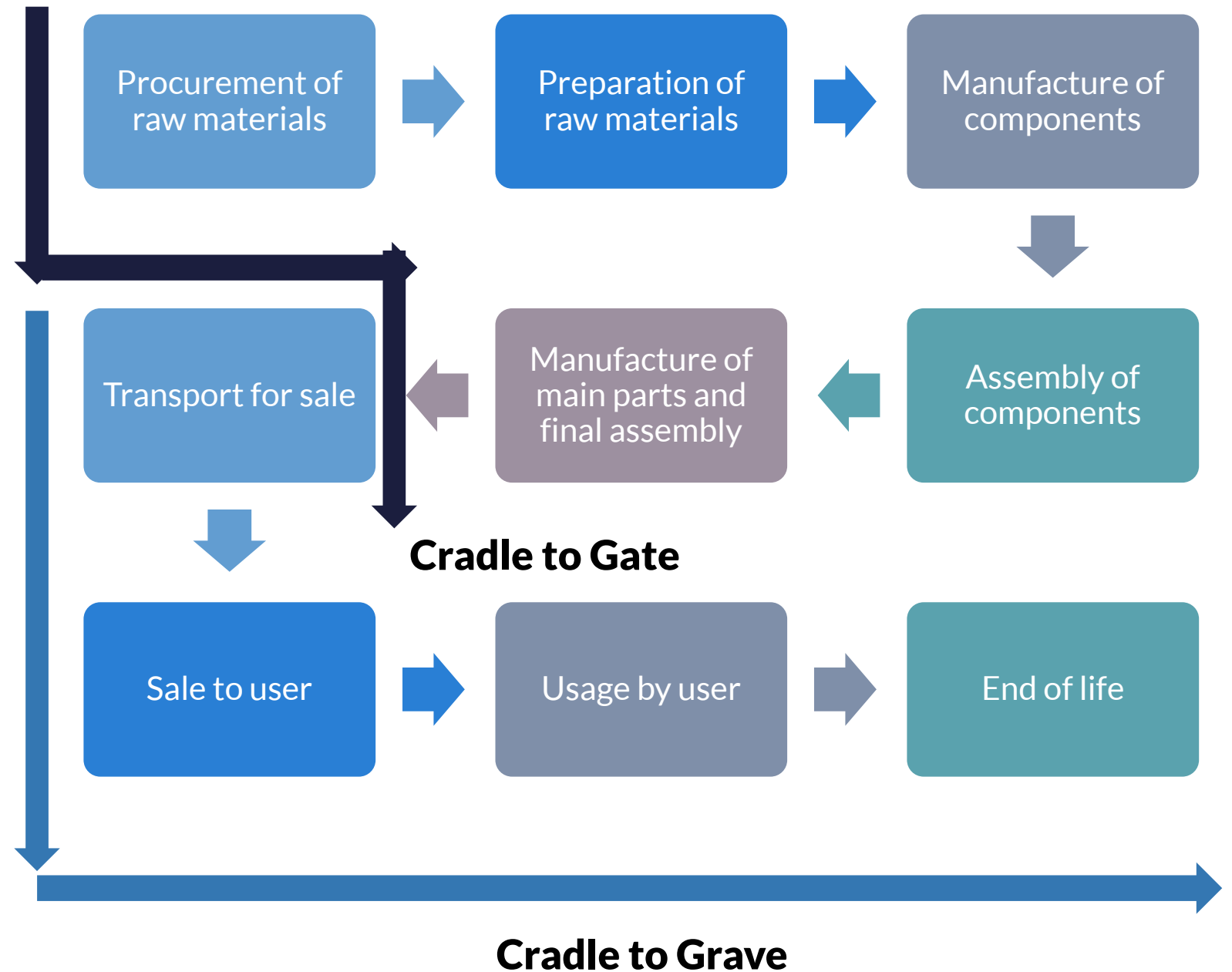




Photo by [Taryn Elliott](#)

LCA of a ceramic mug, which is upcycled to make a new material after its breakage.

The system boundary ends with the end of life of the mug in “cradle to grave” system. If the mug parts are recycled or upcycled, they can be counted in the lifecycle of the next product but will not be included in “cradle to grave” analysis for the mug.

“Cradle to gate” ends with the packaging of the product. Transport and further steps are not included.

Cradle to Grave

