**Lesson Plan: Lecture 10**

**Life Cycle Assessment**

**Description**

In this lecture students will learn about Life Cycle Assessment. The lecture covers the standard framework, theory and real examples of Life Cycle Assessment. LCA is complex process and the purpose of this class is to introduce them to the importance and strengths of performing Life Cycle Assessments.

**Prior to Lecture**

Optional/ Supplemental Readings:

* Guidance on Life-Cycle Thinking and Its Role in Environmental Decision Making, Sustainable Materials Management Coalition, March 2014, <https://www.michaeldbaker.com/wp-content/uploads/2014/03/Guidance-on-Life-Cycle-Thinking-031014.pdf>

Additional resources for more in-depth discussion of LCA:

* OpenLCA: an open source and free software for Sustainability and Life Cycle Assessment, <http://www.openlca.org>

Videos:

* [Life Cycle Assessment Video](https://youtu.be/KrJUpSiCOoU)

**Topics to Cover in Lecture**

* Life Cycle Assessment (LCA)
* LCA Framework
* Limitations of LCA
* Circular Economy

**Class Exercise**

* In-class exercise: Understanding where materials come from. Students are asked to use a simple on-line tool to explore the materials flow of petrochemicals. Steps include:
  + Identify another polymer in the list of materials (from the i-STAT blood analysis cartridge) and investigate where it comes from using the following web page by PetroChemicals Europe, <https://www.petrochemistry.eu/interactive-flowchart/>
  + Create a simple graphic with the flow from petroleum source to the final polymer material.
  + What other aspects of this process should be considered beyond just the materials?
    - Lead a discussion on other considerations of the process beyond materials extraction and processing. Other considerations include energy use in the processing (for heating, cooling, cracking, etc.), transportation costs, etc.