**Lesson Plan: Lecture 12**

**Renewable Feedstocks for Energy**

**Description**

In this lecture students will learn about the role chemistry has on providing a sustainable future. The lecture covers the topic of energy and more sustainable approaches for energy consumption.

**Prior to Lecture**

Required Readings:

Optional/ Supplemental Readings:

* Clark, J.H., Luque, R., Matharu, A.S., Annu. Rev. Chem. Biomol. Eng., 2012, 3: 183-207, <https://www.ncbi.nlm.nih.gov/pubmed/22468603>
* “Agriculture: Beyond food versus fuel”, Graham-Rowe, D., Nature, 474, S6-S8, 2011, <https://www.nature.com/articles/474S06a>
* “Introduction: Next generation biofuels”, Fairley, P., Nature, 474, S2-S5, 2011, <https://www.nature.com/articles/474S02a>
* “Ethics of Biofuels”, by Sharon Astyk, Resilience, originally published by Energy Bulletin, December 28, 2006, <https://www.resilience.org/stories/2006-12-28/ethics-biofuels/>
* “Grass Makes Better Ethanol than Corn Does”, Scientific American, Biello, D., January 8, 2008, <https://www.scientificamerican.com/article/grass-makes-better-ethanol-than-corn/>
* “Switchgrass may unlock the future of biofuel”, March 3, 2017, Silke Schmidt, University of Wisconsin – Milwaukee, <https://phys.org/news/2017-03-switchgrass-future-biofuel.html>

**Topics to Cover in Lecture**

* Petroleum industry
  + Energy sources
  + Energy consumption & demand
  + Meeting the future energy demands
* Biofuels
  + First Generation
    - Corn-based ethanol
    - Biodiesel
  + Second generation biofuels
    - Cellulosics, oils, grasses
  + Third and Fourth generation biofuels
    - Algae

**Class Exercise**

None