Assignment #1 – Due 1/31/11

Sophomore Engineering Clinic II
Algae and Biofuels

Part One: Research Biofuels from Algae

Read the review article, "Biodiesel from microalgae" by Yusuf Chisti. This will provide a start for your research about biofuels from algae. Prepare 5 slides on relevant background and introduction material that will be included in your final presentation.

Groups will be selected at random to present these slides on Monday, January 31st, but all groups must submit a printout of their slides at that time.

Part Two: *Scenedesmus Dimorphus* Growth

All teams will begin their algae studies by measuring the growth of *Scenedesmus Dimorphus*. Read the technical paper by Xin et al. entitled "Growth and lipid accumulation properties of a freshwater microalga *Scenedesmus* sp. under different cultivation temperature." Answer the following questions as a team, turn in a single copy with all teammates' names on Monday, January 31st, and be prepared for an *individual* quiz about this paper on Monday, January 31st.

Question 1: TRUE or FALSE: Nutrient limitation is a method of increasing lipid production in algae. If this statement is false, briefly explain why.

Question 2: Why did the authors choose to vary temperature?

Question 3: How many hours a day did the algae have light?

Question 4: How many different temperatures did the authors use? What were these temperatures?

Question 5: Did the authors replicate their experiments? Why would using replicates be helpful?

Question 6: How did the authors measure algal density (the y-axis in Figure 1)?

Question 7: How often did the authors make measurements of algal density?

Question 8: Explain how the specific growth rate, μ, is calculated.

Question 9: Which temperature had the highest growth rate? Which temperature had the lowest growth rate?

Question 10: Was the lipid content higher at lower temperatures or high temperatures? How did the triglycerides (TAGs) content per lipid vary with temperature?

Question 11: What temperature produced the most saturated fatty acids?

Question 12: The authors believe that 20ºC is the optimal temperature for growing *Scenedesmus* sp. LX1. Do you agree? Why or why not? Support your answer with data from the paper.