

**EVE 290**  
**Introduction to Environmental Engineering**  
**Fall 2011**  
**Homework #19**

1. Microbial growth is dependent on a number of different factors. Do you think that maximum growth is more readily achieved in a laboratory setting, or under typical environmental conditions? Why?
2. Describe the condition of a primary clarifier one day after the raw sludge pumps break down. What do you think would happen?
3. The following data were reported on the operation of a wastewater treatment plant:

<b>Constituent</b>	<b>Influent [mg/L]</b>	<b>Effluent [mg/L]</b>
BOD <sub>5</sub>	200	20
SS	220	15
P	10	0.5

- a. What percent removal was achieved for each constituent?
  - b. What kind of treatment plant would produce such an effluent? Draw a block diagram showing the configuration of the treatment steps.
4. What pollutants are regulated by the EPA's National Ambient Air Quality Standards (NAAQS)? What are the concentration limits and averaging times? What are some of the consequences of an area being deemed "nonattainment" for one or more of the NAAQS?
  5. Besides the ones mentioned in class, name two primary biogenic pollutants and two secondary anthropogenic pollutants.
  6. Estimate the volume of air you have breathed in your lifetime.