

Department of Geosciences Dr. K.S. McNeal
Biogeochemical Cycles and Processes
Spring 2009

HW#2 – Wino Column Report Rubric

SCORE (0-20)	Rubric Category	Expectations
	Biogeochemical Processes	Does the student describe the Winogradsky column? Did the student apply the results of their Winogradsky column to biogeochemical processes? Did the student show specific chemical equations? Does the student have an accurate and complete understanding of the system and of related biogeochemical principles? Are there misconceptions present about the system and biogeochemical principles? Are proper terms used? Does the student consider multiple potential reactions and microbial growth responses to manipulated conditions? Does the student attempt to describe what type of conditions or microbial communities may be present in their columns? Are these speculations reasonable and is an explanation provided as to why they came to this conclusion? Does the student reference measurement techniques that would need to be employed to verify these speculations?
	Biogeochemical and Microbial Research Methods	Does the student describe the usefulness/limitations of laboratory experiments (and the employed qualitative study) and discuss possible direct measurement and characterization methods that could have been utilized had resources and time not been limited? Does the student show an understanding of how these measurements may have been useful had they been employed?
	Scientific Inquiry Method	Did the student state a hypothesis? Did the student include details of the experimental design? Does the student's experimental design appropriately address the hypothesis? Did the student include results (e.g., actual photos) of the experiment? Does the student make reasonable interpretations of the qualitative data collected? Did the student include a description of the soils used and describe where they were collected (e.g., a USDA soil map of the area)? Did the student use scientific logic and reasoning to justify results? Did the student determine possibilities for deviations from original expectations?
	Communication of Findings	The student's product is easily understood and coherent. Includes appropriate components of a scientific paper (i.e. background, research objectives /hypothesis, materials/methods, study area description, observations/results, conclusions/explanations, and references). Product shows creativity and organization. Grammar is appropriately used and sentences are complete.
	Inclusion of References, Comparison to other Research Results, and Application to Natural Systems	Did the student make comparisons to controls, other groups' results, or previous studies? Did the student include references to substantiate their claims? Does the student describe how the modified system is different/similar to the natural Earth system? Does the student include what they might expect to observe in the natural system?

TOTAL: _____ (Out of 100)

Department of Geosciences Dr. K.S. McNeal
Biogeochemical Cycles and Processes
Spring 2009