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How to use Learning Outcomes (11 & 19 June 2018), Certificate of Teaching & Communication Workshop Series

Draft learning outcomes, Freshwater Ecology Lab Course

1. Practice and become proficient with commonly used field and lab methods for freshwater data collection.
2. Distinguish between physical, chemical, and biological properties of freshwater systems and describe how they are related.
3. Identify research questions and apply appropriate methods of data collection to address them.
4. Develop and test hypotheses about freshwater systems by analyzing data collected during lab sessions.
5. Write lab reports using scientific writing style that include the question/problem addressed, your hypotheses, methods of data collection and analysis, appropriate summary of results, and discussion of your findings.

Learning outcome for an individual class period (lecture + lab): Describe how physico-chemical properties of water (e.g., light, temperature, pH, dissolved oxygen) change with depth in a lentic (lake/pond) system, and discuss any relationships between these properties. (Assume stable summer conditions.)

Assignment for Learning Outcomes Workshop part 2:

How would I assess these learning outcomes? Draft an assessment for one learning outcome. Assessment can be formal/graded or informal (e.g., observation or low risk work (credit/no credit)).

To assess this learning outcome for a Freshwater Ecology course, students will sketch conceptual models of each property against depth. In lecture, students will work in groups of 4 for ~ 20 minutes. Each student will sketch and describe one of the four properties (light, temperature, pH, dissolved oxygen); group discussion of additional information related to each property, followed by group discussion and discovery of how properties are related. Discovery = after exhausting knowledge, refer to notes/textbook for additional information. No books allowed for the first 10 minutes. Then come together as a class; have all those assigned to each a property tell the class what they know. (For example, student 1 for temperature sketches how temperature changes with depth; the other students that were assigned temperature can discuss any info they know that student 1 did not share.) Follow for each property and then discuss relationships between properties as a group. We will then conduct a field lab in which students collect data on these parameters along the depth profile of a pond. Lab data will be shared with the group and individuals can graph the field data and write a one-page reflection on how the observed data compare to the conceptual models. If there are differences, discuss potential reasons.