**Guidelines for developing good seminar discussion questions (BIOL 416, Fall 2023)**

Developing good questions is a fundamental critical-thinking skill. The best seminars and lectures are often focussed on addressing a clearly articulated, high quality, thematic question. Likewise, good writing is often based around synthesising your thoughts into a clear, focussed question that then becomes the basis for the argument or thesis statement, or specific research questions or hypotheses. Thus, being able to develop good questions is a fundamental component of learning how to ‘think like a scientist’, but more widely, it is an important life skill for any citizen. And in this course, one of the goals is not just to help you ‘think like a scientist’, but also to think about the larger context in which that science is placed.

Seminar questions should be constructed so that they will likely lead to focussed, intelligent discussion that will move the seminar group toward some potential answer, or toward a more refined perspective on the issue/theme, or toward an even more refined question.

Study the assigned reading material carefully, and reflect on it. What really interests you about it, and why? Develop questions that would take you (and your audience) *beyond* the reading’s text. In other words, formulate a question, and then develop an answer... and use the ideas that arise in that initial answering process to further develop your original question so that is more refined, and probing, and therefore likely to lead to an interesting focussed discussion. This iterative cycle can be repeated multiple times. Good questions have the following features:

* Challenging – they contain ideas that are *new* and indicate an advance on what is stated in the text
* Original – they indicate *clear deep thinking* by the questioner, often including his/her own specific ideas
* Focussed/specific – they contain enough detail that they will *narrow* the discussion and constrain it from vague generalisations
* Rarely can be simply answered as Yes or No, without adding some explanation. For example, don’t ask the reader what ‘he/she thinks’ (e.g. Do you think.....?) - instead put in your own thoughts and then pose the question as an assertion (E.g. If.... , then why/what/how....).
* Concise – Keep your text as focussed as possible... text length is NOT correlated with question quality. Recommendation: If your question absolutely needs some introductory text (and it may not!!), keep it to **no more than 2-3 sentences at most, followed by just one single question.**
* Questions that begin with ‘Why?’, and sometimes with ‘How?’ are often particularly engaging, focussed, and effective in developing a good discussion.

**Some examples of ‘good’ to ‘very good’ questions associated with the Chapin textbook readings:**

1. Our current agricultural practices tend to be large-scale monocultures that are then harvested, leaving the soil bare for extended periods of time. Given that biota is a state factor influencing soil formation, what toll do these practices take on soil health/properties?
2. If the phenolic compounds produced by trees as defenses retard decomposition and reduce soil fertility, can soil fertility be increased by clear cutting? (“Did the vegetation determine soil properties or vice versa?”) Or would increased erosion and reduction of present organisms override this?
3. As we learned in this week’s readings, the organisms present at a site strongly influence the physical and chemical properties of the soil. How do you think geographic range shifts of species (plants and animals) will impact the soil at (a) the sites the organisms are leaving behind and (b) the sites the organisms are migrating to?
4. Most soil development is done in the presence of living organisms, where plants are a source of organic carbon and the variety of these plant species will have a strong influence on the amount and depth distribution of soil carbon. As discussed in earlier lectures there are many sites in which tropical rain forests are being clear cut to make room for palm oil plantations. What would be the major changes in the amount and depth distribution of soil carbon in response to reducing the number of plant species from hundreds down to one, and how would this influence the functional properties of the soil?