CHEM 4530-Proteins & Nucleic Acids

Learning Outcomes
Students will be able to:

1. Explain the multidisciplinary nature of research in order to develop a holistic perspective of scientific research.
2. Identify and assess evidence from both familiar and unfamiliar disciplines in order to support multidisciplinary research efforts.
3. Critically reflect upon their own research processes in order to translate skills and knowledge into new environments such as future projects and careers.

Pre-class Materials
https://www.youtube.com/watch?v=t2d7y_r65HU  YouTube video on Literature Reviews from NCSU

Introduction/Class Layout
Who I am/Who are You?

To be covered in this session:
- Why is research important?
- Interdisciplinary research
- Locating seminal research
- Activity
- Homework: Lab report

Why is Surveying the Literature Important?
Activity—think, pair, share before giving them the answer

Interdisciplinary Research
Discussion based

Which discipline?
So my topic is Batteries as alternative energy source, which disciplines might be interested in this topic?
**Literature Reviews & Locating Seminal Research**
You should have all watched the video by this point, so we will not be covering what a lit review is in class today. An important part of creating a lit review however is in finding important (aka seminal) research in a given field. Locating this research is an intrinsic component of all scientific research. You must be able to justify the research you want to undertake by identifying the gaps in the literature.

**Subject Guides**

**Web of Science Review (if needed)**
What it is and what it does
Student-led demo

  **Topic: Batteries as alternative energy source**
Finding seminal research using citation analysis tools (they should have already done this)

**Relatable Skills**
So, you aren’t at UTC anymore…can you still find seminal research? How? (Not as easy, but Google Scholar can help.)

**In-Class Activity**
Place students in groups of 3-4 (allow self-selection). Emphasize that these are **REAL WORLD PROBLEMS**!

**Problem 1**
What is the effect of mountaintop removal on streams and other receiving bodies of water?

**Problem 2**
Do antioxidants have any effect upon cancer? (You may focus upon a single cancer or discuss effects in general.)

**Problem 3**
Do skin peptides provide any defense against chytridiomycosis in amphibians?

**Problem 4**
Do pharmaceuticals dispersed into our waterways pose an ecological threat? If so, elaborate on those threats.

**Problem 5**
Is there an association between environmental exposure to arsenic and the development of diabetes mellitus?

**Problem 6**
Is there a connection between vaccines containing thimerosal and autism spectrum disorders?
Problem 7
What methods are currently used to control the invasive species, kudzu (Pueraria montana)? Do any of the methods pose deleterious effects to humans?

Brainstorming (5-10 Min)
Students will be allowed a certain amount of time to evaluate their problems and create a research strategy. No computers are allowed during this time.

Searching (30 min)
Students will begin searching. They may use any database or search engine, but ultimately (before turning in their reports) must find 4 peer-reviewed sources. Instructors will circulate after 15 minutes & answer questions.

Share Answers/Processes (4-5 minutes per group)
Groups will give brief presentations of their problems and how they went about finding answers/evidence. Emphasize that the process (not so much the answer in this case) is the important part. Questions to consider:

1. What was your strategy for answering your question?
2. Where did you look?
3. What terms did you search (make a chart)?
4. How did you evaluate the results?
5. What questions remain after your search?
6. REMEMBER: We want to hear about your process. How you conceptualized the question and searched for the answer is more important than whether you found the answer.

Post-Class
Instructions
As a group, you will write a lab report.

1. Follow all usual requirements concerning font, size, spacing, etc.
2. The lab report sections should be as follows:
   a. Introduction: Introduce your topic. What is your topic? Why does it matter?
   b. Literature Review: This would normally be part of the introduction, but you will separate it out for this assignment. This will basically be a summary of the evidence
your group discovered that helps to answer the question. In other words, what does the literature say about your question? (This section should be about 1 page in length.)

c. **Methods:** In this section, discuss all aspects of your research process. Include where you searched for information & why you chose those places, which keywords you used, how you modified your search when necessary, how many results you found, why you selected the studies that you did, etc. [This section will be weighted heaviest in the grading process.]

d. **Discussion:** In this section, restate the objectives and discuss how your question & searching were interdisciplinary. What disciplines (Environmental studies, engineering, etc.) might have a stake in the answer to your question?

e. **Conclusions:** Wrap up your report. Did you find answers or inconclusive evidence?

f. **References:** Use APA style. You should have at least 4 peer-reviewed sources and no more than 1 popular source. You may use no more than 2 credible internet sources (i.e. .gov or .edu sites)

**UTC Learn Survey**

Students will be asked to complete a survey (responses are not identified by student, but all students will be required to complete the survey). The survey will provide quantitative data on the activity and its usefulness.