**Problem Posing Template for Individual Activity**

(Copy this template and share your ideas for incorporating problem posing in one of your courses. Share your work in the Collections.)

**Module Overview**: **Cell Type & Organelle Count**

**Setting**:

Target course (title, majors/non-majors, level [introductory/upper-division], size of class [# of students], lab or lecture

**Introductory Biology, Freshman level, majors/non-majors**

Learning Outcomes for the activity- **Being able to recognize SEMs, cells, differentiate cell organelles in a SEM, graph data, generate graph correctly, calculate mean, .**

How does data acumen align with this learning outcome? Place an “X” in the column next to the skills practiced in this activity

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Quantitative Pillars** |  | **Data Life Cycle** |  | **Social/Pedagogical Concepts** |  |
| Mathematical | **X** | Data import |  | Communication | **X** |
| Computational | **X** | Management |  | Equity, Diversity, Inclusivity |  |
| Statistical thinking |  | Curation |  | Universal Design for Learning |  |
| Reproducibility | **X** | Analysis |  | Ethics |  |
|  |  | Sharing/ Reporting | **X** |  |  |

**Activity/Module**:

Describe the activity- **Students find SEMs of liver, muscle, skin, RBC cell, and count the number of mitochondria, RER, SEM, and nuclei in each cell.**

Course type (e.g. Lecture, lab)- **Lecture activity to get them actively thinking about cells and organelles.**

Pedagogy (e.g. Case, research project, final report, lab activity)- **Small group work or individual work, create a table and a graph, and calculate the mean for each organelle across all cell types**

Describe the data and the tools used to interact with the data- **counts, data input into Excel, Excel file, use of HHMI statistical tutorials, graph production**

Describe where problem posing will be used and how you as the instructor will use problem posing to shape the activity- **Cell types and organelle types**

* What is the Question Focus? **What can numbers of organelles in a cell about what function(s) a cell exhibits**
* How is the Question Focus introduced? **Are all cells in an organism the same? How and why are they different?**

Describe the student products- **Students will generate graphs of their counts for each organelle type for each cell type. They will then calculate a mean for each organelle type for each cell type. Through this, they will also become familiar with interpreting SEMs and gain practice calculating and graphing means for raw data.**

**Assessment**:

How will this learning outcome be assessed?  **Student will submit their graphs, and the handout (not yet complete) with steps and questions guiding them through the process of finding the SEMs, noting the source(s) of the SEMs, and counting the organelle types from each cell type.**

Will students practice this skill again? In what setting (same topic, new topic)?

**Possibly, in other assignments.**

**Extra information**:

What will students need to know before completing this activity?

**Hopefully, they will have read the pre-class assignment/viewed the pre-class video, and taken notes they can then use to help with this assignment.**

What will students do when they are done with the assignment?

**- At the beginning of the next class, students will present a summary of their data and their conclusions of how cell type can be determined/guessed at via relative numbers of organelles.**