Teaching and Learning Goal: **What skill or ability do you want students to acquire? What behavior do you want to change? What knowledge do you want to test? What assumptions (either students' or the instructor's) do you want to test? Focus on only one such goal**

I want students to increase their observation skills.

Teaching Question: **Adapt the teaching and learning goal to a specific course. Make this question narrow and focused so that it can be measured.**

Will students in mammalogy laboratory sections with drawing activities and encouragement to draw as a means of observation have higher laboratory scores than students in mammalogy sections that do not do drawing activities and are not encouraged to draw as a means of observation?

Assessment Technique: **What instrument are you going to use to collect information? Is it simple enough that you know how to analyze the results? Will the information it provides answer the teaching question?**

The instrument used to assess whether drawing activities and encouragement to draw improve student observation skills are scores from the student laboratory sections. This assessment is simple enough to analyze, using t-test and ANOVA. The statistical test will allow us to determine if drawing activities and encouragement to draw improve student observation which will be reflected in higher student laboratory scores.

See *Classroom Assessment Techniques* p. 59 for a helpful "Checklist for Avoiding Problems with Classroom Assessment Projects"

Classroom Practice: What assignment or activity are you going to use in the class to try to test the question? When are you going to do it? Who will conduct it? Will it be graded? Will it be anonymous or will students sign their names? How long will it take? How will students know what to do with it? Who will explain it? How will the relationship between this assignment and activity and the course be explained?

My plan is to: 1) *model* drawing with labeling as a tool for observation of specimens by drawing on the board and by having students draw in lab 2) *coach* students using a detailed handout of structures to draw and compare in lab 1 and 2 and by providing verbal feedback when they show me their drawings in lab and 3) *fade* by allowing students to draw the characters as they choose in the character tables in the lab notebook the rest of the semester.

The model and coaching part of this practice will occur in the first two weeks of lab. Cybil Nicole Cavalieri will conduct this practice. It will be graded. It will not be anonymous students will sign their names to lab quizzes and lab practicals. Lab quizzes take less than 10 minutes in the lab practical can take up to three hours. Modeling drawing and labeling tools for observation will take about 30 minutes of lab time in the first two weeks of lab. Coaching students on detailed handouts will take about 30 minutes of lab time total, distributed into a small amount of time for each student. Students will be informed that they are part of the study and the goals of the study it will be explained to them by Cybil Nicole Cavalieri during the first lab. Students will be informed that they are in a control or a treatment section. The relationship between the drawing activities and the course will be explained to students talking about how drawing helps observation skills and showing students examples of this from the literature. Efforts will be made to get student by and this activity by making it fun and showing them the value of it as a transferable skill for other things in their life.

Summary of Results: What does the information you collected through the assessment instrument tell you about your teaching question?
My goal in this study was to see if drawing activities increase student's observation skills and resulted in higher laboratory scores. There was not a significant difference between mammalogy sections that did drawing exercises and were encouraged to draw and mammalogy sections that did not do drawing exercises and were not encouraged to draw. I reject my hypothesis that sections with drawing activities would have scores higher than students in control sections. The section with drawing activities had the lowest mean of all sections; although not significantly different. Other factors beyond encouragement to draw and drying activities more strongly influenced student scores.

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Conclusion: What have you learned? What surprised you? What would you do differently? What implications does this have for your future classroom practice?

Encouraging students to draw in laboratory and guiding them through drawing structures did not result in increased student scores in laboratory. However, the protocol for this study was helpful as the instructor could correct misconceptions and guide observations of important characters based on how students drew specimens. As a result of this study I used guided drawing and encouragement to draw in the subsequent semesters I taught mammalogy lab.

I was surprised that some students that drew detailed and artistically accurate drawings of skulls and mammalogy lab scored lower than students that drew wireframe like drawings of mammal skulls. I expected students that could accurately draw skulls to be able to identify them at a high level. Being able to observe skulls accurately is not the only skill set being tested in this laboratory, in addition to being able to observe the skulls students also needed to connect those observations to identification and life history parameters of the species they were observing. If I were to do this classroom practice again I would encourage my undergraduate learning assistance to also share their drawing skills with students in the class as they are peer/mentors (students that have taken the class in previous semesters) and I think that that would encourage students to use drawing as a means of observation more readily as undergraduate learning assistance could talk about how drawing help them learn the material.

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