STAT 230 Term Project - Proposal Preparation

Question. The best projects start with an interesting question and then design an experiment around the question, instead of starting with an experiment and then developing the question. Remember that the question needs to be answered by experimentation, not via observational study.

What question are you hoping to answer? What hypotheses are you going to test? What do you think is going to happen?

Example: Does a Stradivarius violin really sound better than another run-of-the-mill violin?

Response. Section 1 from lecture; 4.1 in book

What is your response variable?

Is it a valid measure of the attribute you are trying to test? Is the measurement scale appropriate for ANOVA? Is the response reliable (repeatable)? How, specifically, will you measure it?

Will you be able to get a measurement for each subject? If not, what is the back-up plan?

Example: Volume (cm³) of gas. Valid. Interval scale response is appropriate for ANOVA. We'll capture escaping gas in a balloon and then use water displacement to measure the volume of the balloon. We piloted this with 3 balloon volumes and have created a repeatable procedure for measuring volume of displaced water.

Conditions. Section 1 from lecture; 4.2 in book

What are your factors of interest? At least 2 required. What are the levels of your factors of interest? Does it make sense to include an additional, perhaps observational, factor of interest? What other factors might influence the response? How will you control for these and prevent confounding? (e.g. hold constant, block, randomize)

Materials. Section 1 from lecture; 4.3 in book

What are the materials that you will use?Who or what are your experimental units? This may be different per factor of interest.How many replicates are you considering per treatment combination?How will you obtain your experimental units, recruit your participants, manufacture your device?How does this affect how uniform and or representative your units are?To which population will you be able to make inference?

Design. Sections 6 and 7 from lecture; corresponding chapters in book What design are you considering? How do you plan to randomize experimental units? Would blocking help to reduce nuisance variability? Who or what are your blocks, if applicable?

Analysis. Sections 5, 6, 7, and 11 from lecture; corresponding chapters in book
Which interactions are you considering?
Are there specific treatment combinations or levels of a factor that make sense to compare?
Is a hypothesis test more appropriate or a confidence interval for comparison(s)?

Example: The levels of our factor are 1) no label/number, 2) odd-numbered label, and 3) evennumbered label. We want to compare no number to numbered (even or odd). We are also interested in getting a confidence interval on the difference between odd and even labels.

You might consider performing a pilot with a couple of replicates before coming to approve your project.