Suggestions/Guidelines for Thesis Defense

The thesis defense is more than just the presentation of the research project. Defense means the student should be able to explain and justify what was done, be able to place the work in the larger context of basic and applied science, and suggest future directions for work related to the research results.

Questions and topics of discussion at the defense are determined by the thesis committee. The following are suggestions and guidelines, not policy or mandatory elements of the defense. Questions and topics are not limited to the following. The defense may include topics not mentioned here.

Does the student understand what was done? Can the student explain the project in the technical sense (as was done in the thesis), but also in the common sense? Nobel laureate in Physiology or Medicine (1999) Dr. Günter Blobel is quoted as saying:

> "I don't think there is any concept that you can't make understandable to the educated lay public. I always tell my students and postdocs if you can't explain to your grandmother what you are doing, probably you don't understand it yourself properly."

Can the student explain their thesis (concepts, methods, results) so that it is "understandable to the educated lay public"?

Is the student knowledgeable about the species of organism(s) used in the study? This would include basic biology, evolution, natural history, ecology, and classification, including major characteristics of the taxa to which that organism is assigned.

Does the student understand the project objective and why certain experiments were carried out? Can the student justify the experimental design? The student should demonstrate an understanding of any potential logical or technical weaknesses in the experimental approaches, and be able to provide alternative approaches that might address those weaknesses. Can the student explain the workings of the procedures and instruments used? Can the student explain the workings of any quantitative/statistical procedures used, and why these analyses were conducted?

Does the student understand the significance of the project in the context of both basic science (literature) and applied science? Is the student able to see how the results will fit into the bigger scheme of nature, i.e. how the results help us understand how the world works at the molecular/cellular, organismal, and system levels?

Is the student able to develop putative experiments and rationales not presented in the thesis to address questions posed by committee members? Is the student able to think as a scientist "on their feet"? Can they apply the concepts of their research project and knowledge of biology to suggest additional work, and possible outcomes of that work?

Finally, an individual receiving the Master of Science in Biological Sciences is expected to have knowledge of biology commensurate with the degree being awarded by the faculty. Students should expect and be able to discuss the basics of cell biology, energy, genetics, evolution, ecology, biological diversity, plant biology and animal biology. "Basics" here refers to a general overview of the critical definitions and processes in these topics as presented in an introductory, basic biology course.