Rubric for PLNU Graduate Biology program written thesis for assessment of PLO #1, 2, and 3 (rev. 06/15)

1. Discuss major concepts and theories in biology. (Row 3)
2. Carry out and communicate various experimental methods and types of data analysis. (Rows 4,5)
3. Demonstrate knowledge and skills in critical thinking, such as analysis and synthesis, as applied to primary literature in the field of biology, as well as in science education. (Rows 2, 6)

Component	Initial (70%)	Emerging (80%)	Developed (90%)	Highly Developed (100%)
Problem, question and/or hypothesis	• Fails to identify or summarize problem accurately • No indication of purpose of the research	• Summarizes the problem, though some aspects are incorrect or confusing • Some indication of purpose of the research	• Clearly identifies the problem • Clearly articulates the purpose of the research	• Clearly identifies the problem as well as nuanced aspects or key details • Clearly articulates the purpose of the research, beyond the narrow field
Choice of and use of relevant literature	• References not appropriately integrated into the paper	• Fewer than 35 references appropriately integrated into the paper	• 35-50 references appropriately integrated into the paper	• 50+ ref. appropriately integrated into paper
Knowledge of major biology theories	• Inadequate evidence of understanding of relevant biology concepts	• Basic evidence of understanding of relevant biology concepts	• Clear and adequate evidence of understanding of relevant biology concepts	• Clear and comprehensive evidence of understanding of relevant biology concepts
Methods (data collection/anal)	• No explanation or justification of research design • Methodology is unclear and incomplete	• Some explanation of research design, but no justification • Methodology is basic, but incomplete	• Clearly explains research design, but no justification • Explains methodology	• Clearly justifies and explains research design • Clearly explains methodology
Results	• Graphs and tables are poorly/inaccurately done • One or more pieces of data inaccurately interpreted in text with many opinion statements.	• Graphs and tables are inaccurate/missing labels with some errors • Usually accurately summarizes tables and graphs in text with obvious opinions	• Graphs and tables are adequate • Accurately summarizes the tables and graphs in text with some opinion	• Graphs and tables are professional • Accurately summarizes the tables and graphs in text w/o opinion
Conclusion(s)	• Fails to identify conclusions, or conclusion is a simplistic summary • Conclusion presented as “proof"	• Identifies conclusions and refers to some specific pieces of evidence • Does not relate conclusion to the broader field	• Clearly links evidence with the conclusion • Minimal consideration of limitations	• Clearly links evidence with the conclusion • Considers limitations of the study