Data Analysis for Biology Students: An Integrated Developmental Biology Laboratory and R Programming

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Data analysis is increasingly gaining importance in biological research and industry careers. Biology students are usually exposed to statistics through a single basic statistics course without any integrated learning and application of these skills in biological contexts. Biology laboratories provide a unique opportunity to reinforce the concepts of statistics and data analysis and help students put these concepts into practice while analyzing their own data. We integrated statistics, and graphing with R programming within a developmental biology laboratory. Concepts from statistics were introduced each week that were relevant to the type of data collected and related R functions were introduced so that the students could analyze their data. Students were introduced to the concepts of p-values, effect size, and statistical power to critically assess their results and draw conclusions. Learning outcome assessments were based on pre-lab quizzes and the analysis section of final lab report. In this workshop, we will provide an overview of the R and statistics lesson plan we used during the 10-week class, our approach to teaching such curriculum, and the challenges we faced in teaching it. We will also provide attendees datasets and content background to simulate what was done in class.

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