

# **A Modular Framework for Teaching Sequencing Based Functional Genomics to High School Students**

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Living organisms rely on genes to manage all aspects of their lives. Although all of the cells in an organism possess the exact same genetic code, they can specialize to form different tissues and organs by selectively expressing particular sets of genes at particular times. We designed a modular course to introduce high school students to these major genetic concepts and the sequencing technologies that are now revolutionizing the field of genomics. The course focuses on nematodes of the genus *Steinernema*, insect parasites with broad scientific and commercial applications. Each module achieves specific teaching goals, and they can be used alone or in combination to meet the particular needs of individual instructors. Using this approach, we were able to guide students through all the stages of a modern genomics experiment: culturing the organism of study, isolating RNA from different stage of *Steinernema* life cycle, sequencing the libraries, and then analyzing the data using open-source computational tools. Students reacted positively to their hands-on experience performing the RNA-seq assay and analyzing the data they generated, but they especially enjoyed being given the opportunity to design their own projects based on the nematodes. Overall, we have demonstrated that sequencing assays and genomics can be taught to high school students, and that this course format makes this field more accessible to teachers and students at the secondary and post-secondary levels.

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