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Using Classical Genetics Simulator (CGS) to Teach Students the Basics of Genetic Research

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In large introductory biology classes some labs are difficult to do as wet labs, e.g. classical Mendelian genetics investigations. As a result, we have turned to cyber labs. Working with our introductory biology program, Ben Adamczyk developed a Classical Genetics Simulator (CGS) which gives students the opportunity to perform test crosses with model organisms much like a geneticist would do in a modern laboratory. In this session we demonstrate how we use the CGS program to help students learn the basics of genetics research. The lab activity states: "You are a geneticist and have just returned from the Hawaiian Islands. On a remote island you collected specimens from different populations of fruit flies that are endemic (found only on this island). The genotypes of the individual fruit flies and the mode of inheritance of their phenotypic traits are not known. You need to do controlled crosses in order to determine whether the phenotypes are genetically determined. If the traits are genetic, you also need to determine the mode of inheritance (sex-linked, autosomal, etc.)." Using CGS, the instructor sets the parameters for the populations that the students investigate, such as the number and type of traits in a population, the modes of inheritance, trait linkage, etc. The program doesn't "solve the problem". Students can't play it like a video game and expect it to give away any answers. Rather, CGS requires students to understand what they are doing, why they are doing and how they should do it.

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