background is historically the concern of population genetics.

In addition to familiarizing students with an important, and often under-appreciated area of genetics, the exercises described here help students develop other strengths associated with a well-rounded scientist. The project requires students to develop and test hypotheses, and to seek out relevant information in the primary and secondary scientific literature. Students are asked to test hypotheses throughout their course work, but we don't often ask them to develop hypotheses. Because there is a large literature in population genetics, with theory relevant to most projects developed to some extent, students may often be able to compare their results to those expected from theory. If the findings are consistent with theory, this can be reported. If the findings appear to be inconsistent with theory, then the student can be challenged to account for the discrepancy. Usually, the fault is not with the theory, nor even the hypothesis, but with the predictions. It is useful, in fact, to have some students tackle a project that produces seemingly incongruous results, in order to foster discussion about the actual nature of hypothesis testing: namely, that a mismatch between observed results and expected results may reflect error in determining the latter, and not error in the hypothesis itself.

Finally, all of the exercises provide insight into stochastic processes. All too often, material in biology courses becomes a series of related facts, and it is easy for students to think that the scientist is seeking to describe, at increasingly high resolution, a static, deterministic world. It only takes a few runs of a population genetics simulation to show that, for purely stochastic reasons, the outcome can vary dramatically. We may say we "expect" fixation of a gene copy to take $2N$ generations, but this isn't really what we anticipate. If we understand stochastic processes, we anticipate that our result will probably differ from the expected result. If the student learns nothing else, let it be this.

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