

Biol 1364 laboratory exercise 3

[Science](#), [Statistics](#)



BIOL 1364 LABORATORY EXERCISE 3

INHERITANCE OF CHARACTERS Objectives of the Laboratory: i)

Determination of the genetic control of seed colour, ie how many genes control seed colour, what sort of intra allelic (dominance relationship) and interallelic interactions (independent assortment vs epistasis) govern the inheritance of seed colour. ii) Understand the scientific process involved in studying character inheritance. For example, formulation of null and alternate hypotheses; design experiments to test the hypotheses; statistical analysis of results; draw logical conclusions iii) Interpretation and presentation of results. For example, provide genetic and biochemical explanations to explain your results. Important: Students are required to hand-in their worksheets before leaving the class. Ensure that your name/ ID no. and sample number are recorded. The report should be written according to the sample problem provided in the handout. Question: Seeds of the F1 generation derived from a cross between two different yellow-seeded varieties of corn were collected as Sample F1. The F1 plants were selfed and the resulting F2 seeds were bulked. Take three (3) representative samples of the bulk, each containing approximately 100 seeds. The F1 plants, when test-crossed, gave the test cross generation. Take three representative samples of approximately 100 seeds each from the test cross generation. Carefully label these six samples (three from the F2 generation and three from the testcross generation, as F2-Sample1, F2- Sample2..... etc.). a) Separate each sample into the various colours and count them carefully. Find the means for the F2 and test cross generations b) What phenotypic

frequencies for seed colour are approximated in the F2 and test cross generations? (Show the counts as well as means) c) Formulate a hypothesis to explain the ratio in the F2, and test the observed ratio against the hypothesized ratio, statistically? (Show all steps) d) Inferring from the statistical test in part (b), predict what phenotypic ratio you would expect in the test cross? (Diagram the cross.) e) Statistically test the predicted test cross ratio (from part (c)), against the observed ratio obtained for the test cross generation? (Show all steps). Does the test cross support your hypothesis for the F2 generation? What is the purpose of having the testcross generation, in addition to the F2 generation? f) What genetic phenomenon can be inferred from the results? Provide a genetic as well as biochemical explanations to describe the genetic phenomenon you have inferred. Diagram the cross to indicate the parents, F1, F2 and test cross generations.