



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Sean R. McCreery	Project Number 22030
Project Title Total DNA and Organism Complexity	
Abstract Objectives/Goals The object of my project was to determine if I could extract pure DNA by a simple kitchen technique from several diverse plant and animal species, quantify the amount, and compare the results to answer the question: Do complex organisms such as mammals have more DNA than simpler organisms? Methods/Materials Six diverse plant and animal species had their total DNA extracted by a simple kitchen technique involving homogenization of the specimen in salt solution, cell degradation with papain and soap, and final extraction of the DNA with 99% isopropyl alcohol. The extracts were then poured through coffee filters and the dry weight of the DNA was determined. Purity was measured by UV Spectrophotometry. Results DNA weight for the specimens in grams were banana 0.28, onion 0.16, wheat 0.20, beef liver 0.28, chicken liver 0.27, and squid 0.33 (n = 9 for all with standard deviation calculated). DNA purity of the specimens was excellent with a mean A260/A280 of 1.9 (1.8 - 2.0 very pure). DNA weight in grams per 100 grams of specimen were banana 0.51, onion 0.13, wheat 2.05, beef liver 0.69, chicken liver 0.62, and squid 1.81. Conclusions/Discussion These results imply that some simpler organisms may have more DNA than more complex ones. Particularly in the case of beef and chicken liver, the specimens were quite comparable and the amounts of DNA were similar. This suggests that a bird and mammalian species may have similar amounts of DNA. However, there was poor correlation with the known C-values (DNA haploid weight), probably because of several specimen variables in weight, homogenization, cell size and ploidy. Finally, the fact that the absolute DNA extract weights were so similar between all species suggests a design problem that could limit the total amount of DNA extracted, making quantitative comparison between species undependable.	
Summary Statement Total DNA was extracted from six diverse plant and animal species by a simple kitchen technique, tested for purity, quantified, and compared to determine if the amounts correlated with organism complexity.	
Help Received DNA purity was tested by UV Spectrophotometry by Tom Lum and Daniel Green at the Veterans Administration Campus, Martinez, CA., in the J.A. Green Laboratory of Immunology and Infectious Diseases.	