

**Gretchen Davis**  
Santa Monica, CA  
[Ggdavis23@aol.com](mailto:Ggdavis23@aol.com)

## Teaching Statistics to High School Students

The lament “When are we ever going to use this?” is never uttered when you teach statistics to high school students. From the first class where they gather data about themselves, students see that studying statistics is useful and interesting. And all those activities which involve food is another element that captures student attention. Whether we are measuring fish crackers, counting Skittles to construct confidence intervals, catapulting gummy bears in a unit on design of experiments, or comparing the color counts of M&M’s, students are engaged in the gathering, analyzing and thinking about data. When they compose and then revise their survey questions and experience the struggles of getting a random sample and then organizing all that data so that it makes sense to others, there is excitement and genuine interest.

Success in statistical topics for high school students seems to depend as much on the ability to read thoughtfully as it does on algebraic skills. The role of common sense in problem solving is more apparent in statistics than in advanced algebra or Precalculus courses. Even students who are limited in algebra can make progress in statistics. In fact simulation, graphing, and nonparametric tools such as Spearman’s Rank Correlation are easy and fun for students with very limited math confidence. These students appreciate learning something new, not just repeating mathematical topics (fractions, decimals, percents) that they have failed to grasp in earlier courses.

Students feel empowered when they can contribute to the school newspaper or see connections between the data they are gathering in a physics momentum lab and linear regression or connection between Chi-squared and a taste test for their economics course. They enjoy being able to read the paper and spot the misuses of data, survey summaries, and graphs. They feel powerful.

## Academic Background

My bachelor degree from UCLA was in English, because I mistakenly thought that only really “smart” girls studied math. My first teaching assignment was mathematics. When I returned to college for a teaching credential and masters degree, I found that I really enjoyed abstract algebra, where each problem was a puzzle for the mind. After I completed a masters in Mathematics from CSU San Diego, I continued to teach secondary mathematics, including an elective course in statistics, which was 90% probability and a minimum of descriptive and inferential statistics.

During the summer of 1984 I had the opportunity to work with fifty high school teachers and Dick Scheaffer, Jim Swift, and Jim Fey at three week Woodrow Wilson Institute, held at Princeton. What an eye-opener. The focus of our studies was on data analysis, which was very different than my required college level statistics course. When John Turkey shared his joy in exploring fuzzy data and noise, I knew he was speaking to me. When I returned from Woodrow Wilson, I began to include math modeling in all our algebra courses and changed the ways I taught and thought about probability functions.

For several summers I had the opportunity to work with statisticians and other teachers in Quantitative Literacy teaching teams. We shared ideas and learned from elementary and secondary teachers throughout the United States. Later, I had the chance to work with others to promote Advanced Placement Statistics for secondary students. (At our high school enrollment in Advanced Placement Statistics has increased from twenty students the first year to over 100 students the fourth year, without a decline in Calculus enrollment since many students are opting to take AP Statistics as their fourth year of mathematics.)

Teaching AP Statistics has also forced me to be a serious student again. In addition to the workshops sponsored by College Board and the NCSSM and a recent course at UCLA, I have learned from other teachers who are also struggling with techniques and topics which were not part of our previous college experience. The use of Internet sources and a list-serve where colleagues pose questions and depend on others to respond are new ways for novice and seasoned teachers to learn. At a time when colleagues are retiring, I am having too much fun watching students experience power and excitement as their understanding of statistics grows.

Problems

Chi-squared  
ANOVA