Course Content:

Throughout the year, students will be exposed to four broad conceptual themes, *Exploring Data, Planning A Study, Anticipating Patterns,* and *Statistical Inference*. While the pure mathematics involved is not complicated, this course does require a "mathematical maturity" and interpretive and reasoning skills which the students may not have fostered as much in previous math courses. <u>Written work and the ability to express one's mastery of a problem through words is a major component of this course</u>.

Further clarification of written work:
Many of the questions in AP Statistics deal with interpreting data, often in a written form. Toward this end, there are written assignments throughout each quarter. These assignments are in paragraph form, using proper grammar and spelling, and should be indicative of students capable of higher-level thinking. The assignments are designed to make the real-life connection between the math that is used and the context in which it is used. It is not enough in this case to just get a proper answer. The methodology behind the answer and the understanding of where that answer fits in the greater context of the problem is preeminent in this course.

Advanced Placement:
AP Statistics is equivalent to a college level statistics course. Most universities will give 4 credit hours for a successful AP exam (given in early May). The AP Statistics exam is a difficult, challenging exam. Students who wish to score a 3 or better on this exam need to study, memorize and work hard throughout the year, and practice as many sample questions as possible prior to taking the exam.

Text(s):

Bock, Velleman, & De Veaux. (2010). *Statistics: Modeling the World, 3rd ed.* Addison-Wesley: Boston, MA.
        (Available by PDF with your google docs access.

Moore, McCabe, & Craig. (2009*). Introduction to the Practice of Statistics, 6th ed.* W.H. Freeman & Co: New York, NY. (A few of these texts are available for use in class.)

I strongly recommend that you purchase a copy of Barron's AP* Statistics. We will begin working out of this second semester.

Grades:
The semester grade is cumulative in nature: 80% semester grade/20% final exam
        I will round grades that are 0.5% + to the next percent only if all assignments are turned in.

Grade Breakdown:
                80% **Assessments** (Tests & Quizzes)
                20% **Graded Work** (Selected HW problems, AP Prep, Warm-Ups, & Projects)

                Other Assignments: (not explicitly graded but required for mastery)
                        Reading guides for each chapter, Assigned HW problems, Notes

Tutoring Options:
                Before school by appointment, SUCCESS by appointment, Wednesday after school

Assignments:

Late assignments will receive a 20% penalty. Incomplete assignments will receive at least a 20% penalty. Turn in your assignments fully completed and on time.

Course Guidelines

Supplies: Bring these to class on a daily basis.

Jump/Flash Drive	Binder
College Ruled & Graph Paper	Pencils/Pens
Graphing Calculator with Statistics Capabilities (TI 83/84)	

Attendance:

It is essential that you come to class each day and that you are on time. When you are absent, it is **_your responsibility_** to find out what you missed, including copying notes or class work, and completing homework. You can ask a reliable classmate for this or check on my webpage. Make-up work is given one class period for each day a student is gone from class. If you miss the day of a test or quiz, you will take it upon your return. If you are leaving early for sports or a field trip, you must pick up your work prior to your absence.

Tardies:

Students must be in their seats when the tardy bell rings or they will be considered tardy. Students will be assigned lunch detention after 3 tardies.

Behavior:

This is a college class, come to class ready to learn and be respectful of everyone in the class by refraining from side-bar conversations or other disruptive behavior. When working in groups, do your part. If a student chooses not to be respectful I will conference with the student, assign lunch detentions or write referrals as needed.

We will be using a significant amount of technology in this class; use it appropriately.   Students using technology may lose it for the day, don't waste my time and class time with games.

Statistics: a class in five acts

ACT I: Exploring and Understanding Data

Using real data sets, you will analyze center and spread. The center of the data gives us information about how something *usually* is. The spread tells us just how 'off the mark' things can get. For example, the average and median grades for an exam can tell teachers whether the exam is too easy or too hard. If the spread is very large, however, it can tell teachers that perhaps the teaching process itself was ineffective.

ACT II: Exploring Relationships between Variables

Using real data sets, you will determine whether the relationship between variables indicates an associative or causal relationship. For example, does smoking *cause* lung cancer, or is there merely a higher incidence rate among smokers due to some other common factor?

ACT III: Gathering Data

You will analyze the techniques used to gather data, and judge whether they are "fair" or "biased". This section will include a hands-on project where you will design and administer a survey. We will analyze the results throughout the rest of the year.

ACT IV: Randomness and Probability

One thing is certain: in life, *something* will happen. We often rely upon the "Law of Averages" to determine just how often. In this section, you will prove there is *no* "Law of Averages." Instead, you will determine the statistical probability that a particular event will happen. The results may surprise you!

ACT V: From the Data at Hand to the World at Large: aka Inference

You've got the data and you've analyzed for center and spread. Now what? Using real data sets, you will learn how to apply your results to the world at large. What do those numbers really *mean*? How can I use this information to make decisions?

All students are required to bring their own graphing calculator to class every day. Those that have a TI-89 that do not have the Stats/List Editor have it downloaded onto their calculator so that they all have the same software available.

In the course of the year, students use Technology in the following scenarios:
Unit 1
- Entering a list of data on a calculator
- Creating and interpreting a bar or pie chart through a spreadsheet program
- Creating and interpreting a boxplot, dotplot or histogram
- Calculating the five-number summary for a set of data
- Calculating the mean and standard deviation for a set of data
- Checking for outliers in a set of data
- Finding Normal Percentiles from the Standard Normal Distribution
- Finding a *z*-score from a Percentile
- Creating a Normal Probability Plot

Unit 2
- Creating and interpreting a scatterplot
- Calculating and interpreting the correlation coefficient
- Calculating and interpreting the coefficient of determination
- Calculating the least squares regression line for bivariate data
- Creating a residual plot
- Creating a regression line from Statistical Software output
- Looking at the effect of outliers and influential points on a scatterplot and its correlation through web applets.
- Re-expressing data through non-linear regression

Unit 3
- Running a simulation
- Creating a random sample through a random number generator

Unit 4
- Calculating basic probabilities
- Calculating the mean and standard deviation of a random variable
- Running a Geometric Probability Model
- Running a Binomial Probability Model

Unit 5
- Verifying the Central Limit Theorem
- Creating a Confidence Interval for Proportions
- Conducting a One-Proportion *z*-test
- Creating a Confidence Interval for Two Proportions
- Conducting a Two-Proportion *z*-test

Unit 6

- Creating a One-sample t-interval
- Conducting a One-sample t-test for the mean
- Creating a Two-sample t-interval
- Conducting a Two-sample t-test for the mean
- Conducting a Matched Pairs t-test

Unit 7

- Conducting a Chi-Square Goodness-of-Fit test
- Conducting a Chi-Square test for Homogeneity or Independence
- Conducting a Regression Slope t-test
- Interpreting a Regression Slope t-test through statistical software output