Advanced Placement Statistics

@ EVHS

Practical Applications of Statistics
In the Work Place And In Everyday Life
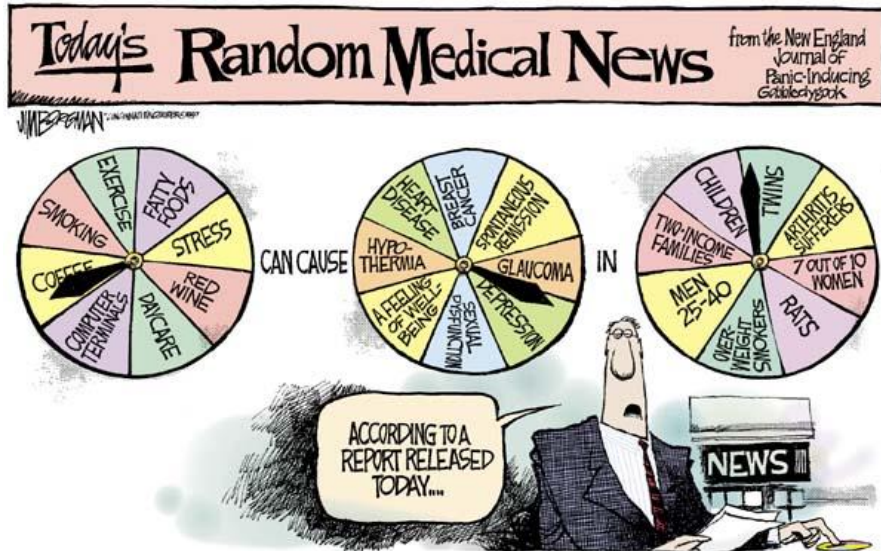
We live in an information society; raw data, graphs, charts, rates, percentages, probabilities, averages, forecasts, and trend lines are an inescapable part of our everyday lives. It is hard to pick up a newspaper without finding an article in which a recent study makes a claim about the effect of a food product on people's health. Studies in which people who ate oatmeal had lower cholesterol than those who did not might suggest that those with high cholesterol would be wise to eat oatmeal. In AP Statistics, we learn to examine the details of studies. We might question if oatmeal really lowered cholesterol or did the subjects just eat oatmeal instead of their normal breakfast of two fried eggs? Perhaps eating cornflakes would have had the same effect.

http://www.nearingzero.net/sci_math_and_stats.html

Many **companies** use statistics. **Business** decisions are made based on market research. **Advertising executives** want to know whether a new ad campaign significantly increases sales. **Doctors** must know the reliability of medicine and treatments. Products such as **pharmaceuticals** require significant evidence of effectiveness and safety. **Politicians** rely on data from polls and public opinion. **Courts** inquire about statistical significance in hearing class action discrimination cases. Any company that expects to obtain a **government contract** must have strong evidence of a statistical quality control program. **Statistical literacy** is important as we are all **consumers** of goods and services and need to make intelligent choices. Advanced Placement Statistics provides the opportunity for students to learn how to make good decisions with data.

This brochure is based on a similar brochure by Michelle Krummel of Wilde Lake HS, Columbia, MD.

AP Stats FAQ

What is AP Statistics?

AP Stats is a college level introductory course in statistics. You'll learn how to collect, organize, analyze, and interpret data.

Why should I take it?

Statistics is the most widely applicable branch of mathematics. It is used by more people than any other kind of math.

How hard is AP Stats?

It's a college course, so the expectations are high. You will need to think hard about the concepts. You'll write – a lot. Grades are based on demonstrated mastery, not just effort or attendance. There is plenty of work, yet we don't turn in much of it. You **MUST** be a self-motivated scholar. Those who aren't….usually end up getting poor grades and/or dropping the class.

What is class like?

Nearly every day we cover something new. We rarely go over HW in class. Sometimes we do labs – which always seem to involve a food item!

Do you have to be a top-rate mathematician?

The course does not depend heavily on abstract mathematical concepts, but you DO need a **very strong** background in Algebra II – regular or honors. Our calculators will help us with much of the numeric drudgery inherent in statistics. More importantly, you must be an AP-level self-motivated scholar who reads the text, stays caught up, and does all HW on a daily basis.

Can I take Stats in college?

Yes. Statistics is required for many majors, and strongly recommended for others. However, most EVHS students receive AP grades high enough to get credit for the introductory course. In fact, EVHS students have a track record of outstanding AP exam performance.

Why take it at EVHS?

At Eastview, it's a full year course, rather than a college semester, so we go at a more reasonable pace. We have time for a major capstone project after the AP Exam We run the largest – and most successful-AP Stats program in Minnesota.

Would it be my only math course next year?

It could be. Many students also enroll in a PreCalc or Calculus course and find the combination 'do-able'. In any case, Stats is not really a 'math' course – it's a whole different sort of animal.

Who can sign up?

You must have a **very strong** background in Algebra II (regular or honors), the recommendation of your current math teacher, and especially **top-notch** scholarly skills & habits.

Who does sign up?

The course has typically been about 2/3 seniors, 1/3 juniors, and an occasional sophomore.

Need more info?

Email/visit an AP Stats instructor or consult a current student.

http://lil67babygirl.tripod.com/id1.html
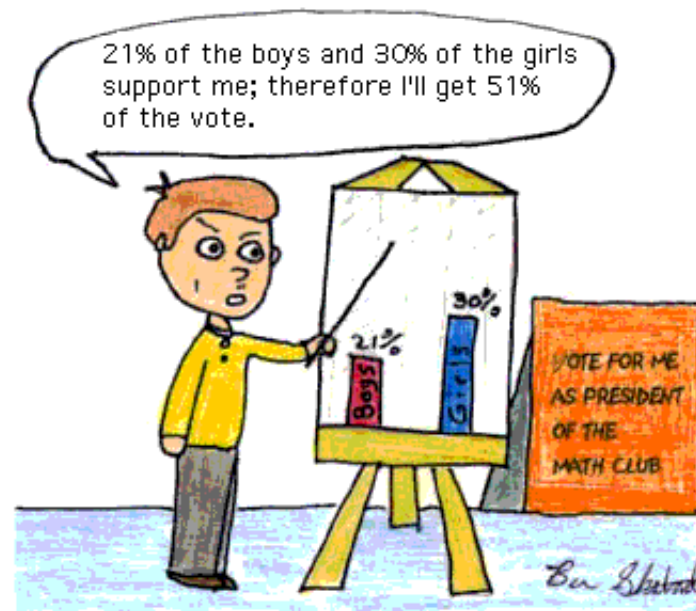
What the Course Covers
The Four Major Components of AP Stat

1. **Experimental Design**
   Students design appropriate experiments & surveys in order to generate quality data, so that proper and defensible conclusions can be drawn – and generalized.

2. **Exploring Data**
   Students collect and examine data and display the patterns that emerge. Data from students in class as well as real world data sets are gathered and used to illustrate concepts.

3. **Producing Models Using Probability and Simulation**
   Students learn to anticipate patterns and produce models for prediction. Students use simulations to model situations that are not practical to replicate using other methods.

4. **Statistical Inference**
   Students learn what conclusions can be drawn about a population, using confidence intervals and significance tests. Students also consider how to investigate research questions, design a study, and interpret the results.

Are you ready for the challenge?

In our experience teaching the course, we have observed certain qualities that make a person a good candidate for AP Statistics. Many of these candidates come from AP calculus, Pre-calculus, or Algebra II. There are other students who definitely experience struggle in the course. Even students who were A students in AP calculus can experience major struggle in AP Statistics. At the same time, students who were B level in pre-calculus or came from Algebra II can be top students in AP Statistics.

So what makes a good match?

We firmly believe that any student can learn a great deal in the course, and can thrive with sufficient effort. But certain qualities tend to correspond to better performance. Here's our subjective list:

AP STATS IS A GOOD MATCH	SKILL	LOWER GRADES IN AP STATS
I do my homework pretty consistently. When I do homework, I really make sure I understand each problem. When I don't I ask questions until I do. I can usually figure out good solutions, even when problems don't work exactly like what we did in class.	**HOMEWORK** ***Must be completed, and understood completely.*** Understanding your assignments is very important. Staying up to date, not getting behind is essential.	I often "get through homework," but sometimes don't understand problems. I usually don't ask questions, and wait for tests or quizzes to really understand the material. I rely a lot on answer keys example problems to do homework.
When material is difficult, I work to figure it out, or seek help when I need it. I ask questions in class. I ask the teacher and my friends for help when I am struggling. I keep working at it until I get it. I like to work with others in understanding the material I am not afraid of sharing my struggles with others.	**ACTIVE LISTENING/PARTICIPATION** Seeks help when necessary. Can ask good questions, take responsibility for understanding the material by working with peers, studying thoroughly for tests, and maintaining good communication with the teacher. Willing to work in groups to increase dialogue and understanding.	I prefer to work on my own, and not ask for help. I don't like to share my work with others. When asked, "do you understand," I say "Yes," whether I do or not. I tend to be a passive learner in the classroom. I don't share my intellectual struggles with others.

Teachers say I write well. I use correct terms and definitions. I can say things clearly and quickly, without rambling. I make good logical connections. I use the English language correctly and with good precision.	**COMMUNICATION** Writes clearly and concisely. Uses terms, definitions, and the English language precisely.	Teachers mention that I sometimes use vague language. I might use imprecise language, or ramble in my explanations. I struggle to explain what I mean on paper.
I do a good job making logical arguments. I can present good evidence to support my claims in an English paper by taking good evidence from the text. My teacher usually understands my arguments, and says that I use good evidence.	**MAKING LOGICAL CONNECTIONS** When making a conclusion or claim, student can support claim with evidence. When reading an explanation, they can determine the author's position, and point to the evidence the author uses to make their claim.	Teachers have mentioned that my claims need more support. I have a hard time connecting events in a text to a position or claim. My teachers struggle to understand my arguments. They ask for more evidence.
I will rarely miss class for games, performances, college visits, or other extracurricular events	**EXTRACURRICULAR INVOLVEMENT** Students with lots of commitments to sports, student council, or the performing arts need to make sure that they don't miss class.	I will occasionally need to miss class for games, events, or outside commitments.

Students coming from…

Pre-calculus course:

<u>A/A-/B+ level</u>: AP Stats is likely to be a good match for you. Expect more work integrating mathematics with clear verbal communication / reasoning.

<u>B/B- level</u>:   could potentially be a good match. Students who have weaker work habits can expect to have a tough time (B- or below). Students who struggle communicating well in English / History may also have trouble (B- or below).

<u>C+ level or below</u>: Rarely a good match.

Calculus course:

These students tend to do very well in AP Statistics, provided they complete assignments thoughtfully and regularly. However, these students also learn a great deal about <u>writing and communicating their thinking</u> carefully and correctly. Because these skills are emphasized more in AP Statistics than in previous math courses (including calculus!) some students experience an initial struggle, but usually rise to the challenge.

Algebra II course:

You need to prepare yourself for more difficult challenges and more effort to understand ideas than in Algebra II. This course is clearly a step up.

<u>A/A- level</u>: tend towards have grades in the B / B+ range in AP Statistics, provided they work hard to understand the material and complete assignments. A and A- grades are possible, but B+/B is more common for successful students from Algebra II.

<u>B+/B level</u>: success in AP Statistics will vary depending upon work ethic and communication skills (reading, writing and verbal and willingness to self-advocate).

<u>C+ or lower</u>: not recommended for AP Statistics.

In general, ALL students should have a pre-registration consultation with their current math instructor, or an AP Stats instructor, to help decide if AP Stats is a good match.
AP Statistics is NOT a good match if:

- You don't advocate for yourself when material is challenging.
- You struggle to explain your reasoning and work with good precision and clarity.
- You don't have excellent homework habits and consistent effort/attendance/enthusiasm.
- You will miss class days.
- You don't do homework thoroughly or regularly.
- You don't like to participate actively in the classroom.
- You have difficulty solving problems that are different from ones learned in class.
- You don't ask questions or seek help when struggling
- You don't communicate with precision and clarity
- You don't read complex passages with care and precision.
- You depend on the teacher to always tell you how to do each problem.