

AP Statistics

Form A2 New Course Proposal

Course Title: AP Statistics

Department: Mathematics

Duration: 1 year

Grade Level(s): 11 and 12

Prerequisite(s): Advanced Algebra 2, Pre-calculus recommended

Contact Person(s): Ryan Fisher

Proposal Date: Oct. 11, 2016

1. Why is a new course necessary?

With changes to the district math curriculum, such as Every Day Math in grades K-6, more and more of our students are entering high school having taken Geometry in 8th grade, and many of them do not have interest in progressing all the way through IB Math Higher Level. This course should appeal to students interested in studying the social sciences at the university level, and provide an upper level math class for students intending to pursue any area of study that does not typically necessitate learning calculus. Many of these students currently take our non-AP statistics course as well as financial management and business math, but would prefer to be able to earn college credit, especially for a course many will have to take in college anyway.

Additionally, according to an interest survey given in each math class in the spring of the 2015-2016 school year, there were approximately 40 upperclassmen and 40 underclassmen that already expressed interest in taking an advanced statistics class at DHS. I believe as we have more students entering who will complete Algebra 2 prior to their junior year this number will grow.

2. What are the “big ideas” or “core concepts” that will be covered in the course? Consider Common Core State Standards, Power Standards or Focal Points for GLCE’s and HSCE’s.

Students will complete the standards established by the College Board for AP Statistics. These include the following:

- Describe patterns and departures from patterns
- Plan and conduct a study
- Explore random phenomena using probability and simulation
- Estimate population parameters and test hypothesis

The entire course syllabus can be found at the following web address:

<https://secure-media.collegeboard.org/digitalServices/pdf/ap/ap-statistics-course-description.pdf>

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3. How will technology be integrated into the course (consider NETS/METS standards)?

Technology is an integral part of AP Statistics. Here's an excerpt from the AP syllabus:

The AP Statistics course adheres to the philosophy and methods of modern data analysis. Although the distinction between graphing calculators and computers is becoming blurred as technology advances, at present the fundamental tool of data analysis is the computer. The computer does more than eliminate the drudgery of hand computation and graphing — it is an essential tool for structured inquiry.

Data analysis is a journey of discovery. It is an iterative process that involves a dialogue between the data and a mathematical model. As more is learned about the data, the model is refined and new questions are formed. The computer aids in this journey in some essential ways. First, it produces graphs that are specifically designed for data analysis. These graphical displays make it easier to observe patterns in data, to identify important subgroups of the data and to locate any unusual data points. Second, the computer allows the student to fit complex mathematical models to the data and to assess how well the model fits the data by examining the residuals. Finally, the computer is helpful in identifying an observation that has an undue influence on the analysis and in isolating its effects.

In addition to its use in data analysis, the computer facilitates the simulation approach to probability that is emphasized in the AP Statistics course. Probabilities of random events, probability distributions of random variables and sampling distributions of statistics can be studied conceptually, using simulation. This frees the student and teacher from a narrow approach that depends on a few simple probabilistic models.

4. How will career or “real world” experiences be integrated into the course?

The study of statistics is centered around students collecting and interpreting data from the world around them. One of the central topics of the course is on Sampling and Experimentation. The major areas of study within that unit are the following:

- Planning and conducting surveys and experiments using appropriate methods of data collection
- Generalizability of results and types of conclusions that can be drawn from observational studies, experiments, and surveys

Additionally, the data analysis the students will learn is an integral part of most college-level social science courses, such as psychology. Many of the students who take this class will be either concurrently enrolled in such classes, or will eventually take those courses after DHS.

5. What summative and formative assessments will be used to measure student achievement?

Students will take the national AP Statistics exam at the end of the course. A full description of the assessment can be found on the [course description](#). Formatively, students will have regular practice problem sets that will be checked in class, as well as hands-on, technology driven data analysis labs to reinforce the core statistical concepts addressed throughout the course.

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Form A3 Instructional Resource Review

(textbooks, reference materials, classroom technology, online resources, media)

Date: January 9th, 2016

Applicant(s) : Ryan Fisher

Building Involved: High School

Grade(s) and/or Course: AP Statistics

Targeted population: 11th and 12th grade students who have completed Algebra 2. Students who have interest in social science careers that will need to take an advanced math course, but not necessarily calculus, should have strong interest.

Describe the teaching resource(s) being considered:

The standard textbook used by the schools in our area that offer AP Statistics is *The Practice of Statistics 5th edition*, by Starns, Tabor, Yates, and Moore. The textbook is aligned with the AP Statistics exam, and the writing team is also involved with the creation of the AP Statistics standards and exams.

The cost per book is \$129.49. Assuming purchase of materials for three sections, which is what student survey data collected in the spring of 2016 suggests would be the interest level, we would initially need 90 textbooks, totaling \$11,654.10.

We also have previewed other textbooks, including *Stats: Modeling the World* by Beck and Wellman, but after meeting with area teachers at the local AP Statistics workshop, we were dissuaded from selecting it, primarily from teachers using that textbook. Additionally, we considered the textbook currently used in the statistics class we offer, but it insufficiently covers the material necessary for the course.

Connection to specific goals within the strategic plan: To offer our students the courses necessary to meet their interests and the educational foundation for their academic future.

Connection to District Improvement Plan or School Improvement Plan(s): It links directly with the goal of increased math achievement in the District Improvement Plan, as well as the Teacher Work Group looking at student interests based on the School Improvement Plan.

Explain how the resource(s) supports the GLCEs, HSCEs, Common Core and/or other standards and benchmarks? The book aligns with the AP standards set for the course. Additionally, this resource, and the course in general, will thoroughly reinforce the statistical concepts outlined in the Common Core mathematical standards.

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Please review the resource(s) and answer the following:

1. How does the resource support various learning styles, multiple intelligences of the students, and differentiated instruction?

A sample of the text shows it has an 11th grade reading level, which is in line with the targeted student population. The textbook comes with digital access and interactive resources to meet the needs of students of all abilities.

2. In what way(s) does the resource appeal to students?

The textbook is colorful, has pictures scattered throughout, and has large font. The book is clearly organized with goals, key terms, warm ups, skill builders, examples, checks for understanding, algebra tips, calculator tips, wrap ups, and exercises. Each section is organized the same way, so the sections are predictable and easy to follow.

3. Does the material support cultural diversity and gender equity? Yes.

4. Does the material encourage critical thinking and problem solving? Give examples.

Yes. The majority of the text is about engaging students to think critically about data. Most questions from each section in the book are about analyzing data critically. Here is a sample question from Chapter 13:

Which blue is most blue? The color of a fabric depends on the dye used and also on how the dye is applied. This matters to clothing manufacturers, who want the color of the fabric to be just right. A manufacturer dyes fabric made of ramie with the same “procion blue” die but applies the dye in three different ways. Then he uses a colorimeter to measure the lightness of the color on a scale in which black is 0 and white is 100. Here are the data for 24 pieces of fabric divided into three groups of 8 that were randomly assigned to be dyed in each way:

Method A: 41.72 41.83 42.05 41.44 41.27 42.27 41.12 41.49
Method B: 40.98 40.88 41.30 41.28 41.66 41.50 41.39 41.27
Method C: 41.68 41.65 42.30 42.04 42.25 41.99 41.72 41.97

The figure below displays the Minitab output for one-way ANOVA applied to these data. Based on this analysis, is there good reason to think that the three methods do not all yield the same shade of blue? Perform an appropriate test to help answer this question.

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5. What Teacher aids are provided?

Online access to the teacher edition of the textbook is provided. The teacher's edition contains a suggested outline of chapters in the book covering each topic addressed in the AP syllabus. Additionally, a pdf version of the solution manual covering each practice problem in the book is available for teachers. Also, data files for the larger data sets used in explorations in the textbook are provided in a variety of formats, including for graphing calculators and spreadsheet applications. ExamView test generator is included as well, which is a commonly used piece of software used to create assessments of all types.

6. Describe what other alternatives were considered and why were they are not being proposed:

We previewed *Stats: Modeling the World* by Bock, Velleman, and DeVeaux from Pearson Publishing, as well as *Understandable Statistics* by Brase and Brase, which is the textbook we currently use in the non-AP statistics course offered at DHS. Neither of the books associate their content directly with the standards described in the AP Statistics syllabus. *The Practice of Statistics*, however, clearly associates each of its chapters and sections with the AP Statistics standards, and has practice AP test questions built into each chapter and multiple cumulative practice exams for students incorporated directly into the book.

Additionally, the book we have selected is the one most commonly used in the areas surrounding us, including Saline High School.

7. For text based resources:

- a. Is the reading level appropriate for the users?
A sample of the text shows it has an 11th grade reading level, which is the target student population.
- b. Does it provide students with resources for understanding the content and how to use the text?
Yes.
- c. Does it provide and promote uses of technology? Links to websites?
Yes. There are many activities throughout the text specifically designed for students to manipulate data through spreadsheets and other statistical software, which is a major component of the AP course design.

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8. Community review

Date of review: 12/20/2016

Location of meeting: DHS Media Center

Number of attendees: 4

Keep a record of the meeting(s): Adjacent building review 1/11/2017, Admin meeting 11/15/2016

Comments & recommendations: Parents were in favor of the plan and recommended moving forward.

K12 administrative team recommendation: Yes No Needs revision

Comments/suggestions: Move forward.

Dexter Community Schools 12/1/2010