Seward, Stefanie <sseward@sanjacinto.k12.ca.us>

San Jacinto Unified School District New Course Proposal

Google Forms <forms-receipts-noreply@google.com>
To: sseward@sanjacinto.k12.ca.us

Thu, Jan 30, 2020 at 8:31 AM

Thanks for filling out San Jacinto Unified School District New Course Proposal

Here's what we got from you:

STATS IN SPORTS

EDIT RESPONSE

San Jacinto Unified School District New Course Proposal

For more information on how to complete this form please contact:
Janet Covacevich
Director, Secondary C & I
(951)929-7700 ext. 4263
jcovacevich@sanjacinto.k12.ca.us

Your email address (**sseward@sanjacinto.k12.ca.us**) was recorded when you submitted this form.

SAN JACINTO UNIFIED SCHOOL DISTRICT

Signature Page must be printed and wet signed

Access Signature Page at this link https://docs.google.com/a/sanjacinto.k12.ca.us/document/d/1TO2G1fXxR6WGNhinPY-oNaxtY130cZHUOjTT3Ntv5Zg/edit?usp=sharing

School *

SJHS

New Course Proposal Submitted By: *

Seward

Course Title *

Statistical Reasoning in Sports

Transcript Title (15 characters or less) *

Please be sure to count each character and spaces used to be no more than 15.

Stat Reasoning

Course Code (assigned by Data Management, extension 4221):

M0550

Academic Department *

Math

Graduation Requirement Met *

Math

Honors (*note: Honors courses seeking A - G status must offer a non-Honors equivalent course) *

No

Grade Level (check all that apply) *

- [ ] 6th
- [ ] 7th
- [ ] 8th
- [ ] 9th
- [ ] 10th
- [x] 11th
- [x] 12th

Pre-Requisite (list all that apply) *

Integrated Math III/Math 2

Co-Requisite (list all that apply) *

n/a

Possible credits *

10 - year long class

Course Learning Environment *

- [x] Classroom Based
- [ ] Online/Hybrid

CALPADS Course Code (assigned by Data Mgt.)

9259

Career Technical Education Courses

Will this course be part of CTE Pathways? *

No

Is this an Integrated Course (Academics with Career Technical Education) *

No

CTE Courses Only: Indicate the Level of the Course:

CTE Courses Only: Indicate the Industry Sector

CTE Courses Only: Career Pathway & Code Pathway Name

Submitting Courses That are Program Status, Courses Modeled After Another Institution, or Online, or AP

Course Plans for Program Status, Online, or AP must be attached to this form.

Will this course meet any of the descriptors above? *

Yes

Program Status Courses (can be auto approved) - Name the Exact Program and Course Title:

Statistical Reasoning in Sports

Submitting a Course Modeled After Another Institution:

When modeling after another institution's course, you will also need to enter a course overview specific to San Jacinto Unified School District as well as course content specific to SJUSD.
Any course modeled after another institution's course will not more forward until it has been written to reflect SJUSD's unique needs.

Submitting a course modeled after another institution.

Which school and ATP code? Must state exact course title.

Centinela Valley Union High School District

Adopt an Online Publisher Course

Adopt a Program Status Course

Advanced Placement (AP) Courses Only: Please answer the following questions:

This section only applies to AP courses.

AP Courses Only: Date Submitted to CollegeBoard for AP Audit:

Month ▼ Day ▼ 2020 ▼

Exact Course Title

CollegeBoard Authorization Code

Course Content

Please note: There are not specific requirements regarding the number of units each course should have.
For reference: University of California A-G Guide: http://www.ucop.edu/agguide/a-g-requirements/index.html
Copy and paste the link into your web browser for course samples.

Course Overview: Provide a brief summary (3 - 5 sentences) of the course's content. *

This course introduces students to the main concepts of introductory statistics. Students will collect, analyze, and draw conclusions from data. Selected topics include displaying and summarizing data, linear regression, probability, sample surveys, experiments, confidence intervals, and hypothesis tests. In addition, students will be expected to reason quantitatively and provide substantial written explanations. The intent of the course is to prepare students for an introductory level college statistics course or AP Statistics. The textbook is a study of all the above topics from a sports perspective. Many majors require students to take a course in statistical reasoning. This 21st century skill is a reflection of the increasingly data driven world that we live in. The purpose of this course, Statistical Reasoning in Sports, is to provide students with a class that introduces them to statistical reasoning in a context that is rich with examples likely to spark their interest. And, although the course uses sports as a context, it isn't primarily about sports—its focus is to teach students about statistics. This course is for students who are interested in learning about statistics in a different context with real-world applications. From the first day of class, students will be using real data to answer interesting questions.

For EACH UNIT of the course, please provide:

1. A unit title
2. A concise 3 - 5 sentences describing the topics being addressed that demonstrate the critical thinking, depth, and progression of the content covered.
3. A brief 3 - 5 sentences summarizing a key assignment from this unit and covering:
a. how a student will complete this assignment
b. what a student will produce
c. what the student will learn

Most importantly, use the unit(s) and key assignment(s) to demonstrate that the course meets the subject specific course criteria on the A - G Guide.

Units (outline each unit in the section provided. Indicate new units with a number and title) *

Unit 1: Exploring Categorical Data
Unit Description: Did LeBron James Choke in the Playoffs?
Students will learn how to distinguish between categorical and quantitative variables. Produce and interpret displays of categorical data, including bar charts, pie charts, and segmented bar charts. Distinguish between parameters (ability) and statistics (performance) in a sports context. Conduct simulations, by hand and with technology, to investigate variability in athletic performance, including the law of large numbers. Recognize the concept of sampling variability in the context of sports and its role in the decision making process. Critically reflect on the limitations of their own conclusions and conclusions made by others. Use the binomial distribution to estimate probabilities.
The organization of the content in this course is very different from a traditional statistics course. Instead of taking the first half of the course to build the skills needed to do inference, we will complete the four step statistical process in each chapter. Beginning with the first chapter, we will learn how to ask a statistical question, learn how to collect the appropriate data, learn the skills needed to analyze the data, and draw conclusions from the data. In subsequent chapters we will repeat this process, each time with a new focus or type of data.
Unit 2: Comparing Two Proportions
Unit Description: Is there a Home Field Advantage in the NFL?
Students will learn how to state hypotheses, including a null and alternative hypothesis, about the difference between two proportions. Simulate the distribution of the difference in two proportions. Calculate and interpret p-values. Use p-values to make conclusions about the difference in two proportions. Understand the principles of experimental design, including control, randomization and replication. Understand the connection between the design of a study and the methods used to analyze the study. Understand the types of conclusions that can be drawn from various types of studies, especially cause-and-effect conclusions.
To make it possible to do inference early in the course, we will be using randomization tests rather than tests using approximations based on a normal model. Although this technique is relatively new in an introductory level statistics course, it is extremely powerful because of its versatility and ability to be easily understood by students while still being theoretically correct. It also forces students to understand the reasoning of hypothesis testing rather than memorizing a set of algorithms and formulas.
Students will also spend time during each chapter working on projects where they collect data through experimentation or online research. Frequently allowing the students the opportunity to investigate statistical questions of their own choosing will make the material more relevant to the students and also more likely to be remembered.
Finally, technology will play a big part in this day-to-day instruction. Not only will students be using graphing calculators to create graphs and calculate summary statistics, they will be using statistical software and online applets to run simulations, and spend time online doing research and collecting data.
Unit 3: Investigating Independence
Unit Description: Does the Hot Hand Exist in Sports?
Students will explain the concept of independence in sports. State hypotheses, including a null and alternative hypothesis, about independence in sports. Simulate the distribution of the longest streak in a series of trials. Describe a Type I and Type II error in context.
Students use web-based databases (e.g. www.baseball-reference.com, www.pro-football-reference.com) to select data for statistical analysis. This includes exploratory data analysis (graphing and distribution descriptions) as well as inferential statistics (formulating hypotheses and drawing conclusions based on p-values). The web-based investigative tasks tie into the computer based exercises.
Unit 4: Exploring Numerical Data
Unit Description: Does the Designated Hitter Increase Offense in Major League Baseball?
Students will produce and interpret displays of quantitative variables, including

dot plots, histograms, and boxplots.
Unit 5: Comparing Two Means or Two Medians
Unit Description: Does the Designated Hitter Increase Offense in Major League Baseball?
Students will understand the distinction between independent and dependent samples. Analyze paired samples using the difference in each pair. State hypotheses, including a null and alternative hypothesis, about the mean difference of two dependent samples. Simulate the distribution of the mean difference in two dependent samples.
Unit 6: Exploring Measures of Variability
Unit Description: Which 7-Iron is more Consistent?
Students will learn how to calculate and interpret the mean absolute deviation (MAD) as a measure of consistency (variability). Calculate and interpret the standard deviation as a measure of consistency (variability). Understand the influence of outliers on the standard deviation. State hypotheses, including a null and alternative hypothesis, about the difference of two standard deviations. Simulate the distribution of the difference in two standard deviations.
Unit 7: Standardized Scores and Normal Distributions
Unit Description: Which Players should I Draft for my Fantasy Team?
Students will learn how to calculate, interpret and use standardized scores. Using the 68-95-99.7 rule. Using the normal distribution to model athletic performance and estimate probabilities.
Unit 8: Estimating Ability with Confidence Intervals
Unit Description: What is LeBron's True Ability?
The logic of confidence intervals. Calculate a confidence interval for a single proportion, a single mean, the difference between two proportions, and the difference between two means.
Unit 9: Exploring Relationships Between Numerical Variables
Unit Description: Teeing Off: Hit it Long or Hit it Straight?
Student will use scatterplots to display the relationship between two quantitative variables. Use the correlation coefficient to measure the strength of a linear relationship. Understand how outliers influence the correlation coefficient. State hypotheses, including a null and alternative hypothesis, about the correlation coefficient. Simulate the distribution of the correlation coefficient.
Unit 10: Using Relationships to Make Predictions
Unit Description : How can we Build a Better Baseball Team?
Students will use equations to make predictions. Calculate and interpret residuals. Calculate and interpret the standard deviation of residuals. Understanding the concept of Least Squares. Calculate and use the least squares regression line. Interpret the slope of a least squares regression line. Understand how outliers influence the equation of a least squares regression line. State hypotheses, including a null and alternative hypothesis, about the slope of a least squares regression line. Simulate the distribution of the slope of a least squares regression line. Understand the concept of regression to the mean and how it affects predictions of future performance.
Unit 11: Multiple Regression
Unit Description : Hit it Long or Hit it Straight? Why not Both?
Students will learn the concept of multiple regression. Use multiple regression models to make predictions. Learn the concept of logistic regression. Use logistic regression to make prediction and produce and interpret time plots.
Unit 12: Exploring Counting Rules and Probability
Unit Description: Should you go for it on the Fourth Down?
Students will calculate and interpret expected values. Use expected values to evaluate strategies in sport. Construct and using two-way tables and tree-diagrams to find conditional probability. Develop and use probability rules: general additional and general multiplication rules.

Course Materials

Provide the COURSE MATERIALS that students use and analyze throughout the course. When appropriate, please incorporate these materials into the course's unit descriptions in the COURSE CONTENT section.

Some subject areas and disciplines require courses to include specific course materials. Please refer to the subject course criteria in the link above and/or the California Department of Education (http://www.cde.ca.gov/ci/cr/cf/imagen.asp) for more information.

Course Material

Please access the hyperlinked Google Slide deck for a sample of the required information for any course materials that will be used in the course.

Google Slide Deck Link w/samples

https://docs.google.com/a/sanjacinto.k12.ca.us/presentation/d/1LaBuMtWAqL9bMaPKGQ8ooRZ6AZOLtS2PV0HGPudpYqo/edit?usp=sharing

Select Course Material (select all that apply) *

- [x] Textbook
- [ ] Literary Text
- [ ] Manual
- [ ] Periodical
- [ ] Scholarly Article
- [x] Website
- [ ] Primary Document
- [ ] Multimedia
- [ ] Other

Course Material: Primary *

Statistical Reasoning in Sports by Josh Tabor and Christine Franklin, published by BFW

Course Materials: Additional (if applicable)

A-G Courses

For courses seeking A - G status please answer the questions below

Is this course being submitted for A-G status? *

Yes

Subject for A - G status

- [ ] "A" History/Social Science
- [ ] "B" English
- [x] "C" Mathematics
- [ ] "D" Lab Science
- [ ] "E" Language Other Than English
- [ ] "F" Visual and Performing Arts
- [ ] "G" Elective

Name the Discipline (i.e. US History, LOTE, Theater, etc.)

Math

Is this an Integrated Course (Academics with Career Technical Education)

- ( ) Yes
- (•) No

Does this course need to be retro-activated to a previous year?

No

If yes, which year(s)?

- [ ] 2017-2018
- [ ] 2016-2017
- [ ] 2015-2016
- [ ] 2014-2015

Final Review

Please review your course prior to submission to ensure it meets all requirements, courses will not be moved forward until they have provided all the required information.

End of Course Submission

Before you submit, please verify that you have completed all required components for submission.

[Quoted text hidden]

Statistical Reasoning In Sports

Centinela Valley Union High School District

asic Course Information

Title:	Statistical Reasoning In Sports
Transcript abbreviations:	
Length of course:	Full Year
Subject area:	Mathematics (C) / Statistics
UC honors designation?	No
Prerequisites:	Integrated Math III/Algebra II (Required)
Co-requisites:	None
Integrated (Academics / CTE)?	No
Grade levels:	11th, 12th
Course learning environment:	Classroom Based

ourse Description

urse overview:

This course introduces students to the main concepts of introductory statistics. Students will collect, analyze, and draw conclusions from data. Selected topics include displaying and summarizing data, linear regression, probability, sample surveys, experiments, confidence intervals, and hypothesis tests. In addition, students will be expected to reason quantitatively and provide substantial written explanations. The intent of the course is to prepare students for an introductory level college

statistics course or AP Statistics. The textbook is a study of all the above topics from a sports perspective. Many majors require students to take a course in statistical reasoning. This 21st century skill is a reflection of the increasingly data driven world that we live in. The purpose of this course, *Statistical Reasoning in Sports*, is to provide students with a class that introduces them to statistical reasoning in a context that is rich with examples likely to spark their interest. And, although the course uses sports as a context, it isn't primarily about sports—its focus is to teach students about statistics. This course is for students who are interested in learning about statistics in a different context with real-world applications. From the first day of class, students will be using real data to answer interesting questions.

ıurse content:

Unit 0: Goals and Outcomes

This course teaches students how to use four-steps of the statistical process in the context of sports: ask questions, collect data, analyze data, and make conclusions. Each chapter will begin with a sports-related statistical question (e.g. Is there a home field advantage in the NFL?) and then students will learn how to collect appropriate data, how to analyze the data, and how to make appropriate conclusions. Although the context of the examples and exercises will be sports related, the primary focus of the class will be to teach students the basic principles of statistical reasoning. Major statistical topics include: making appropriate graphical displays for univariate and bivariate data, both categorical and quantitative; calculating and interpreting summary statistics for univariate and bivariate data, both categorical and quantitative; least squares regression; the concept of independence; using simulations to estimate probability distributions; probability distributions, including the binomial and normal distributions; using probability distributions and expected value to evaluate strategy in sports; the logic of hypothesis testing, including stating hypotheses, calculating and interpreting p-values, drawing conclusions, and Type I and Type II errors; estimating parameters with confidence intervals; and proper methods of data collection, including sampling and experiments. Use of technology, including statistical software, online applets, and the graphing calculator will be prominent in the course. Students will also have to complete investigations which require all four steps of the statistical process to be completed using data collected online or by the students themselves.

⊒ Unit Assignment(s):

This sports-based approach is a way to "flavor" the traditional statistics curriculum, extend and deepen learning, and provide real-world applications for core statistical knowledge to better engage students in their learning. By the end of the course, students will be assessed on the following areas:

1. Students are able to formulate statistical questions and identify statistical claims made by others.
2. Students can collect appropriate data to answer statistical questions, including designing experiments and using available data from the internet and other sources.
3. Students can use a wide variety of tools to analyze and summarize distributions of data.
4. Students understand the role of variability in the data collection process and incorporate this understanding when drawing conclusions about statistical questions.
5. Students critically reflect on their own conclusions and conclusions made by others, including the limitations of these conclusions.

Unit 1: Exploring Categorical Data

Unit Description: Did LeBron James Choke in the Playoffs?

Students will learn how to distinguish between categorical and quantitative variables. Produce and interpret displays of categorical data, including bar charts, pie charts, and segmented bar charts. Distinguish between parameters (ability) and statistics (performance) in a sports context. Conduct simulations, by hand and with technology, to investigate variability in athletic performance, including the law of large numbers. Recognize the concept of sampling variability in the context of sports and its role in the decision making process. Critically reflect on the limitations of their own conclusions and conclusions made by others. Use the binomial distribution to estimate probabilities.

The organization of the content in this course is very different from a traditional statistics course. Instead of taking the first half of the course to build the skills needed to do inference, we will complete the four step statistical process in each chapter. Beginning with the first chapter, we will learn how to ask a statistical question, learn how to collect the appropriate data, learn the skills needed to analyze the data, and draw conclusions from the data. In subsequent chapters we will repeat this process, each time with a new focus or type of data.

Unit Assignment(s):

Key Assignment: "Did LeBron James Choke in the Playoffs?" - Students explore categorical data; Students are introduced to the difference between of PERFORMANCE (statistic, sample result) and ABILITY (population parameters); Students are introduced to dotplots and other types of graphing categorical data (bar charts, pie charts). TYPICAL ASSIGNMENT: Given a dotplot find best and worst PERFORMANCES; indicate what would be a surprising PERFORMANCE and what changes in scoring would indicate a change of ABILITY.

Unit Assessment: Use random numbers to determine if a sport has different results than actual reported results. Assess multiple graphs and determine which could represent indicated performance using law of large numbers.

Unit 2: Comparing Two Proportions

Unit Description: Is there a Home Field Advantage in the NFL?

Students will learn how to state hypotheses, including a null and alternative hypothesis, about the difference between two proportions. Simulate the distribution of the difference in two proportions. Calculate and interpret *p*-values. Use *p*-values to make conclusions about the difference in two proportions. Understand the principles of experimental design, including control, randomization and replication. Understand the connection between the design of a study and the methods used to analyze the study. Understand the types of conclusions that can be drawn from various types of studies, especially cause-and-effect conclusions.

To make it possible to do inference early in the course, we will be using randomization tests rather than tests using approximations based on a normal model. Although this technique is relatively new in an introductory level statistics course, it is extremely powerful because of its versatility and ability to be easily understood by students while still being theoretically correct. It also forces students to understand the reasoning of hypothesis testing rather than memorizing a set of algorithms and formulas.

Students will also spend time during each chapter working on projects where they collect data through experimentation or online research. Frequently allowing the students the opportunity to investigate statistical questions of their own choosing will make the material more relevant to the students and also more likely to be remembered.

Finally, technology will play a big part in this day-to-day instruction. Not only will students be using graphing calculators to create graphs and calculate summary statistics, they will be using statistical software and online applets to run simulations, and spend time online doing research and collecting data.

Unit Assignment(s):

Key Assignment: "Is There a Home Field Advantage in the NFL?" - Students are introduced to simulations to compare two proportions. TYPICAL ASSIGNMENT: For two types of shooting free throws, students identify treatments, formulate hypotheses to be tested, interpret a p-value, and are asked to understand the potential relationship between ABILITY and treatments.

Key Assignment: Test the hypothesis that there is no difference in the mean of points scored in home vs. away games. Students are given a set of scores (sample data). They compute the means for away and home games. They compute the test statistic (the difference of these means). Students then perform simulations by writing the scores on cards and shuffling them at random into two piles and taking the difference of the means of these two piles. Students generate a dot-plot and find the p-value based on the dot plot and the test statistic. Students will end these exercises by interpreting the p-value and reaching conclusions based on the p-values and the hypotheses they started with.

Unit Assessment: Using two-way tables, be able to state hypotheses and determine and interpret p-values using difference of proportions statistic. Determine if hypothetical case is an experiment or an observational study.

Unit 3: Investigating Independence

Unit Description: Does the Hot Hand Exist in Sports?

Students will explain the concept of independence in sports. State hypotheses, including a null and alternative hypothesis, about independence in sports. Simulate the distribution of the longest streak in a series of trials. Describe a Type I and Type II error in context.

Students use web-based databases (e.g. www.baseball-reference.com (https://www.baseball-reference.com/), www. pro-football-reference.com (https://www.pro-football-reference.com/)) to select data for statistical analysis. This includes exploratory data analysis (graphing and distribution descriptions) as well as inferential statistics (formulating hypotheses and drawing conclusions based on p-values). The web-based investigative tasks tie into the computer based exercises.

Unit Assignment(s):

Key Assignment: "Is it Possible to Get In the Zone?" Students are introduced to the concept of independence. TYPICAL ASSIGNMENT: In a set of pairs of free throws, does success in the first shot affect the chances of success in the second?

Unit Assessment: Describe and determine Type I and Type II error in context. Investigate independence by determining p-value of difference in performance of two proportions.

Unit 4: Exploring Numerical Data

Unit Description: Does the Designated Hitter Increase Offense in Major League Baseball?

Students will produce and interpret displays of quantitative variables, including dot plots, histograms, and boxplots.

⮒ Unit Assignment(s):

Use the mean and median to measure the center of a distribution and understand the difference between the two, particularly with regard to resistance to outliers.

Use the range and interquartile range to measure the spread of a distribution and understand the difference between the two, particularly with regard to resistance to outliers.

State hypotheses, including a null and alternative hypothesis, about the difference between two means (or medians).

Simulate the distribution of the difference in two means (or medians).

Unit Assessment: Draw and assess 5-number summary of a set of sports data and determine if outliers exist. Discuss center, shape, and spread of data and determine if mean is greater than median (or vice versa).

Unit 5: Comparing Two Means or Two Medians

Unit Description: Does the Designated Hitter Increase Offense in Major League Baseball?

Students will understand the distinction between independent and dependent samples. Analyze paired samples using the difference in each pair. State hypotheses, including a null and alternative hypothesis, about the mean difference of two dependent samples. Simulate the distribution of the mean difference in two dependent samples.

⮒ Unit Assignment(s):

Key Assignment: Students perform a paired difference of means test, e.g. athletes' performance with spiked shoes vs. regular shoes. Students understand the need to randomize, and how to program the computer to produce matched random pairings. Students produce and see the effect of repeated randomizations in the creation of a distribution.

Unit Assessment: Compare and contrast the difference of two means using simulated data. Describe and determine Type I and Type II error in context

Unit 6: Exploring Measures of Variability

Unit Description: Which 7-Iron is more Consistent?

Students will learn how to calculate and interpret the mean absolute deviation (MAD) as a measure of consistency (variability). Calculate and interpret the standard deviation as a measure of consistency (variability). Understand the influence of outliers on the standard deviation. State hypotheses, including a null and alternative hypothesis, about the difference of two standard deviations. Simulate the distribution of the difference in two standard deviations.

⮒ Unit Assignment(s):

Key Assignment: Students test the consistency of the performance of two players. Students look at a set of scores for each player and then they compute and interpret the standard deviations of these two data sets; the students compute the test statistic as the difference of these standard deviations. Students are given a modeled simulation dot-plot and are asked to determine the p-value, interpret it and reach conclusions based on this p-value.

Unit Assessment: Using paired data, interpret the mean difference of summarized data. Calculate, graph, and interpret a mean difference of paired data.

Unit 7: Standardized Scores and Normal Distributions

Unit Description: Which Players should I Draft for my Fantasy Team?

Students will learn how to calculate, interpret and use standardized scores. Using the 68-95-99.7 rule. Using the normal distribution to model athletic performance and estimate probabilities

⮒ Unit Assignment(s):

Key Assignment: "Who is the Home Run King?" - Students are introduced to the concepts of standardized scores and the Normal distribution. TYPICAL ASSIGNMENT: For the years 1927, 1961, 1998, and 2001 (all years with home run records of 60 or more) which player had the best PERFORMANCE? Students compute z-scores for Babe Ruth, Roger Maris, Mark McGwire, and Barry Bonds.

Unit Assessment: Calculate standardized test score (z-score) and determine the between two athletes of different sports, which performs "better". Use 68-95-99.7% rule to determine the percent of athletic performances within 1, 2, and 3 standard deviations away from mean. Using percentiles, determine (solve) for standard deviation.

Unit 8: Estimating Ability with Confidence Intervals

Unit Description: What is LeBron's True Ability?

The logic of confidence intervals. Calculate a confidence interval for a single proportion, a single mean, the difference between two proportions, and the difference between two means.

Unit Assignment(s):

Unit Assessment: Calculate and interpret confidence intervals for a single proportion and the difference of proportions for an athlete. Calculate and interpret margin of error for a confidence interval of a single proportion.

Unit 9: Exploring Relationships Between Numerical Variables

Unit Description: Teeing Off: Hit it Long or Hit it Straight?

Student will use scatterplots to display the relationship between two quantitative variables. Use the correlation coefficient to measure the strength of a linear relationship. Understand how outliers influence the correlation coefficient. State hypotheses, including a null and alternative hypothesis, about the correlation coefficient. Simulate the distribution of the correlation coefficient.

Unit Assignment(s):

Key Assignment: Students are introduced to the concepts involved in relationships between numerical variables: association, correlation coefficient and correlation vs. causation. TYPICAL ASSIGNMENT: Given the driving distance and driving accuracy of various golfers, students determine a relationship between these two variables and explore the nature of this relationship (strength, direction and linearity).

Unit Assessment: Describe the association in a scatterplot of two numerical variables in terms of strength, linearity, and direction. Test an hypotheses for the correlation and determine p-value in context.

Unit 10: Using Relationships to Make Predictions

Unit Description : How can we Build a Better Baseball Team?

Students will use equations to make predictions. Calculate and interpret residuals. Calculate and interpret the standard deviation of residuals. Understanding the concept of Least Squares. Calculate and use the least squares regression line. Interpret the slope of a least squares regression line. Understand how outliers influence the equation of a least squares regression line. State hypotheses, including a null and alternative hypothesis, about the slope of a least squares regression line. Simulate the distribution of the slope of a least squares regression line. Understand the concept of regression to the mean and how it affects predictions of future performance.

⮒ Unit Assignment(s):

Unit Assessment: Determine and interpret Least Squares Regression Line (LSRL) for an athletic performance, including the interpretation of slope if influential data points are removed. Describe and interpret slope and y-intercept of LSRL.

Unit 11: Multiple Regression

Unit Description : Hit it Long or Hit it Straight? Why not Both?

Students will learn the concept of multiple regression. Use multiple regression models to make predictions. Learn the concept of logistic regression. Use logistic regression to make prediction and produce and interpret time plots.

⮒ Unit Assignment(s):

Unit Assessment: Using sports statistics, determine the discrete binomial probability, including the expected value. Using sports statistics, determine the cumulative binomial probability, including expected value.

Unit 12: Exploring Counting Rules and Probability

Unit Description: Should you go for it on the Fourth Down?

Students will calculate and interpret expected values. Use expected values to evaluate strategies in sport. Construct and using two-way tables and tree-diagrams to find conditional probability. Develop and use probability rules: general additional and general multiplication rules.

⮒ Unit Assignment(s):

Students will use conditional probabilities and expected values to evaluate strategies in sports.

ourse Materials

Textbooks

Title	Author	Publisher	Edition	Website	Primary
tatistical Reasoning in Sports	Josh Tabor, Chris Franklin	W. H. Freeman and Company	2011	[empty]	Yes

EDUCATING AND INSPIRING EXCELLENCE

SJUSD

SAN JACINTO UNIFIED SCHOOL DISTRICT

New Course Signature/Approval Page

I. Suggested Course Title: Statistical Reasoning In Sports

II. Department(s): Math

III. School: SJHS

IV. School Committee Members:

a. Name: Ember Gardner Signature: Ember Gardner
b. Name: Lisa Sprenkle Signature:
c. Name: S. Seward Signature:
d. Name: Lloyd Sheppard Signature:
e. Name: Signature:

V. Committee Meeting Date(s): 11/1, 11/6

VI. Department Chair Signature:

a. Name: K. Cochran Signature: Date: 12/10/19
b. Name: Signature: Date:

VII. Principal Signature:

a. Name: Courtney Hall Signature: Date: 12/10/19

VIII. Course Proposal Reviewed by Educational Services:

a. Director, Educational Services: Janet Covacevich
Signature: Date: 12-19-19
b. Assistant Superintendent of Educational Services:
Signature: Date: 2/2/2020

IX. Course Proposal Approved by the Board of Trustees:

a. SJUSD Board of Trustees President:
Signature: Date: