

Spaulding High School

Course Title: Statistics

Department: Mathematics

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Course Description:

The goals of this course are to further the knowledge and usage of statistics regarding organizing and producing data, probability and inference. This course moves quickly and assumes knowledge of Algebra 1, Algebra 2 and Geometry topics and uses a variety of learning methods including explorations, experiments and self-directed study. There is a heavy dependence on the TI-83 graphing calculator. To be successful, Statistics students must complete daily work and readings, as well as think independently.

Topics/Areas of Study/Units of Study:

- Univariate Data
- Bivariate Data
- Sampling Methods
- Experimental Design
- Probability
- Inference

Materials/Text(s): Students will need to bring the following with them every day:

- Composition Book
- 3-ring binder
- Pencil
- Graphing Calculator: TI 83 or 84

Replacement cost(s): \$120 if a textbook is assigned

Practice:

Students will be given multiple learning opportunities during class and homework almost every night. While these assignments are not assessed, they are highly recommended.

Assessment/Reassessment:

Students will have multiple opportunities to show proficiency on each standard during class time. Additional opportunities are available and may be arranged on a case by case basis outside of class time. There will be limits on how long students can wait before reassessing, and these will be defined during class time. The most recent assessment will be used to indicate a student's level of proficiency.

Students will also be assessed using the schoolwide "Habits of Work" Rubric. This will include respect, effort, and accountability. This will determine eligibility for after school activities.

Classroom Expectations:

- Students will not be allowed to use their cell phones during class
- Please let me know if an absence is planned. It is the student's responsibility to find out what they missed in a timely manner.
- Extra assistance is available before school, after school, and during advisory.

| | Standards | Proficiency | | | |
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| A. Organizing Data* | Communicate the 5 W's | | | | |
| | Describe Statistical Information in Context | | | | |
| | Construct Graphical Representations | | | | |
| | Interpret Visual Representations | | | | |
| | Describe Shape, Outliers, Center, and Spread | | | | |
| | Describe the Skew of a Data Set | | | | |
| B. Relationships* | Identify Explanatory and Response Variables | | | | |
| | Describe and Interpret Scatterplots | | | | |
| | Compute Linear Regression | | | | |
| | Interpret Regression Lines | | | | |
| | Explain Affects on Correlation | | | | |
| | Explain Correlation Coefficients and Variability | | | | |
| | Compute Residuals to Evaluate Quality | | | | |
| | Straighten Non-Linear Data | | | | |
| C. Producing Data* | Know the Difference Between Experiment and Observation | | | | |
| | Identify Significances of Data Collection Techniques | | | | |
| | Describe Sampling Strategies | | | | |
| | Identify Sources of Potential Bias | | | | |
| | Describe Fundamentals of Experimental Design | | | | |
| | Describe Various Experimental Strategies | | | | |
| | Design Samples and Experiments | | | | |
| D. Probability | Compute Simple Theoretical and Empirical Probabilities | | | | |
| | Determine Mutually Exclusive and/or Independent Events | | | | |
| | Compute Conditional Probabilities | | | | |
| | Design Simulations | | | | |
| | Run Simulations and Interpret Results | | | | |
| | Create a Probability Density Function | | | | |

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|---------------------|---|--|--|--|--|
| | Compute Probabilities of Discrete and Random Variables | | | | |
| | Calculate Mean & Standard Deviation of Random Variables | | | | |
| | Compute Binomial and Geometric Probabilities | | | | |
| | Compare and Contrast Normal Distributions | | | | |
| | Compute Normal CDF Values | | | | |
| | Use Z-Scores to Compare Scenarios | | | | |
| | Determine When to Assume Normality | | | | |
| | Use Distributions to Approximate Probabilities | | | | |
| | Transform Random Variables | | | | |
| E. Inference | Compute Sample Statistics | | | | |
| | Compute and Interpret Confidence Intervals | | | | |
| | Explain Why Computations Use Diminished Data | | | | |
| | Explain Connections Between Proportions and Probability | | | | |
| | Apply the Central Limit Theorem | | | | |
| | Compute Confidence Intervals for Proportions | | | | |
| | Compute Confidence Intervals for Sample Means | | | | |
| | Compare T-Distributions and Normal Distributions | | | | |
| | Explain the Effects of Sample Size | | | | |
| | Compute Sample Sizes to Adjust Margins of Error | | | | |
| | Determine Appropriate Hypothesis | | | | |
| | Interpret Relationship of P-Values and Critical Values | | | | |
| | Determine Significance of Proportion Testing | | | | |
| | Determine Significance of Mean Testing | | | | |
| | Determine Significance of Paired Testing | | | | |
| | Determine When Paired Sampling Occurred from Context | | | | |
| | Calculate and Interpret Type I and Type II Errors | | | | |
| | Compute Power of a Test | | | | |
| | Compute and Interpret Chi Square Distributions | | | | |

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| | Compute Significance of Approximations of Slope (Optional) | | | | |
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Course Performance Guidelines:

Exemplary = Majority of standards are Exemplary

Proficient = Majority of standards are Proficient or Exemplary

★ Indicate standard that must be at a proficient level for an overall proficiency in the class