

Pequannock Township School District

Curriculum Syllabus

Course Name and level / Grade level and Subject: Statistics

Course Description:

Statistics is a research-oriented discipline that includes a vast area of research. This course introduces students to the basics of statistical testing, within both descriptive and inferential statistics. Students learn to organize, display, and analyze data and to explore the elements of probability. As you progress through the class, students will discover how to use statistics in their everyday life and in their future career.

Course Proficiencies:

The following is a list of proficiencies that describe what students are expected to know and be able to do as a result of successfully completing this course. The following proficiencies are the basis of the assessment of student achievement. The learner will demonstrate mastery of:

1. Sampling and Data
 - Data collection
 - Data classification
 - Experimental design
2. Descriptive Statistics
 - Frequency distributions
 - Displaying data
 - Measures of central tendency
 - Measures of variation
 - Measures of position
3. Probability Topics
 - Counting Principles
 - Conditional Probability and Multiplication Rule
 - Addition Rule
 - Combinatorics
4. Discrete Random Variables
 - Probability Distributions
 - Binomial Distributions
 - Geometric & Poisson Distributions
5. The Normal Distribution

- Normal Distributions and Standard Normal Distribution
 - Normal: Finding: Probabilities/Values
 - Sampling Distributions and Central Limit Theorem
 - Approximating the Binomial Distribution
6. Confidence Intervals
- Confidence Intervals for the Mean (σ known)
 - Confidence Intervals for the Mean (σ unknown)
 - Confidence Intervals for Population Proportions
 - Confidence Intervals for Variance and Standard Deviation
7. Hypothesis Testing
- Hypothesis Testing for the Mean (σ known)
 - Hypothesis Testing for the Mean (σ unknown)
 - Hypothesis Testing for Proportions
 - Hypothesis Testing for Variance and Standard Deviation

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them. *SMP1*
2. Reason abstractly and quantitatively. *SMP2*
3. Construct viable arguments and critique the reasoning of others. *SMP3*
4. Model with mathematics. *SMP4*
5. Use appropriate tools strategically. *SMP5*
6. Attend to precision. *SMP6*
7. Look for and make use of structure. *SMP7*
8. Look for and express regularity in repeated reasoning. *SMP8*

Scope and Sequence

<p>Unit 1 (Marking Period 1)</p> <p>Students will examine the role of statistics in the decision-making processes. Basic concepts and goals of statistics will be introduced.</p>
<p>Unit 2 (Marking Period 1)</p> <p>Students will construct frequency distributions and the appropriate graph to display data accurately. Students will explore measures of central tendency.</p>
<p>Unit 3 (Marking Period 1-2)</p>

Understanding the basic vocabulary and concepts of classic and conditional probability is necessary for everyday life. This unit provides an explanation of probability for processes with a finite number of possible outcomes. It explains the meaning of probability, as well as how to calculate probability and odds. It also examines the relationship between complementary events.

Unit 4 (Marking Period 2)

Students will learn how to create and use probability distributions. Knowing the shape, center, and variability of probability distributions enables the decision making process in inferential statistics.

Unit 5 (Marking Period 3)

Students will utilize the area under the normal curve to answer probabilistic questions. Students will apply the Central Limit Theorem to determine the likelihood of the occurrence of an event.

Unit 6 (Marking Period 3)

Students will employ the use of confidence intervals to determine the likelihood of a population mean being between a certain set of values. Students will apply the concepts of confidence intervals to determine differences between two population means.

Unit 7 (Marking Period 4)

Students will apply and interpret the logic of a hypothesis-testing procedure.

Assessments

Evaluation of student achievement in this course will be based on the following:

1. Observational data collected by teachers as students are learning
2. Formative assessments given by teachers to gauge progress toward each proficiency
3. Department Common Unit Assessments
4. Final Project

Curriculum Resources

Anchor Programs/Teacher Materials

- Elementary Statistics: Picturing the World by Pearson (2019)
- www.mymathlabforschool.com

Home and School Connection

The following are suggestions and/or resources that will help parents support their children:

- <https://www.princetonreview.com/academic-tutoring/subjects/statistics>
- <https://www.khanacademy.org/math/statistics-probability>
- <https://www.freemathhelp.com/statistics.html>
- <http://www.math.com/homeworkhelp/Statistics.html>