

**Wilson Area School District  
Planned Course Guide**

**Title of planned course:** Probability and Statistics

**Subject Area:** Mathematics

**Grade Level:** 12

**Course Description:** This course is a study of efficient counting, permutations and combinations, organizing and reporting data, probabilities, and theoretical distributions.

**Time/Credit for this Course:** .5 Credits; Half year

**Curriculum Writing Committee:** BethAyn Tarsi

## Curriculum Map

**August:** N/A

**September:** N/A

**October:** N/A

**November:** N/A

**December:** N/A

**January:** Random Samples  
Experimental Design

**February:** Experimental Design  
Organizing Data  
Averages and Variation

**March:** Averages and Variation  
Correlation and Regression

**April:** Probability Theories  
Binomial Probability

**May:** Binomial Probability  
The Normal Distribution  
Hypothesis Testing

**June:** Chi-Square Distribution

**Wilson Area School District  
Planned Course Materials**

**Course Title:** Probability and Statistics

**Textbook:**

Understanding Basic Statistics  
Brase/Brase Fifth Edition  
2010  
Brooks/Cole Cengage Learning

**Supplemental Books:**

Statistics and Probability in Modern Life (old textbook)

**Teacher Resources:**

Teacher created handouts/activities  
Internet resources  
Student Notetaking Guide

## Curriculum Scope & Sequence

**Planned Course:** Probability and Statistics

**Unit:** Random Samples & Experimental Design

**Time frame:** 3 – 5 classes

**State Standards:** 2.6.11A

**Anchor(s) or adopted anchor:**

**Essential content/objectives:** At end of the unit, students will be able to:

- Identify variables in a statistical study
- Distinguish between different types of variables
- Identify populations and samples
- Distinguish between parameters and statistics
- Compare and contrast descriptive and inferential statistics

**Core Activities:** Students will complete/participate in the following:

- Define applicable vocabulary
- Apply vocabulary to statistical situations
- Analyze statistical data to apply vocabulary
- Interpret statistical data for flaws

**Extensions:**

- Find statistical references in paper media (newspaper and magazines) and apply vocabulary and interpret the results for plausibility.

**Remediation:**

- Chapter review exercises which revisits concepts and vocabulary.
- Teacher/peer tutoring
- Math Lab assignment

**Instructional Methods:**

- Lecture notes
- Small group activities
- Higher order thinking questions
- Power-Point Presentations
- Warm-ups
- Book examples

**Materials & Resources:**

- MS Office and PowerPoint
- Graphing Calculators
- Pre-written notes/handouts/activities
- Textbook
- Student notetaking guide

**Assessments:**

- Teacher observation
- Homework
- Warm-ups
- Questioning
- Worksheets
- Tests/quizzes

## Curriculum Scope & Sequence

**Planned Course:** Probability and Statistics

**Unit:** Organizing Statistical Data

**Time frame:** 5 – 10 classes

**State Standards:** 2.6.11C

**Anchor(s) or adopted anchor:**

**Essential content/objectives:** At end of the unit, students will be able to:

- Create graphical representations of statistical data
- Analyze graphical representations of statistical data

**Core Activities:** Students will complete/participate in the following:

- Define different types of graphical representations of statistical data
- Practice creating graphical representations for statistical data
- Analyze statistical data to determine the best graphical representation to apply

**Extensions:**

- Create a book of graphical representations found in print media

**Remediation:**

- Chapter review exercises which revisits concepts and vocabulary.
- Teacher/peer tutoring
- Math Lab assignment

**Instructional Methods:**

- Lecture notes
- Small group activities
- Higher order thinking questions
- Power-Point Presentations
- Warm-ups
- Book examples

**Materials & Resources:**

- MS Office and PowerPoint
- Graphing Calculators
- Pre-written notes/handouts/activities
- Textbook(s)
- Student notetaking guide

**Assessments:**

- Teacher observation
- Homework
- Warm-ups
- Questioning
- Worksheets
- Tests/quizzes

## Curriculum Scope & Sequence

**Planned Course:** Probability and Statistics

**Unit:** Determine Averages and Variation of Data

**Time frame:** 5 - 10 classes

**State Standards:** 2.6.11C

**Anchor(s) or adopted anchor:**

**Essential content/objectives:** At end of the unit, students will be able to:

- Determine measures of central tendency
- Determine the percentile rank when given a set of data
- Determine the variance and standard deviation of a set of data
- Interpret the standard deviation of a set of data

**Core Activities:** Students will complete/participate in the following:

- Practice problems at board and seat
- Apply the formula for percentile rank given a set of data and interpret the results
- Apply the formulas for variance and standard deviation and interpret the results

**Extensions:**

- Collection and presentation of statistical data within the students area of interest.

**Remediation:**

- Chapter review exercises which revisits concepts and vocabulary.
- Teacher/peer tutoring
- Math Lab assignment

**Instructional Methods:**

- Lecture notes
- Small group activities
- Higher order thinking questions
- Power-Point Presentations
- Warm-ups
- Book examples

**Materials & Resources:**

- MS Office and PowerPoint
- Graphing Calculators
- Pre-written notes/handouts/activities
- Textbook(s)
- Student notetaking guide



**Assessments:**

- Teacher observation
- Homework
- Warm-ups
- Questioning
- Worksheets
- Tests/quizzes

## Curriculum Scope & Sequence

**Planned Course:** Probability and Statistics

**Unit:** Correlation and Regression

**Time frame:** 10 - 15 classes

**State Standards:** 2.6.11A, 2.6.11C, 2.6.11.E

**Anchor(s) or adopted anchor:**

**Essential content/objectives:** At end of the unit, students will be able to:

- Determine the correlation coefficient of a given set of data
- Determine, statistically, the line of best fit for a set of data
- Determine the equation of the least squares regression
- Make predictions utilizing a least squares regression line

**Core Activities:** Students will complete/participate in the following:

- Practice problems at board and seat
- Apply the formula to determine the correlation coefficient
- Analyze the correlation coefficient of a set of data to determine accuracy of fit
- Apply the formula for least squares regression
- Determine the accuracy of the least squares regression line

**Extensions:**

- Class data collection for applying the least squares regression to determine which variable has the largest impact. (stomp rocket activity)

**Remediation:**

- Chapter review exercises which revisits concepts and vocabulary.
- Teacher/peer tutoring
- Math Lab assignment

**Instructional Methods:**

- Lecture notes
- Small group activities
- Higher order thinking questions
- Power-Point Presentations
- Warm-ups
- Book examples

**Materials & Resources:**

- MS Office and PowerPoint
- Graphing Calculators
- Pre-written notes/handouts/activities
- Textbook(s)

**Assessments:**

- Teacher observation
- Homework
- Warm-ups
- Questioning
- Worksheets
- Tests/quizzes

## Curriculum Scope & Sequence

**Planned Course:** Probability and Statistics

**Unit:** Probability

**Time frame:** 15 – 20 classes

**State Standards:** 2.7.11A, 2.7.11.C, 2.7.11.E

**Anchor(s) or adopted anchor:**

**Essential content/objectives:** At end of the unit, students will be able to:

- Determine the number of permutations and combinations
- Determine the sample space of a particular situation
- Determine the probability of a particular event within a particular situation
  - Independent/dependent events
  - Mutually exclusive events
- Utilize probability rules to determine the likelihood of a particular event
  - Addition rule
  - Multiplication rule

**Core Activities:** Students will complete/participate in the following:

- Practice problems at board and seat
- Apply the formulas for permutations and combinations
- Create the sample space utilizing tree diagrams
- Apply the formulas for probability given a particular situation
- Analyze a given situation to determine which probability formula to apply

**Extensions:**

- Create a probability distribution relevant to student interest and present to the class. Students will need to explain which they would fit within the data and explain the impact on their lives and future decisions.

**Remediation:**

- Chapter review exercises which revisits concepts and vocabulary.
- Teacher/peer tutoring
- Math Lab assignment

**Instructional Methods:**

- Lecture notes
- Small group activities
- Higher order thinking questions
- Power-Point Presentations
- Warm-ups
- Book examples

**Materials & Resources:**

- MS Office and PowerPoint
- Graphing Calculators
- Pre-written notes/handouts/activities
- Textbook(s)
- Student notetaking guide

**Assessments:**

- Teacher observation
- Homework
- Warm-ups
- Questioning
- Worksheets
- Tests/quizzes

## Curriculum Scope & Sequence

**Planned Course:** Probability and Statistics

**Unit:** Binomial Distribution

**Time frame:** 5 – 10 classes

**State Standards:** 2.7.11A, 2.7.11E

**Anchor(s) or adopted anchor:**

**Essential content/objectives:** At end of the unit, students will be able to:

- Differentiate between types of random variables
- Determine if a random variable fits the criteria for a binomial distribution
- Determine the probability of an event within a binomial distribution
- Determine the mean, variance and standard deviation of binomial distribution

**Core Activities:** Students will complete/participate in the following:

- Define the different types of random variables
- Practice problems at board and seat
- Apply the formula for the binomial distribution
- Apply the formulas for determining the mean, variance and standard deviation of a binomial distribution
- Utilize the binomial distribution table of values to assist in finding the probability

**Extensions:**

- Find binomial probability results in print media and interpret their results on our everyday lives

**Remediation:**

- Chapter review exercises which revisits concepts and vocabulary.
- Teacher/peer tutoring
- Math Lab assignment

**Instructional Methods:**

- Lecture notes
- Small group activities
- Higher order thinking questions
- Power-Point Presentations
- Warm-ups
- Book examples

**Materials & Resources:**

- MS Office and PowerPoint
- Graphing Calculators
- Pre-written notes/handouts/activities
- Textbook(s)
- Student notetaking guide

**Assessments:**

- Teacher observation
- Homework
- Warm-ups
- Questioning
- Worksheets
- Tests/quizzes

## Curriculum Scope & Sequence

**Planned Course:** Probability and Statistics

**Unit:** Normal Distribution

**Time frame:** 5 – 10 classes

**State Standards:** 2.7.11A, 2.7.11E

**Anchor(s) or adopted anchor:**

**Essential content/objectives:** At end of the unit, students will be able to:

- Determine if the data supports a normal distribution
- Determine the probability of an event within a normal distribution
- Normalize a set of data to be able to utilize the normal distribution table of values
- Determine a data point within a set for a particular outcome
- Determine the mean, variance and standard deviation of normal distribution

**Core Activities:** Students will complete/participate in the following:

- Practice problems at board and seat
- Apply the formula for normalizing a set of data
- Apply the formulas for determining the mean, variance and standard deviation of a normal distribution
- Apply the formulas to determine a specific data point for a particular situation within a normal distribution

**Extensions:**

- Relate the normal distribution to the area under the curve and the mean value theorem in calculus

**Remediation:**

- Chapter review exercises which revisits concepts and vocabulary.
- Teacher/peer tutoring
- Math Lab assignment

**Instructional Methods:**

- Lecture notes
- Small group activities
- Higher order thinking questions
- Power-Point Presentations
- Warm-ups
- Book examples



**Materials & Resources:**

- MS Office and PowerPoint
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- Textbook(s)
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**Assessments:**

- Teacher observation
- Homework
- Warm-ups
- Questioning
- Worksheets
- Tests/quizzes

## Curriculum Scope & Sequence

**Planned Course:** Probability and Statistics

**Unit:** Chi-Square Distribution

**Time frame:** 5 – 10 classes

**State Standards:** 2.7.11E

**Anchor(s) or adopted anchor:**

**Essential content/objectives:** At end of the unit, students will be able to:

- Determine if the data supports a chi-square distribution
- Determine whether the null hypothesis of a chi-square distribution should be accepted or rejected
- Determine the degrees of freedom within a chi-square distribution

**Core Activities:** Students will complete/participate in the following:

- Practice problems at board and seat
- Apply the formula for testing the null hypothesis within a chi-square distribution
- Apply the formulas to determine the degrees of freedom within a chi-square distribution

**Extensions:**

- Compare and contrast probability distributions and hypothesis testing.
- Analyze recent print media for probability distributions and hypothesis testing to relate unit to real world

**Remediation:**

- Chapter review exercises which revisits concepts and vocabulary.
- Teacher/peer tutoring
- Math Lab assignment

**Instructional Methods:**

- Lecture notes
- Small group activities
- Higher order thinking questions
- Power-Point Presentations
- Warm-ups
- Book examples

**Materials & Resources:**

- MS Office and PowerPoint
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**Assessments:**

- Teacher observation
- Homework
- Warm-ups
- Questioning
- Worksheets
- Tests/quizzes