Math Planned Course: CP Statistics – Grades 11 - 12

Unit: **Introduction to Statistics**

Content Standard: **Identify and analyze the types of statistics, data, and sampling techniques.**

State Curriculum Standards:

2.5.11B Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predications, concepts, procedures, generalizations, ideas, and results.
2.5.11C Present mathematical procedures and results clearly, systematically, succinctly, and correctly.
2.5.11D Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem an why the reasoning is valid.
2.6.8 B Explain effects of sampling procedure and missing or incorrect information on reliability.
2.6.11D Make predictions using interpolation, extrapolation, regression and estimation using technology to verify them.
2.6.11G Describe questions of experimental design, control groups, treatment groups, cluster sampling and reliability.
2.6.11H Use sampling techniques to draw inferences about large populations

ISTE Standards:

1 Basic operations and concepts
2 Social, ethical, and human issues
3 Technology productivity tools
4 Technology communications tools
5 Technology research tools
6 Technology problem-solving and decision-making tools

PSSA Anchors:

M11.A.2.1 Apply ratio and/or proportion in problem-solving situations.
M11.E.1.1.2 Answer questions based on displayed data.

Math Planned Course: CP Statistics – Grades 11 - 12

Course Content	Student Performance	Resources	Assessments
A. Branches of Statistics • Descriptive • Inferential B. Types of Data • Qualitative • Quantitative C. Levels of Measurement D. Experimental Design E. Sampling Techniques • Random • Stratified • Cluster • Systematic • Convenience	• Discuss, research, and define statistics • Identify the two major areas of statistics • Analyze newspaper or magazine articles to determine the types of statistics • Compare and contrast types of data and list examples • Examine newspaper articles for distortions of data • Classify data with respect to the four levels of measurement • Identify different methods for experimental design and sampling techniques • Complete open-ended and multiple choice questions to review concepts • Create samples using various techniques • List careers that use statistics	• Elementary Statistics: Picturing the World, 4th Edition (Prentice Hall) • Newspaper articles • Magazine articles • Teacher generated projects • Elementary Statistics data disk (Prentice Hall) • Graphing and/or scientific calculators • Supplementary resource materials • CPS • Study Island • Spiral review and project binder • Appendix	• Teacher made test • Teacher made quizzes • Journal entry • Case study • Newspaper/magazine analysis • Real statistics exercises • Teacher observation • Textbook problems • Application problems • Bell ringers • Final project **Remediation** • StatPro Computer tutorial **Enrichment** • Technology project • Uses and abuses exercises

Math Planned Course: CP Statistics – Grades 11 - 12

Unit: **Descriptive Statistics**

Content Standard: **Organize and manipulate data using the best method of representation that allows patterns to be easily interpreted.**

State Curriculum Standards:

2.1.11A Use operations.
2.2.11A Develop and use computation concepts, operations and procedures with real numbers in problem-solving situations.
2.2.11B Use estimation to solve problems for which an exact answer is not needed.
2.2.11E Recognize that the degree of precision needed in calculating a number depends on how the results will be used and the instruments used to generate the measure.
2.2.11F Demonstrate skills for using computer spreadsheets and scientific and graphing calculators.
2.5.11B Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predications, concepts, procedures, generalizations, ideas, and results.
2.5.11C Present mathematical procedures and results clearly, systematically, succinctly, and correctly.
2.6.8 E Analyze and display data in stem-and-leaf and box-and-whisker plots.
2.6.11A Design and conduct an experiment using random sampling. Organize and represent the results with graphs.
2.6.11D Make predictions using interpolation, extrapolation, regression and estimation using technology to verify them.
2.7.8 B Present the results of an experiment using visual representations (e.g., tables, charts, graphs)
2.8.11Q Represent functional relationships in tables, charts, and graphs.

ISTE Standards:

1 Basic operations and concepts
2 Social, ethical, and human issues
3 Technology productivity tools
4 Technology communications tools
5 Technology research tools
6 Technology problem-solving and decision-making tools

PSSA Anchors:

M11.A.3.1.1 Simplify expressions using the order of operations to solve problems.
M11.A.3.2.1 Use estimation to solve problems.
M11.C.1.1.1 Identify and/or use the properties of a radius, diameter, chord, tangent, and/or secant of a circle.
M11.C.1.1.2 Recognize or use the properties of arcs, semicircles, inscribed angles and/or central angles.
M11.E.1.1.1 Create and/or use appropriate graphical representations of data, including box-and-whisker plots, stem-and-leaf plots, scatter plots, line/double line, bar/double bar and circle graphs.
M11.E.1.1.2 Answer questions based on displayed data .
M11.E.4.1.1 Estimate or calculate to make predictions based on a circle, line, or bar graph or given situation.
M11.E.4.2.1 Draw, find and/or write an equation for a line of best fit for a scatter plot.
M11.E.4.2.2 Make predictions using the equations or graphs of best-fit lines of scatter plots.

Course Content	Student Performance	Resources	Assessments
A. Frequency Distributions • Histograms • Polygons • Relative Frequency Histograms B. Graphical Representation of Data: • Bar graph • Pictograph • Circle graph • Stem-and-leaf • Pareto charts • Time series chart • Scatter plots C. Distortions of Data	• List methods for collecting/displaying data • Determine when to use each type of graph to display data • Predict trends by analyzing various types of graphs • Construct and analyze frequency distributions, histograms, bar graphs, pictographs and circle graphs • Create a survey, collect data, represent data graphically, and analyze data • Construct a graph that distorts the data found in the survey • Complete text problems and exploration activity 1 • Analyze articles for misleading graphs • Create a spreadsheet to compute frequency distributions for text problems	• Elementary Statistics: Picturing the World, 4th Edition (Prentice Hall) • Student-made surveys • Student-made graphs • Construction paper, markers, colored pencils, rulers, compasses • Various sample graphs • Newspaper/magazine articles • M&M candies • Exploring Statistics with the TI-83 (Brendan Kelly, 1998) • Elementary Statistics Data Disk (Prentice Hall) • Graphing and/or scientific calculators • Supplementary resource materials • CPS • Study Island • Spiral review and project	• Teacher made test • Teacher made quizzes • Journal entry • Case study • Newspaper/magazine analysis • Real statistics exercises • Teacher observation • Textbook problems • Application problems • Bell ringers • Final project **Remediation** • StatPro Computer Tutorial • Exploration activities **Enrichment** • Internet research

		binder • Appendix	

Unit: **Descriptive Statistics**

Content Standard**: Calculate and use measures of central tendency, variation, and position to evaluate, draw conclusions, and make predictions.**

State Curriculum Standard:

2.1.11A Use operations.
2.2.11A Develop and use computation concepts, operations and procedures with real numbers in problem-solving situations.
2.2.11E Recognize that the degree of precision needed in calculating a number depends on how the results will be used and the instruments used to generate the measure.
2.5.11A Select and use appropriate mathematical concepts and techniques from different areas of mathematics and apply them to solving non-routine and multi-step problems.,
2.5.11B Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predications, concepts, procedures, generalizations, ideas, and results.
2.5.11C Present mathematical procedures and results clearly, systematically, succinctly, and correctly.
2.5.11D Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem an why the reasoning is valid.
2.6.8 A Compare and contrast different plots of data using values of mean, median, mode, quartiles, and range.
2.6.8 B Explain effects of sampling procedures and missing or incorrect information on reliability.
2.6.8 E Analyze and display data in stem-and-leaf and box-and-whisker plots.
2.6.11A Design and conduct an experiment using random sampling. Organize and represent the results with graphs.
2.6.11D Make predictions using interpolation, extrapolation, regression and estimation using technology to verify them.
2.6.11H Use sampling techniques to draw inferences about large populations.

ISTE Standards:

1 Basic operations and concepts
2 Social, ethical, and human issues
3 Technology productivity tools
4 Technology communications tools
5 Technology research tools
6 Technology problem-solving and decision-making tools

PSSA Anchors:

M11.A.3.1.1 Simplify expressions using the order of operations to solve problems.
M11.A.3.2.1 Use estimation to solve problems.
M11.E.1.1.1 Create and/or use appropriate graphical representations of data, including box-and-whisker plots, stem-and-leaf plots, scatter plots, line/double line, bar/double bar and circle graphs.
M11.E.1.1.2 Answer questions based on displayed data .
M11.E.4.1.1 Estimate or calculate to make predictions based on a circle, line, or bar graph or given situation
M11.E.2.1.1 Calculate or select the appropriate measure of central tendency of a set of data given or represented on a table, line plot, or stem-and-leaf plot.

M11.E.2.1.2 Calculate and/or interpret the range, quartiles and interquartile range of sets of data.
M11.E.2.1.3 Describe how outliers affect measures of central tendency.

Course Content	Student Performance	Resources	Assessments
A. Measures of Central Tendency • Mean • Median • Mode • Weighted mean • Outlier B. Distributions • Symmetric • Uniform • Skewed C. Measures of Variation • Range • Variance • Standard deviation D. Measures of Position • Quartiles • Percentiles • Fractiles • Interquartile range • Box-and-whisker plots	• Define different types of measures of central tendency and when each should be used • Calculate each type of measure from sets of student generated data and interpret the results • Determine which type of measure of central tendency works best in the business world • Discuss various measures of variation and how to compute them • Calculate and interpret the measures of variation for given sets of data • Examine standardized tests and their use of measures of position • Calculate and analyze quartiles, percentiles, and fractiles from sample test data • Represent data by constructing a box-and-whisker plot • Complete text questions • Examine and complete case study questions	• Elementary Statistics: Picturing the World, 4th Edition (Prentice Hall) • Sample Standardized test data • Case Study from text • Pizzazz! (Creative Publications, 1996) • Elementary Statistics Data Disk (Prentice Hall) • Graphing and/or scientific calculators • Supplementary resource materials • CPS • Study Island • Spiral review and project binder • Appendix	• Teacher made test • Teacher observation • Textbook problems • Case study • Journal entry • Teacher made activities • Bell ringers • Final project **Remediation** • StatPro tutorial • Peer tutoring **Enrichment** • Extending the basic exercises

Unit: **Probability**

Content Standard: **Apply the different rules of probability to solve real world problems and make predictions.**

State Curriculum Standards:
2.1.11A Use operations.
2.2.11A Develop and use computations concepts, operations and procedures with real numbers in problem-solving situations.
2.5.11B Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas, and results
2.5.11C Present mathematical procedures and results clearly, systematically, succinctly and correctly.
2.7.11B Apply probability and statistics to perform an experiment involving a sample and generalize its results to the entire population.
2.7.11C Draw and justify a conclusion regarding the validity of a probability or statistical argument.
2.7.11E Solve problems involving independent simple and compound events.

ISTE Standards:
1 Basic operations and concepts
2 Social, ethical, and human issues
3 Technology productivity tools
4 Technology communications tools
5 Technology research tools
6 Technology problem-solving and decision-making tools

PSSA Anchors:
M11.A.3.1.1 Simplify expressions using the order of operations to solve problems.
M11.A.3.2.1 Use estimation to solve problems.
M11.E.3.1.1 Find probabilities for independent, dependent or compound events and represent as a fraction, decimal or percent.
M11.E.3.1.2 Find, convert and/or compare the probability and/or odds of a simple event.

Course Content	Student Performance	Resources	Assessments

A. Types of Probability
• Classical
• Empirical
• Subjective
 	
B. Conditional Probability
 	
C. Addition Rule
 	
D. Multiplication Rule
 	
E. Types of Events
• Independent
• Dependent
• Mutually exclusive
	• Identify and take notes on the types of probability and sample space
	
	• Compare and contrast independent and dependent events
	
	• Use addition and multiplication rules to determine the probability of an event
	
	• Make predictions about various experiments then perform the probability experiment
	
	• Perform probability experiments to simulate counting problems:
	  • toss a coin 50 times
	  • rolling dice
	  • cards
	  • birthday dice
	  • counting pizzas (NCTM)
	
	• Perform similar experiments as above using explore activities 8 and 10 and the graphing calculators
		• Elementary Statistics: Picturing the World, 4th Edition (Prentice Hall)
		
		• Mathematics Teacher (NCTM) Vol 95, No 1, Jan 2002
		
		• Probability (Scholastic, 1998)
		
		• Pizzazz! (Creative Publications, 1996)
		
		• Access to Math: Probability (Globe Fearon, 1996)
		
		• Probability Activities (Key Curriculum Press, 1993)
		
		• Cards, dice, coins, counters
		
		• Exploring Statistics with the TI-83 (Brendan Kelly, 1998)
		
		• Elementary Statistics Data Disk (Prentice Hall)
		
		• Graphing and/or scientific calculators
		
		• Supplementary resource materials
		
		• CPS
		
		• Study Island
			• Teacher made test
			
			• Teacher observation
			
			• Textbook questions
			
			• Experiments
			
			• Journal entry open/ended question
			
			• Explore activities
			
			• Bell ringers
			
			Remediation
			• StatPro Computer tutorial
			
			• Peer tutoring
			
			Enrichment
			• Technology project
			
			• Extending the basics exercises

		• Spiral review and project binder • Appendix	

Unit: **Probability**

Content Standard: **Determine the odds, combinations, and permutations of an event occurring.**

State Curriculum Standards:
2.1.11A Use operations.
2.2.11A Develop and use computations concepts, operations and procedures with real numbers in problem-solving situations.
2.5.11B Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas, and results
2.5.11C Present mathematical procedures and results clearly, systematically, succinctly and correctly.
2.7.8A Determine the number of combinations and permutations of an event.
2.7.11A Compare odds and probability.
2.7.11B Apply probability and statistics to perform an experiment involving a sample and generalize its results to the entire population.
2.7.11C Draw and justify a conclusion regarding the validity of a probability or statistical argument.
2.7.11E Solve problems involving independent simple and compound events.

ISTE Standards:
1 Basic operations and concepts
2 Social, ethical, and human issues
3 Technology productivity tools
4 Technology communications tools
5 Technology research tools
6 Technology problem-solving and decision-making tools

PSSA Anchors:
M11.A.3.1.1 Simplify expressions using the order of operations to solve problems.
M11.A.3.2.1 Use estimation to solve problems.
M11.E.3.1.1 Find probabilities for independent, dependent or compound events and represent as a fraction, decimal or percent.
M11.E.3.1.2 Find, convert and/or compare the probability and/or odds of a simple event.
M11.E.3.2.1 Determine the number of permutations and/or combinations or apply the fundamental counting principle.

Course Content	Student Performance	Resources	Assessments
A. Counting • Fundamental Counting Principle • Permutations • Distinguishable Permutations • Combinations B. Odds	• Define combinations and permutations • Restate the formulas for combinations and permutations using mathematical symbols • Calculate various combinations and permutations • Draw tree diagrams to illustrate outcomes in a multi-stage event • Calculate the number of combinations for a given problem and write the results in their journals using PSSA format • Perform probability activities concerning Pascal's triangle • Discuss the use of odds in the real-world • Calculate the odds of an event • Determine where probability	• Elementary Statistics: Picturing the World, 4th Edition (Prentice Hall) • Mathematics Teacher (NCTM) Vol 95, No 1, Jan 2002 • Probability Activities (Key Curriculum Press, 1993) • Cards, dice, coins, counters • Exploring Statistics with the TI-83 (Brendan Kelly, 1998) • Elementary Statistics Data Disk (Prentice Hall) • Graphing and/or scientific calculators • Supplementary resource materials • CPS • Study Island • Spiral review and project binder	• Teacher made test • Teacher observation • Textbook questions • Experiments • Journal entry open/ended question • Explore activities • Bell ringers **Remediation** • StatPro Computer tutorial • Peer tutoring **Enrichment** • Technology project • Extending the basics exercises

	would be used in real-life	• Appendix	

Unit: **Discrete Probability Distributions**

Content Standard: **Use probability distributions to analyze data in real-world situations.**

State Curriculum Standards:
2.1.11A Use operations.
2.2.11A Develop and use computations concepts, operations and procedures with real numbers in problem-solving situations.
2.2.11D Describe and explain the amount of error that may exist in a computation using estimates.
2.5.11A Select and use appropriate mathematical concepts and techniques from different areas of mathematics and apply them to solving non-routine and multi-step problems.
2.5.11B Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas, and results
2.5.11C Present mathematical procedures and results clearly, systematically, succinctly and correctly.
2.5.11D Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem and why the reasoning is valid.
2.6.11A Design and conduct an experiment using random sampling.
2.6.11H Use sampling techniques to draw inferences about large populations.
2.7.11B Apply probability and statistics to perform an experiment involving a sample and generalize its results to the entire population.
2.7.11C Draw and justify a conclusion regarding the validity of a probability or statistical argument.
2.7.11D Use experimental and theoretical probability distributions to make judgments about the likelihood of various outcomes in uncertain situations.
2.7.11E Solve problems involving independent simple and compound events.

ISTE Standards:
1 Basic operations and concepts
2 Social, ethical, and human issues
3 Technology productivity tools
4 Technology communications tools
5 Technology research tools
6 Technology problem-solving and decision-making tools

PSSA Anchors:
M11.A.3.1.1 Simplify expressions using the order of operations to solve problems.
M11.A.3.2.1 Use estimation to solve problems.
M11.E.2.1.1 Calculate or select the appropriate measure of central tendency of a set of data given or represented on a table, line plot, or stem-and-leaf plot.
M11.E.2.1.2 Calculate and/or interpret the range, quartiles and interquartile range of sets of data.
M11.E.2.1.3 Describe how outliers affect measures of central tendency.
M11.E.3.1.1 Find probabilities for independent, dependent or compound events and represent as a fraction, decimal or percent.

M11.E.3.1.2 Find, convert and/or compare the probability and/or odds of a simple event.

Course Content	Student Performance	Resources	Assessments
A. Discrete Random Variables • Mean • Variance • Standard deviation B. Discrete Probability Distribution C. Expected Value	• Define components of a probability distribution • Watch video 4.1 demonstrating constructing a probability distribution • Calculate standard deviation and expected value of a probability distribution • Calculate text problems and written exercises • Construct a discrete probability distribution and its graph • Write a journal entry explaining real-life situations that probability distributions would be used • Examine lottery drawings and determine the expected value of a student's gain • Analyze how probability distributions are used in various careers	• Elementary Statistics: Picturing the World, 4th Edition (Prentice Hall) • "Elementary Statistics" Video (Prentice Hall) • Elementary Statistics Data Disk (Prentice Hall) • Graphing and/or scientific calculators • Supplementary resource materials • CPS • Study Island • Spiral review and project binder • Appendix	• Teacher made test • Teacher observation • Textbook questions • Journal entry • Application problems • Teacher created projects • Bell ringers • Final project **Remediation** • StatPro Computer tutorial • Pizzazz! activity **Enrichment** • Technology project

	• Find the expected value of a probability distribution		

Unit: **Discrete Probability Distributions**

Content Standard: **Identify the differences between and use various types of probability and binomial distributions to analyze data in real-world situations.**

State Curriculum Standards:
2.1.11A Use operations.
2.2.11A Develop and use computations concepts, operations and procedures with real numbers in problem-solving situations.
2.2.11D Describe and explain the amount of error that may exist in a computation using estimates.
2.2.11E Recognize that the degree of precision needed in calculating a number depends on how the results will be used and the instruments used to generate the measure.
2.5.11A Select and use appropriate mathematical concepts and techniques from different areas of mathematics and apply them to solving non-routine and multi-step problems.
2.5.11B Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas, and results
2.5.11C Present mathematical procedures and results clearly, systematically, succinctly and correctly.
2.5.11D Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem and why the reasoning is valid.
2.6.11A Design and conduct an experiment using random sampling.
2.6.11H Use sampling techniques to draw inferences about large populations.
2.7.11B Apply probability and statistics to perform an experiment involving a sample and generalize its results to the entire population.
2.7.11C Draw and justify a conclusion regarding the validity of a probability or statistical argument.
2.7.11D Use experimental and theoretical probability distributions to make judgments about the likelihood of various outcomes in uncertain situations.
2.7.11E Solve problems involving independent simple and compound events.

ISTE Standards:
1 Basic operations and concepts
2 Social, ethical, and human issues
3 Technology productivity tools
4 Technology communications tools
5 Technology research tools
6 Technology problem-solving and decision-making tools

PSSA Anchors:
M11.A.3.1.1 Simplify expressions using the order of operations to solve problems.
M11.A.3.2.1 Use estimation to solve problems.
M11.E.2.1.1 Calculate or select the appropriate measure of central tendency of a set of data given or represented on a table, line plot, or stem-and-leaf

plot.
M11.E.2.1.2 Calculate and/or interpret the range, quartiles and interquartile range of sets of data.
M11.E.2.1.3 Describe how outliers affect measures of central tendency.
M11.E.3.1.1 Find probabilities for independent, dependent or compound events and represent as a fraction, decimal or percent.

Course Content	Student Performance	Resources	Assessments
A. Binomial Distribution • Mean • Variance • Standard deviation B. Geometric Distribution C. Poisson Distribution	• Discuss various new symbols and formulas for finding distributions • Watch video for 4.2 on binomial distributions • Complete written exercises on binomial distributions • Create graphs displaying binomial distributions • Use Pascal's triangle to compute combinations in Exploration 11 • Complete the case study on the binomial distribution • Calculate binomial probability distributions using tables and/or technology • Compare and contrast binomial, geometric, and Poisson distributions in a journal entry	• Elementary Statistics: Picturing the World, 4th Edition (Prentice Hall) • "Elementary Statistics" Video (Prentice Hall) • Case study • Exploring Statistics with the TI-83 (Brendon Kelly, 1998) • Elementary Statistics Data Disk (Prentice Hall) • Graphing and/or scientific calculators • Supplementary resource materials • CPS • Study Island • Spiral review and project binder • Appendix	• Teacher made test • Teacher observation • Textbook questions • Journal entry • Application problems • Teacher created projects • Bell ringers • Final project **Remediation** • StatPro Computer tutorial **Enrichment** • Technology project • Extending basics exercises

	• Calculate probability using the Geometric and Poisson distributions		

Unit: **Normal Probability Distributions**

Content Standard: **Use normal probability distributions to analyze data and solve problems.**

State Curriculum Standards:
2.1.11A Use operations.
2.2.11A Develop and use computations concepts, operations and procedures with real numbers in problem-solving situations.
2.2.11D Describe and explain the amount of error that may exist in a computation using estimates.
2.2.11E Recognize that the degree of precision needed in calculating a number depends on how the results will be used and the instruments used to generate the measure.
2.5.11A Select and use appropriate mathematical concepts and techniques from different areas of mathematics and apply them to solving non-routine and multi-step problems.
2.5.11B Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas, and results
2.5.11C Present mathematical procedures and results clearly, systematically, succinctly and correctly.
2.5.11D Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem and why the reasoning is valid.
2.6.11A Design and conduct an experiment using random sampling.
2.6.11H Use sampling techniques to draw inferences about large populations.
2.6.11 I Describe the normal curve and use its properties to answer questions about sets of data that are assumed to be normally distributed.
2.7.11B Apply probability and statistics to perform an experiment involving a sample and generalize its results to the entire population.
2.7.11C Draw and justify a conclusion regarding the validity of a probability or statistical argument.
2.7.11D Use experimental and theoretical probability distributions to make judgments about the likelihood of various outcomes in uncertain situations.
2.7.11E Solve problems involving independent simple and compound events.

ISTE Standards:
1 Basic operations and concepts
2 Social, ethical, and human issues
3 Technology productivity tools
4 Technology communications tools
5 Technology research tools
6 Technology problem-solving and decision-making tools

PSSA Anchors:
M11.A.3.1.1 Simplify expressions using the order of operations to solve problems.
M11.A.3.2.1 Use estimation to solve problems.

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M11.E.2.1.1 Calculate or select the appropriate measure of central tendency of a set of data given or represented on a table, line plot, or stem-and-leaf plot.
M11.E.2.1.2 Calculate and/or interpret the range, quartiles and interquartile range of sets of data.
M11.E.2.1.3 Describe how outliers affect measures of central tendency.
M11.E.3.1.1 Find probabilities for independent, dependent or compound events and represent as a fraction, decimal or percent.

Course Content	Student Performance	Resources	Assessments
A. Normal Curves • Properties • Empirical rule B. Standard Normal Distribution • Properties • Area under curve • Applications C. Z-Score • x-Values D. Central Limit Theorem • Standard error • Finite correction factor	• List properties of a normal distribution and steps for sketching normal curves • Identify normal curves by analyzing mean, median, and mode • Discuss uses of bell curve and calculate the area under the curve • Interpret normal distributions of standardized tests such as GRE and MAT • Estimate standard normal deviations by examining normal curves and distributions • Calculate and interpret z-score problems • Transform z-scores from previous problems to x-values • Interpret z-scores and x-values • Use the standard normal table to translate z-scores • Calculate normal distributions using a table and technology • Complete case study	• Elementary Statistics: Picturing the World, 4th Edition (Prentice Hall) • "Elementary Statistics" Video (Prentice Hall) • Exploring Statistics with the TI-83 (Brendan Kelly, 1998) • Elementary Statistics Data Disk (Prentice Hall) • Graphing and/or scientific calculators • Supplementary resource materials • CPS • Study Island • Spiral review and project binder • Appendix	• Teacher made test • Teacher observation • Textbook questions • Journal entry • Application problems • Teacher created projects • Bell ringers • Final project **Remediation** • StatPro Computer tutorial • Explore activity **Enrichment** • Technology project

	• Interpret and apply the Central Limit Theorem to various problems		

Unit: **Confidence Interval**

Content Standard: **Determine the confidence interval for various types of samples and tests.**

State Curriculum Standards:

2.1.11A Use operations.
2.2.11A Develop and use computations concepts, operations and procedures with real numbers in problem-solving situations.
2.2.11D Describe and explain the amount of error that may exist in a computation using estimates.
2.2.11E Recognize that the degree of precision needed in calculating a number depends on how the results will be used and the instruments used to generate the measure.
2.5.11A Select and use appropriate mathematical concepts and techniques from different areas of mathematics and apply them to solving non-routine and multi-step problems.
2.5.11B Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas, and results
2.5.11C Present mathematical procedures and results clearly, systematically, succinctly and correctly.
2.5.11D Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem and why the reasoning is valid.
2.6.11A Design and conduct an experiment using random sampling.
2.6.11B Use appropriate technology to organize and analyze data taken from the local community.
2.6.11D Make predictions using interpolation, extrapolation, regression and estimation using technology to verify them.
2.6.11H Use sampling techniques to draw inferences about large populations.
2.7.11B Apply probability and statistics to perform an experiment involving a sample and generalize its results to the entire population.
2.7.11C Draw and justify a conclusion regarding the validity of a probability or statistical argument.
2.7.11D Use experimental and theoretical probability distributions to make judgments about the likelihood of various outcomes in uncertain situations.

ISTE Standards:

1 Basic operations and concepts
2 Social, ethical, and human issues
3 Technology productivity tools
4 Technology communications tools
5 Technology research tools
6 Technology problem-solving and decision-making tools

PSSA Anchors:

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M11.A.3.1.1 Simplify expressions using the order of operations to solve problems.
M11.A.3.2.1 Use estimation to solve problems.
M11.E.2.1.1 Calculate or select the appropriate measure of central tendency of a set of data given or represented on a table, line plot, or stem-and-leaf plot.
M11.E.2.1.2 Calculate and/or interpret the range, quartiles and interquartile range of sets of data.
M11.E.2.1.3 Describe how outliers affect measures of central tendency.
M11.E.3.1.1 Find probabilities for independent, dependent or compound events and represent as a fraction, decimal or percent.

Course Content	Student Performance	Resources	Assessments
A. Estimates • Point estimate • Interval estimate • Maximum error of estimate B. Levels of Confidence C. Confidence Intervals for the Mean • Large sample • Small sample • Population proportions D. Minimum Sample Size	• Define and find types of estimates • Watch intro video demonstrating methods for finding confidence intervals • Construct and interpret confidence intervals for real-world problems • Determine maximum error of estimates • Compare and contrast using confidence intervals for samples, population proportions, and standard deviation • Construct confidence intervals for population proportions • Calculate t-distributions in the Exploration 13 activity • Apply intervals to real-world	• Elementary Statistics: Picturing the World, 4th Edition (Prentice Hall) • Statistics and Probability in Modern Life Video (Prentice Hall) • Exploring Statistics with the TI-83 (Brendan Kelly, 1998) • Case study • Elementary Statistics Data Disk (Prentice Hall) • Graphing and/or scientific calculators • Supplementary resource materials • CPS • Study Island • Spiral review and project binder	• Teacher made test • Teacher observation • Textbook questions • Journal entry • Exploration activity • Bell ringers • Case study **Remediation** • StatPro Computer tutorial **Enrichment** • Technology project • Extending the basics exercises

	situations including the case study • Calculate t-distribution in the explore activity 13 • Interpret t-distribution tables	• Appendix	

Unit: **Hypothesis Testing with One Sample**

Content Standard: **Perform hypothesis tests with one sample using various techniques.**

State Curriculum Standards:
2.4.11B Construct valid arguments from stated facts.
2.4.11C Determine the validity of an argument.
2.5.11A Select and use appropriate mathematical concepts and techniques from different areas of mathematics and apply them to solving non-routine and multi-step problems.
2.5.11B Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas and results.
2.5.11C Present mathematical procedures and results clearly, systematically, succinctly and correctly.
2.5.11D Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem and why the reasoning is valid.
2.6.11A Design and conduct an experiment using random sampling. Describe the data as an example of a distribution using statistical measures of center and spread. Organize and represent the results with graphs. (Use standard deviation, variance and t-tests.)
2.6.11E Determine the validity of the sampling method described in a given study.
2.7.11C Draw and justify a conclusion regarding the validity of a probability or statistical argument.

ISTE Standards:
1 Basic operations and concepts
2 Social, ethical, and human issues
3 Technology productivity tools
4 Technology communications tools
5 Technology research tools
6 Technology problem-solving and decision-making tools

PSSA Anchors:
M11.A.3.1.1 Simplify expressions using the order of operations to solve problems.
M11.A.3.2.1 Use estimation to solve problems.
M11.E.2.1.1 Calculate or select the appropriate measure of central tendency of a set of data given or represented on a table, line plot, or stem-and-leaf plot.
M11.E.2.1.2 Calculate and/or interpret the range, quartiles and interquartile range of sets of data.

M11.E.2.1.3 Describe how outliers affect measures of central tendency or percent.

Course Content	Student Performance	Resources	Assessments
A. Null and Alternative Statements B. Types of Tests C. Hypothesis Testing • Large samples • Small samples • Proportions • Variance • Standard deviation	• Write null and alternative hypothesis • Identify the claim of a test • Determine which type of hypothesis test should be used • Draw normal curves and shade appropriately • Perform hypothesis tests using formulas, by hand and using a graphing calculator • Draw conclusions about claims	• Elementary Statistics: Picturing the World, 4th Edition (Prentice Hall) • Statistics and Probability in Modern Life Video (Prentice Hall) • Exploring Statistics with the TI-83 (Brendan Kelly, 1998) • Case study • Elementary Statistics Data Disk (Prentice Hall) • Graphing and/or scientific calculators • Supplementary resource materials • CPS • Study Island • Spiral review and project	• Teacher made test • Teacher observation • Textbook questions • Journal entry • Exploration activity • Bell ringers • Case study **Remediation** • StatPro Computer tutorial **Enrichment** • Technology project • Extending the basics exercises

		binder • Appendix	

Unit: **Correlation and Regression**

Content Standard: **Determine linear correlation and regression lines in order to make predictions in real-world situations and analyze the validity of the prediction.**

State Curriculum Standards:

2.1.11A Use operations.
2.2.11A Develop and use computations concepts, operations and procedures with real numbers in problem-solving situations.
2.2.11C Construct and apply mathematical models, including lines and curves of best fit, to estimate values of related quantities.
2.2.11D Describe and explain the amount of error that may exist in a computation using estimates.
2.2.11E Recognize that the degree of precision needed in calculating a number depends on how the results will be used and the instruments used to generate the measure.
2.5.11A Select and use appropriate mathematical concepts and techniques from different areas of mathematics and apply them to solving non-routine and multi-step problems.
2.5.11B Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas, and results
2.5.11C Present mathematical procedures and results clearly, systematically, succinctly and correctly.
2.5.11D Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem and why the reasoning is valid.
2.6.8 C Fit a line to the scatter plot of two quantities and describe any correlation of the variables.
2.6.11A Design and conduct an experiment using random sampling.
2.6.11B Use appropriate technology to organize and analyze data taken from the local community.
2.6.11C Determine the regression equation of best fit (e.g., linear, quadratic, exponential)
2.6.11D Make predictions using interpolation, extrapolation, regression and estimation using technology to verify them.
2.6.11E Determine the validity of the sampling method described in a given study.
2.6.11H Use sampling techniques to draw inferences about large populations.
2.7.11B Apply probability and statistics to perform an experiment involving a sample and generalize its results to the entire population.
2.7.11C Draw and justify a conclusion regarding the validity of a probability or statistical argument.
2.7.11D Use experimental and theoretical probability distributions to make judgments about the likelihood of various outcomes in uncertain situations.
2.7.11E Solve problems involving independent simple and compound events.
2.8.11M Given a set of data points, write an equation for the line of best fit.

ISTE Standards:

1 Basic operations and concepts

2 Social, ethical, and human issues
3 Technology productivity tools
4 Technology communications tools
5 Technology research tools
6 Technology problem-solving and decision-making tools

PSSA Anchors:
M11.A.3.1.1 Simplify expressions using the order of operations to solve problems.
M11.A.3.2.1 Use estimation to solve problems.
M11.D.2.1.3 Write, solve and/or apply a linear equation.
M11.E.4.2.1 Draw, find and/or write an equation for a line of best fit for a scatter plot.
M11.E.4.2.2 Make predictions using the equations or graphs of best-fit lines of scatter plots.

Course Content	Student Performance	Resources	Assessments
A. Scatter Plots • Independent variable • Dependent variable • Correlation • Correlation coefficient B. Hypothesis Testing • Right-tailed t-test • Left-tailed t-test • Two-tailed t-test C. Regression Lines • Residuals • Line of best fit • Regression equation • Prediction of y-value • Coefficient of determination • Standard error	• Construct scatter diagrams from student collected data on two variables • Discuss correlations between variables • Compare and contrast types of linear correlation using scatter diagrams • Determine the correlation coefficient for various problems using methods including t-test • Perform a hypothesis test for a population correlation coefficient • Discuss methods to determine the line of best fit • Calculate the equation of a linear regression line • Complete the case study • Calculate the linear regression between test marks and hours of study in explore activity 7 • Examine and calculate the three types of variation	• Elementary Statistics: Picturing the World, 4th Edition (Prentice Hall) • "Elementary Statistics" Video (Prentice Hall) • Exploring Statistics with the TI-83 (Brendan Kelly, 1998) • Elementary Statistics Data Disk (Prentice Hall) • Graphing and/or scientific calculators • Supplementary resource materials • CPS • Study Island • Spiral review and project binder	• Teacher made test • Teacher observation • Textbook questions • Journal entry • Application problems • Teacher created projects • Bell ringers • Final project **Remediation** • StatPro Computer tutorial **Enrichment** • Technology project

	• Predict y-values • Use technology to find multiple regression equations and y-values	• Appendix	