Summit Public Schools

Summit, New Jersey

Grade Level 7/ Content Area: Mathematics

Length of Course: Full Academic Year

Curriculum: Pre-Algebra Enriched

Revised Summer 2017

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Course Description: The Pre-Algebra Enriched course will prepare students for the Algebra Enriched 8th grade course. It has been designed to offer an austere and extensive foundation that addresses the new New Jersey Student Learning Standards for 7th grade math and several 8th grade standards. Students will build on their knowledge of computation with rational numbers, relationships between variables, basic geometric formulas and proportional reasoning. They will use number properties, order of operations and algebraic models to evaluate expressions and solve equations. Students will create and use numerical, algebraic and graphical representations to analyze patterns, relations, and functions. Order of operations will be extended to simplifying expressions with exponents. They will solve multi-step equations with rational numbers and variables on both sides. Ratios, proportions, and percents are applied to tables, graphs and equations in real-world contexts. They will extend their work in two-dimensional geometry by learning properties of polygons and finding the area and perimeter of complex polygons. Students will manipulate area formulas using algebraic properties to find missing dimensions, as well as maximize area given a fixed perimeter (and vice versa). The three-dimensional geometry will include recognizing the two-dimensional shapes formed by slicing solids in different ways, knowing properties of solids and classifying them as prisms or pyramids, and finding surface area and volume. The statistics and probability units will include comparative analysis of similar data sets, theoretical and experimental probability, random sampling, tree diagrams showing possible outcomes, and scatter plots/lines of best fit. Throughout the course, technology, interdisciplinary activities, media literacy and global perspectives will be integrated.

Texts and Resources:
Algebra One Interactions Course 1 (Holt, Rinehart and Winston © 1998)
Pre-Algebra (Prentice-Hall © 2001)
Kuta Software
Mathworksheets4kids.com
math-aids.com
math-drills.com

Standards:
New Jersey Student Learning Standards (2016)
http://www.state.nj.us/education/cccs/2016/math/standards.pdf

Scope & Sequence for Pre-Algebra Enriched

Unit 1: The Number System

- Day 1 & 2: Independent work on sections 1.5-1.7 (Complete quiz 1.5-1.8 by Sept 16-10 questions)
- Day 3: Whole group lesson (Number properties)
- Day 4: Begin review of integer operations/absolute value OR
  - mini lesson review w teacher
- Day 5: Diagnostic test
- Day 6, 7, 8: Review integer operations/absolute value
- Day 9 & 10: Review for Patterns in Algebra Test
- Day 11: Test 1 (1.5-1.8, 2.1-2.5)

Topic	Standards	Time Frame
Factors and Divisibility 1.5		S
Exponents and Prime Factorization 1.6		E
Order of Operations 1.7****	6.EE.A.2.c	E
Number Properties and Mental Computation 1.8	7.EE.1	
Review/Quiz 1.5 to 1.8		A
Integers and the Number Line 2.1	6.NS.C.6.c	B
Integer Addition 2.2	7.NS.A.1.b	O
Comparing Integers 2.3	7.NS.A.1.b	V
Integer Subtraction 2.4	7.NS.A.1.b	E
Review/Quiz 2.1 to 2.4		
Integer Multiplication and Division 2.5	7.NS.A.2.b	
Review Test- Patterns in Algebra and with Integers		
Introduction to Rational Numbers 3.1/Using Equivalent Fractions(*w/ variables*) 3.2	8.NS.A.1, 7.NS.A	1
Exploring Decimals 3.3	7.NS.A.2d	1
Review/Quiz 3.1 to 3.3		2
Addition and Subtraction of Rational Numbers (use improper fractions instead of regrouping-*with variables*) 3.4	7.NS.A.1	2
Multiplying and Dividing Rational Numbers 3.5	7.NS.A.2	2
Review/Chapter 3 Test: Rational Numbers		3
Total		22 days

Unit 2a: Expressions and Equations

Topic	Standards	Time Frame
Addition and Subtraction Equations(fractions) PHPA 2001:5.7	7.EE.B.3, 4.a	1
Addition and Subtraction Equations(decimals) PHPA 2001: 3.5	7.EE.B.3, 4.a	1

Topic	Standards	Time Frame
Multiplication and Division Equations PHPA 2001: 3.6/5.8	7.EE.B.3, 4.a	1
Exploring Inequalities 5.6	7.EE.B.4.b	1
Solving Related Inequalities 5.7 - *includes basic compound inequalities* (graphing, writing from a graph) (use additional outside resources)	7.EE.B.4.b	2
Review/Quest One-step Equations and Inequalities (with fractions and decimals)		**2**
Identifying parts of an algebraic expression PHPA 2001: 2.3	7.EE.A.1,2	1
Adding Expressions 5.1	7.EE.A.1,2	1
Subtracting Expressions 5.2	7.EE.A.1,2	2
Exploring Polynomials 5.5 - *include discussion of degree and descending order*	7.EE.A.1	2
Review/Quiz 2.3,5.1,5.2, 5.5		**2**
Multiplying and Dividing Expressions 6.1	7.EE.A.1	1
Exponents and Multiplication/Division PHPA 4.7-4.8,5.9 (*zero power rule, negative exponents, etc.*)	8.EE.A.1	4-5
Review/Quiz 6.1 and exponent rules		**2**
Exploring Products and Factors 6.3 - *include trinomials*	7.EE.A.1	3
Review/Test Algebraic Expressions, Exponent Rules, Factoring		**3**
Total		30 days

Unit 2b: Expressions and Equations-From Grade 8 Standards 8.EE

Topic	Standards	Time Frame
Solving Two-step Equations 7.1(Fractions and Decimals)	7.EE.B.4.a	2
Solving Multi-step Equations 7.2	8.EE.C.7.b	2
Algebraic Applications 7.3	7.EE.B.3,4a	4
Review/Quiz 7.1 to 7.3- no calculator		**2**
Geometric Applications 7.4 - **LITERAL EQUATIONS ONLY** (use additional outside resources)	7.EE.A.1	1
Exploring Related Inequalities 7.5	7.EE.B.4b	1
Absolute Value Equations 7.6	7.EE.A.1	2
Review/Quiz 7.4 to 7.6 (ABSOLUTE VALUE EQUATIONS)- no calculator		**2**
Absolute Value Inequalities 7.6	7.EE.B.4b	2
Review/Chapter 7 Test CALCULATOR ALLOWED		**3**
Total		21days

Unit 3: Ratio and Proportional Relationships

Topic	Standards	Time Frame
Ratios and Unit Rates (constant of proportionality using tables, graphs, equations) PHPA 2001 6.1	7.RP.A.1, 7.RP.A.2a-d	4
Proportions PHPA 2001 6.2-Include complex fractions	7.RP.A.2a	2
Similar Figures/indirect measure and Scale Drawings PHPA 2001	7.G.A.1	3

6.3		
Review/Quiz PHPA 2001 6.1-6.3		**2**
Solving Problems Involving Percents 6.6 (Fractions, Decimals, and Percents)	7.NS.A.2.d	1
Solving Problems Involving Percents 6.6 (Percent Proportion)	7.RP.A.2a, c	1
Percent applications - tax, tip, markup, commission, interest	7.RP.A.3	3
Review/Quiz - Percents and applications		**2**
Percent Applications: percent of change and discount	7.RP.A.3	1
Review/Test Ratio, Percent Application and Proportional Relationships		**3**
Total		22 days

Unit 4: Statistics and Probability -
See http://www.opusmath.com/common-core

Topic	Standards	Time Frame
Experimental Probability 3.8	7.SP.C.6	1
Theoretical Probability (Sample spaces, tree diagrams) 3.9	7.SP.C.5,7	1
Theoretical Probability (Odds and Independent/Dependent Events) 3.9	7.SP.C.8	2
Review/Quiz 3.8 to 3.9		**2**
MMM and choosing the best measure of central tendency (PHPA 3.3)	7.SP.B.4	1
Measures of variability (IQR and MAD, use outside resources)	7.SP.B.4	2
Comparative inferences (difference of mean divided by MAD)	7.SP.B.4	1
Review/Quiz MMM, MAD, IQR, comparative inferences		2
Scatter Plots and Correlations 11.5	7.SP.A	1
Finding Lines of Best Fit 11.6	7.SP.A	1
Random samples (biased/unbiased), estimating population size - Common Core Support Coach/PHPA 2001 12.8	7.SP.A	2
Review/Test – Data analysis and probability		**3**
Total		20 days

Unit 5: Geometry

Topic	Standards	Time Frame
Lines and Angles 4.1(Using a protractor,Naming basic geometric figures)	7.G.B.1,2	1
Exploring Angles 4.2 (vertical, adjacent, supp, comp)	7.G.A.1,2	1
Parallel Lines and transversals 4.3	7.G.B.5	2
Triangles/Polygons 4.3-4.4 - *include conditions that form one triangle, no triangles, infinitely many triangles, sum of interior angles formula (n-2)180 -*	7.G.A.2	3

draw diagonals from one vertex of polygon to prove number of triangles formed PHPA2001 9-3 extension		
Review/Quiz 4.1-4.4		2
Perimeter and Area (include compound/shaded) 4.5-4.6	7.G.B.4,6	2
Exploring Circles 12.1	7.G.B.4	1
Review/Quiz 4.5,4.6,12.1 (Perimeter and Area of 2-D Figures)		**2**
Square Roots and the Pythagorean Theorem 4.7	8.G.B.7	2
Translations, reflections, rotations	8.G.A.2,3	2-3
Review/Chapter 4 Test- 2-D Test		**3**
Exploring Surface Area and Volume 12.2	7.G.B.6	1
Surface Area of Cylinders and Polygonal Prisms 12.3,12.4	7.G.B.6	3
Surface Area of Cones, Pyramids, Spheres 12.6,12.7	7.G.B.6	3
Review/Quiz Surface Area		**2**
Volume of Cylinders 12.4	8.G.C	2
Volume of Cones and Pyramids 12.5	8.G.C	1
Volume of Spheres 12.7	8.G.C	1
Review/Test Surface Area and Volume		**3**
Total		35 days

Unit 1: The Number System

<table>
<tr><td colspan="2" align="center">The Number System
Students will be able to apply and extend previous understandings
of operations with fractions.</td></tr>
<tr><td colspan="2">Big Ideas: <i>Course Objectives / Content Statement(s)</i>
● Use number properties, divisibility rules and exponents to solve mental math problems
● Perform integer operations
● Add, subtract, multiply, and divide rational numbers</td></tr>
<tr><td align="center">Essential Questions
<i>What provocative questions will foster inquiry, understanding, and transfer of learning?</i></td><td align="center">Enduring Understandings
<i>What will students understand about the big ideas?</i></td></tr>
<tr><td>With the constant advances in technology, is it still important to understand the order of performing operations to get accurate results and number properties?

How are integers used in the real world?

What professions use rational numbers?</td><td>Students will understand that...
● Applying number properties makes it easier to compute and estimate quickly without a calculator.

● Elevation of land, temperature, methods of gains and losses in financial affairs, and time use integers to count positive and negative units.

● Bakers, carpenters, chemists, stock analysts and stockowners use rational numbers.</td></tr>
<tr><td align="center">Areas of Focus: Proficiencies
(Cumulative Progress Indicators)</td><td align="center">Examples, Outcomes, Assessments</td></tr>
<tr><td>Students will:

7.NS.1Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

7.NS.2 Apply and extend previous understandings of multiplication and division of fractions to multiply and divide rational numbers.</td><td>Instructional Focus:
● Using strategies to perform mental computation

● Learning the rules to add, subtract, multiply and divide integers

● Perform basic math operations with negative and positive fractions and mixed numbers

Sample Assessments:
● 3 unit quizzes
● 2 unit tests

Sample Assessments 7.NS 1

Example 1: Use a number line to illustrate:
● $p - q$ ie. $7 - 4$</td></tr>
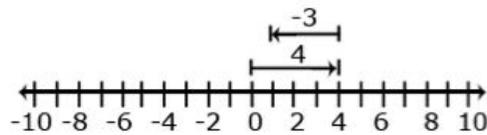</table>

- *p+(-q) ie. 7+(–4)*
- Is this equation true *p – q = p + (-q)?*
  Students explore the above relationship when *p* is negative and *q* is positive and when both *p* and *q* are negative. Is this relationship always true?

Example 2:
Morgan has $4 and she needs to pay a friend $3. How much will Morgan have after paying her friend?
> *Solution:*
> 4 + (-3) = 1 or (-3) + 4 = 1

Sample Assessments 7.NS.2

Jim's cell phone bill is automatically deducting $32 from his bank account every month. How much will the deductions total for the year?

Instructional Strategies:
   Interdisciplinary Connections
Research six battles of the civil war. Figure out when they occurred in time and record the total number of soldiers enlisted and casualties. Then determine, out of the six battles, if the difference between the number enlisted and the number of casualties was greater. Order the total number of casualties from least to greatest using negative numbers and battle names in respective order. Find the fraction of casualties out of soldiers enlisted in simplest form. Order the fractions from least to greatest to determine which war lost the largest percent of soldiers due to casualties.

   Technology Integration
Have students determine the difference between terminating and repeating decimals by using a calculator to change fractions to decimals.

Integer Operations

	www.xpmath.com Math Fighter-Integer Operations
	Video tutorial on integer addition http://www.youtube.com/watch?v=ZYHjT0m_iyQ -integer song "Row, Row your boat"
	Global Perspectives Review the place values in the decimal system from the hundreds place to the ten-thousandths place behind the decimal point. Tell students that the place-value system was invented by a Hindu mathematician.
	Site on how sums of unit fractions were used in ancient Egypt to represent fractions- http://www.mathpages.com/home/kmath340/kmath340.htm
	Discovery Education-lesson on how Egyptians used hieroglyphics to write numerals:http://www.discoveryeducation.com/teachers/free-lesson-plans/rational-number-concepts.cfm

Unit 2a: Expressions and Equations
(Data in Algebra, Operations with Polynomials and Equations)

Expressions and Equations
Use properties of operations to generate equivalent expressions.

Big Ideas: *Course Objectives / Content Statement(s)*
- Add, subtract, multiply and divide polynomials of the first degree
- Finding products of powers, power of powers, and quotients of powers
- Factor and find products of monomials and binomials/trinomials of different degrees.
- Solving one step inequalities and equations using rational numbers

Essential Questions	Enduring Understandings
What provocative questions will foster inquiry, understanding, and transfer of learning?	*What will students understand about the big ideas?*
- How does one apply the order of operations in solving one-step equations and inequalities? - How does solving inequalities differ from solving equations?	Students will understand that... - Properties of equality are used to keep equations balanced and inequalities true. - Equations and inequalities can have no solution. Equations can have no solution, finite solutions or infinitely many solutions. Inequalities can have no solution, a set of solutions, or infinitely many solutions.

Areas of Focus: Proficiencies (Cumulative Progress Indicators)	Examples, Outcomes, Assessments
Students will: 7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. 7.EE.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. 7.RP.2 Recognize and represent proportional relationships between quantities.	Instructional Focus: - Using exponent rules to find products and quotients of powers - Solve one-step inequalities involving decimals and fractions - Using distributive property and rules for combining like terms to simplify variable expressions - Finding products of polynomials and using prime factorization to factor polynomials. Sample Assessments: 3 unit quizzes

8.EE.7b Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	• 2 unit tests Sample Assessments 7.EE.4 SCR: Suppose you and your friends form a band, and you want to record a demo tape. Studio A rents for $100 plus $50 per hour. Studio B rents for $50 plus $75 per hour. Create a graph for both studio A and B and determine which studio would better for renting 5, 10, and 15 hours. Use algebra tiles to model simplifying expressions. Sample Assessments 7.EE.1 All varieties of a certain brand of cookies are $3.50. A person buys peanut butter cookies and chocolate chip cookies. Write an expression that represents the total cost, T, of the cookies if p represents the number of peanut butter cookies and c represents the number of chocolate chip cookies Sample Assessment 7.RP.2 The table below gives the price for different numbers of books. Do the numbers in the table represent a proportional relationship? Instructional Strategies: Interdisciplinary Connections Many businesses, such as repair companies and rental companies, charge a base rate and a unit charge. A table, a bar chart, or an equation can easily model these charges. Ask students to look through magazines and newspapers to find companies that use this pricing structure. Have students create two separate tables of pricing for two different companies that use this pricing structure.

Number of Books	Price
1	3
3	9
4	12
7	18

Solve various literal equations that are used by scientist. i.e. $E = mc^2, \frac{9}{5}C + 32 = F, D = RT$

Technology Integration

Combining like terms
www.xpmath.com -Like terms invaders

http://www.youtube.com/watch?v=iPGUSGh8k_I
Solving one-step equations with fractions

Global Perspectives
Use a search engine to find the exchange rate of the US dollar to 3 different countries around the world. Write an equation that will represent that amount of currency you will receive if exchanging $100, $500, $1000, $1500 and $2000. For each table list the name of the currency, the country name and if the US dollar is worth more or less than the country's currency.

Unit 2b: Expressions and Equations (Solving Multi-step Equations)

Expressions and Equations
Use properties of operations to generate equivalent expressions and solve multi-step equations.

Big Ideas: *Course Objectives / Content Statement(s)*
- Solve two step equations using inverse operations
- Solving multi-step equations
- Using applications of percent, systems of equations and geometric applications to solve multi-step equation word problems
- Use properties of equality to solve literal equations for a given variable.
- Solve absolute value equations and inequalities

Essential Questions	Enduring Understandings
What provocative questions will foster inquiry, understanding, and transfer of learning?	*What will students understand about the big ideas?*
- How does solving an equation with division of a fraction differ from other equations? - How can equations with rational numbers be used as tools to best describe and help explain real-life situations? - What do we need to do differently to solve an equation with variables on both sides?	Students will understand that... - Canceling out multiplication of a fraction using inverses requires the use of a reciprocal. - Real world problems can be modeled and solved by using algebraic equations. - The use of the properties of equality and the concept of logical equivalence maintain the solutions of the original equation.

Areas of Focus: Proficiencies (Cumulative Progress Indicators)	Examples, Outcomes, Assessments
Students will:	Instructional Focus:
7.EE.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.	- Solve two-step equations - Solve multi-step equations and word problems - Solve absolute value equations and inequalities Sample Assessments: 2 unit quizzes 1 unit test Sample Assessment 8 EE 7a-b - Mark sells t-shirts for $10 each. It cost $5 for each shirt and $.80 per shirt for
7.EE.4b Solve word problems leading to inequalities of the form $px + q > r$ or $px + q$	

<r, where *p, q,* and *r* are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.

8.EE.7a-b Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. ⬜Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

7.NS.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

7.G.5 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.

personalizing art materials. How many shirts must Mark sell to break even? Part II If Mark pays $25 a month on his loan for a t-shirt printing machine, how many shirts must Mark sell in a month to break even.

Sample Assessment 7G.5
Example 1: Find the measure of angle x.
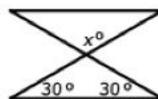
Instructional Strategies:
Interdisciplinary Connections
Collect nutritional labels from three healthy snacks. Use the percent daily values to calculate the amount of total fat, cholesterol, sodium, total carbohydrate, and protein an individual should consume in a day.

Technology Integration
Solve two-step equations
www.xpmath.com -Solving two-step equations

Global Perspectives
Many business use the break-even equation on a daily basis
http://www.accountingcoach.com/online-accounting-course/01Xpg02.html

Many professions in the united states, Canada, etc. are based on commission.
http://www.cra-arc.gc.ca/tx/bsnss/tpcs/pyrll/clcltng/ncmtx/cmmssn-eng.html

Unit 3: Ratio and Proportional Reasoning

(Includes Applications of Percent)

Standard: **Ratio and Proportional Reasoning**
Analyze proportional relationships and use them to solve real-world and mathematical problems.

Big Ideas: *Course Objectives / Content Statement(s)*
- Students will calculate unit rates associated with ratios of fractions.
- Students will represent unit rate (constant of proportionality) in tables, graphs (the point (1, r), and equations (y = kx)
- Students will decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin
- Students will write and solve proportions in relation to problems involving similar figures, scale models, and maps.
- Students will solve problems involving real-world applications of percent.

Essential Questions	**Enduring Understandings**
What provocative questions will foster inquiry, understanding, and transfer of learning?	*What will students understand about the big ideas?*
- How can ratios and proportions allow you to determine your travel time on a road trip? - How can you identify a proportional relationship from a table? Graph? Equation? - How can understanding unit rate, markup, and discount make you a smart and thrifty consumer? - When you get a job, why is it important to know the difference between a fixed salary or a salary based only on commission? - How do proportions help determine measurements of very tall objects?	Students will understand that… - The graph of a proportional relationship is a straight line through the origin. - The unit rate, or constant of proportionality, is k in the equation $y = kx$, and r in the point (1, r) - A unit rate can be used to determine which products constitute the better buy. - Proportions and similar figures are used to find heights of tall trees and other objects that are not easy to measure directly. - A proportion can be used to find actual distances from a map or sizes of actual objects from a scale model. - Proportions are used to solve basic percent problems and applications of percent. - Knowing applications of percent such as discount, sales tax, markup, percent change, commission, and simple interest can help one to be an informed consumer and make good purchasing decisions.
Areas of Focus: Proficiencies (Cumulative Progress Indicators)	**Examples, Outcomes, Assessments**

| Students will:	Instructional Focus:
7.G.1 Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.	● Solving proportions ● Understanding ratios ● Scale factors and scale drawings Sample Assessments: ● 1 unit quiz
7.RP.3 Use proportional relationships to solve multi-step ratio and percent problems.	Sample Assessment 7.G.1 Example 1: Task- Tara's family is driving to her grandmother's house. The family travels 362.25 miles between 6:30a.m. and 12:15 p.m.

Example 1: Task- Tara's family is driving to her grandmother's house. The family travels 362.25 miles between 6:30a.m. and 12:15 p.m.

    a. Calculate the family's average rate for the day.
    b. Draw a graph that predict how far they would travel if they drove for 7 hrs.
    c. Determine how much faster Tara's family would have arrived if they traveled at an average rate of 70mph.

Example 2: Julie shows the scale drawing of her room below. If each 2 cm on the scale drawing equals 5 ft, what are the actual dimensions of Julie's room? Reproduce the drawing at 3 times its current size.

5.6 cm
1.2 cm
4 cm
1.2 cm
2.8 cm
4.4 cm
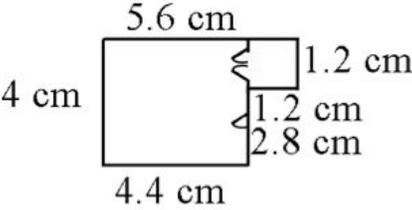
Instructional Strategies:
  Interdisciplinary Connections
Maps used in social studies use scales to help readers estimate the actual distance between cities.

  Technology Integration

	Using tables, graphs, and functions to model the relationship between two variables www.xpmath.com Functions Rates of Change :Odd One Out Global Perspectives Many maps around the world use maps to outline their country and individual towns. The United States is one of few countries that use a customary unit of measure system. Therefore, one has to know the ratio used to convert between customary units or measure and metric units of measures.

Unit 4: Statistics and Probability

Standard: Statistics and Probability
Use random sampling to draw inferences about a population. Draw informal comparative inferences about two populations. Investigate chance processes and develop, use, and evaluate probability models.

Big Ideas: *Course Objectives / Content Statement(s)*
- Find the experimental and theoretical probability of an event
- Using measures of central tendency to determine which measure best describes the data
- Using measures of variability to make conclusions about a data set.
- Draw informal comparative inferences about two populations.
- Use the line of best fit and patterns to draw conclusions about data not given.

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	Enduring Understandings *What will students understand about the big ideas?*
• How can experimental and theoretical probabilities be used to make predictions or draw conclusions?	• Probability is about predictions over the long term rather than predictions of individual events.
• When does order matter?	• It is important to place data values in order when finding measures of central tendency, creating data displays and graphing data
• How do scatter plots relate to linear models?	• Graphs of linear relationships represent patterns and facilitate predictions in real-world settings (including scatter-plots).

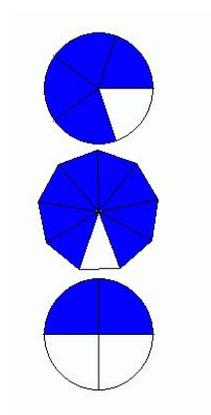| Areas of Focus: Proficiencies (Cumulative Progress Indicators)	Examples, Outcomes, Assessments
Students will:	Instructional Focus:
7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.	• Find the experimental and theoretical probability of an event • Finding the mean, median and mode of a set of data
7.SP.6 Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.	• Graph and analyze scatter plots Sample Assessments: • 2 unit quizzes • 1 unit test Sample Assessment 7.SP.7

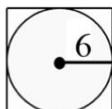|	
7.SP.7 Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.	Example 1: Find the probability if you randomly select one piece from each of the three shapes, you will get 3 highlighted pieces and the odds of getting at least one unhighlighted piece.
8.SP.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.	
8.SP.2 Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.	Probability = -------
8.SP.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.	Odds= --------
	Example 2: If Mary chooses a point in the square, what is the probability that it is not in the circle?
	Sample Assessment 8SP.1, 2 & 3 Given data from students' math scores and absences, make a scatter plot.

Absences	Math Scores
3	65
5	50
1	95
1	85
3	80
6	34
5	70
3	56
0	100
7	24
8	45
2	71
9	30
0	95
6	55
6	42
2	90
0	92
5	60
7	50
9	10
1	80

Instructional Strategies:
   Interdisciplinary Connections
Polls are taken in different elections to determine the popular vote for different subgroups of voters. Predictions are made based on these polls and statistics. Research the past election of the recent president. Determine if the polls taken to determine the popular vote of three different subgroups were correct. Please discuss if the survey was biased or unbiased and reasons why or why not the prediction was correct?

Punnett Square is based on probability
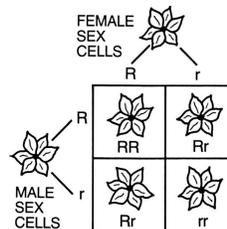
Technology Integration
Line of Best Fit
www.xpmath.com Naruto: Line of Best Fit

Watch a basketball game of your choice. Track the attempted shots and baskets made by five of the basketball players in the game. Create a table with the data. Find the average amount of shots made and baskets made by

	all of the players. Then find the percent of accuracy for each player and overall. Global Perspectives Google search the populations of various nations. Find the average population size of the nations. Compare and contrast the population sizes to the average found. Students will determine other environmental or political factors that might affect the population size.

Unit 5: Geometry

Standard : Geometry

Draw, construct, and describe geometrical figures and describe the relationships between them. Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Big Ideas: *Course Objectives / Content Statement(s)*
- Describe and identify relationships of angles formed by parallel lines cut by a transversal
- Find the area and perimeter of two dimensional objects
- Use the perimeter/area to find missing dimensions of 2-D figures
- Solving changing area, fixed perimeter and changing perimeter, fixed area problems
- Find the surface area and volume of cylinders and prisms.

Essential Questions	Enduring Understandings
What provocative questions will foster inquiry, understanding, and transfer of learning?	*What will students understand about the big ideas?*
- What special angles are formed by parallel lines cut by a transversal? - How can one find the surface area of more complex 3-D figures? - How can one find the volume of more complex 3-D figures? - Is there a way to determine the maximum area given a fixed perimeter and vice versa?	- Parallel lines cut by a transversal form several pairs of congruent angles, namely alternate interiors, alternate exteriors, and corresponding angles. - Surface area is the sum of areas of the sides of the object and may best be represented as a two-dimensional model. - Volume is a measure of capacity and relates to the area of the base of a prism times the height of the prism. - Different shaped figures can have equal areas but the dimensions used to create the figure can vary in size, therefore creating a bigger perimeter. Likewise figures can have the same perimeter, but the closer the measurements are in value will maximize the area.
Areas of Focus: Proficiencies (Cumulative Progress Indicators)	**Examples, Outcomes, Assessments**
Students will:	Instructional Focus:
7.G.4 Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the	Identify supplementary, complementary, vertical, and adjacent angles and use the properties of such angles to write and solve equations.

circumference and area of a circle.	● Identify alternate interior, alternate exterior, and corresponding angles and use their congruence to solve multi-step algebraic equations.
	
	● Understand the relationship between the variables in area formulas
	
	● Find the area and perimeter of two dimensional figures
	
	● Find the surface area and volume of three dimensional figures
	
	Sample Assessments:
	● 3 unit quizzes
	● 2 unit tests
	
	Sample Assessment 7.G.6
	
	The surface area of a rectangular solid is 344 cm^2.The lengths of two of the sides are 10 cm and 6 cm. What is the length of the other side?
	
	Sample Assessment 8.G.7
	The Irrational Club wants to build a tree house. They have a 9-foot ladder that must be propped diagonally against the tree. If the base of the ladder is 5 feet from the bottom of the tree, how high will the tree house be off the ground?
	
	Instructional Strategies:
	   Interdisciplinary Connections
	Prisms were used in science to investigate the nature of light
	http://www.omega.com/literature/transactions/volume1/historical2.html
	
	   Technology Integration
	Video tutorial on surface area of Prisms and Cylinders:
	http://www.youtube.com/watch?v=t-W3ZTtqVkw

7.G.5 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.	
7.G.6 Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	
8.G.6 Explain a proof of the Pythagorean Theorem and its converse.	
8.G.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.	

	Video tutorial on volume of Prisms and Cylinders: http://www.youtube.com/watch?v=6nJgDehGmI4 Global Perspectives Rectangular pyramids can be found in Egypt. They were built many centuries ago in ancient Egypt. The pyramids in ancient Egypt were built to protect the body of the deceased pharaoh. These massive tombs were constructed to withstand the elements of time and were intended to last forever.