Summit Public Schools

Summit, New Jersey

Grade Level 7/ Content Area: Mathematics

Length of Course: Full Academic Year

Curriculum: Pre-Algebra

Revised 2017

Developed by: Tiffany Bennett Emily Hitchen Tonyamarie Ramsay **Course Description:** This one-year course has been designed to equip students with the skills needed for Foundations of Algebra. Students will solidify their computation skills with rational numbers and integers, applying both number sets to algebraic and real-world problems. Students will be expected to write and solve one- and two-step equations with rational coefficients, solve and graph one- and two-step inequalities with integer and rational coefficients, and evaluate algebraic expressions with integers and rational numbers. In addition, students at this level will extend their understanding of algebraic expressions through the integration of exponent rules, including simplifying expressions with Scientific Notation. Order of operations will be extended to simplifying expressions with exponents. Ratios, proportions, and percents will be represented using tables, graphs and equations in real-world contexts.

Students will extend their work in two-dimensional geometry by finding areas of compound figures, or finding missing dimension given the area and remaining dimension(s). The three-dimensional geometry unit will include recognizing the two-dimensional shapes formed by slicing solids in different ways, knowing properties of solids and identifying their parts, 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 graphs. Throughout the course, technology, interdisciplinary activities, media literacy and global perspectives will be integrated.

Texts and Resources:

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 7

Unit 1: The Number System

Торіс	Standard	Time
		Frame
Variables and Expressions 1.1	7.EE.A.1	1
Order of operations 1.2 (review)	6.EE.A.2.c	1
Evaluating Expressions 1.3 (review)	6.EE.A.2.a	2
Review/Quiz 1 (1.1-1.3)		2
Integers and Absolute Value 1.4	7.NS.A.1.a	1
Adding and Subtracting Integers 1.5-1.6	7.NS.A.1.b	3
Review/Quiz 2 (1.4-1.6)		2
Multiplying and Dividing Integers 1.9	7.NS.A.2.b	1
Review/Test-Integer Operations		3
Adding and Subtracting Rational Numbers (Decimal Review)	7.NS.A.1.d	2
Multiplying and Dividing Rational Numbers (Decimals Review)	7.NS.A.2	2
Review/Quiz - Decimal Operations		2
Rational Numbers 4.6 (Defining and Graphing, Evaluating Rational	7.NS.A.1,	1
Expressions)	7.EE.A	
Ordering and Comparing Rational Numbers (fractions and decimals) 5.2	7.NS.2.d	1
Adding and Subtracting Rational Numbers (fractions) 5.3	7.NS.1.d	4
Review/Quiz – 4.6, 5.2, 5.3		2
Algebraic Fractions (adding and subtracting) - outside sources	7.EE.A.1	3
Multiplying and Dividing Rational Numbers 5.4	7. <u>NS.A.2</u> .c	2
Review/Test – Rational Number Operations (Fractions Ch 5)		3
Total		38 days

Unit 2: Expressions and Equations

Торіс	Standard	Time Frame
Properties of Numbers 2.1	7.EE.A.1	1
The Distributive Property 2.2	7.EE.B.4.a	2
Simplifying Variable Expressions 2.3	7.EE.A.1 , 2	2
Variables and Equations 2.4	7.EE.B.4.a	1
Review/Quiz 1 (2.1-2.4)		2
Solving Equations by Adding or Subtracting 2.5, 3.5, 5.7	7.EE.B.3, 4.a	3
Review/Quiz 2 (2.5, 3.5, 5.7)		2
Solving Equations by Multiplying or Dividing 2.6, 3.6, 5.8	7.EE.B.3, 4.a	2
Review/Test 2.1-2.6, 3.5, 3.6, 5.7, 5.8		2
Inequalities and their Graphs 2.8	7.EE.B.4.b	1
Solving One-Step Inequalities by Adding and Subtracting 2.9	7.EE.B.4.b	1
Solving One-Step Inequalities by Multiplying and Dividing 2.10	7.EE.B.4.b	2
Review / Quiz 2.8-2.10		2
Solving two-step equations 7.1	7.EE.B.4.a	2
Solving two-step inequalities 7.6	7.EE.B.4.b	1
Review/Test 2.8-2.10, 7.1, 7.6		3
Total		29 days

Торіс	Standard	Time
		Frame
Exponents, order of operations with exponents 4.2	8.EE.A.1	2
Exponents and Multiplication 4.7, 5.9 (powers of products only)	8.EE.A.1	2-3
Review/Quiz 4.2, 4.7, 5.9		2
Exponents and Division 4.4, 4.8	8.EE.A.1	2
Powers of Quotients 5.9	8.EE.A.1	1
Scientific Notation 4.9	8.EE.A.3	2
Review / Test		3
Total		15 days

Unit 2A: Expressions and Equations (from Grade 8 – 8.EE.A.1 and 8.EE.A.3)

Unit 3: Ratios and Proportional Relationships

Торіс	Standard	Time
		Frame
Ratios and Unit Rates 6.1	7.RP.A.1	2
Constant of proportionality - tables, graphs, equations	7.RP.A.2a-d	2
Proportions 6.2	7.RP.A.2a	1
Review/Quiz 6.1 to 6.2, Constant of Proportionality		2
Similar figures 6.3	7.G.A.1	2
Indirect measure and Scale Drawings 6.3	7.G.A.1	2
Review/Test - Rate, Ratio, and Proportion		2
Fractions, Decimals, Percents 6.5	review	1
Percent Proportions and Equations 6.6-6.7	7.RP.A.2	1
Review/Quiz 6.5-6.7		2
Applications of Percent 6.8-6.9 (tip, tax, commission, percent	7.RP.A.3	4
change, markup, discount		
Review/Quest - Percent		3
Total		22 days

Unit 4: Statistics and Probability

Торіс		Time
		Frame
Introductory Probability 6.4	7.SP.C.5	1
Counting Outcomes and Theoretical Probability 12.4	7.SP.C.7	2
Independent and Dependent Events 12.5	7.SP.C.8	2
Experimental Probability 12.7	7.SP.C.6	2
Review/ Quiz Probability		2
Measures of Central Tendency 3.3	7.SP.B.4	2
Measures of Variability MAD/IQR	7.SP.B.4	2-3
Comparative inferences - overlap - difference of means divided by MAD	7.SP.B.3,4	1
Review/Quiz MMM, MAD, IQR, comparative inferences		2
Random Samples and Surveys 12.8	7.SP.A	2
Review/Test		3
Total		21 days

Unit 5: Geometry

Торіс	Standard	Time
		Frame
Points, Lines, and Planes 9.1	7.G.A.2	3
Angle Relationships & Parallel Lines 9.2	7.G.B.5	3
Classifying Polygons 9.3	Review	1
Unique triangles - one, infinite, none (use outside resources)	7.G.A.2	2
Review / Quiz 9.1 – 9.3		2
Area of Polygons (includes irregular figures) 10.1-10.2	7.G.B.6	3
Circles and Circumference 9.6	7.G.B.4	1
Area of Circles 10.3	7.G.B.4	1
Review/Test 2D Geometry		2
Space Figures 10.4	Review	1
Surface Area of Prisms and Cylinders 10.5	7.G.B.6	3
Volume: Prisms & Cylinders 10.7	7.G.B.6	2
Review /Quest – 3D Geometry		2
Total		24 days

Unit 1: The Number System

The Number System		
Students will be able to apply and extend previous understandings		
$\mathbf{P}_{i} = \mathbf{P}_{i} \mathbf{P}_{i}$		
big ideas: Radonai Number Operations PHPA. 1.	1-1.0, 1.9, 4.0, 5.5-5.4	
• Understand and convert rational numbers		
• Students will compare and order positive and negative rational numbers and find		
absolute values.		
• Apply properties of operations as strategies	to add, subtract, multiply and divide rational numbers	
• Solve and model real-world problems/situation	tions involving rational numbers.	
Essential Questions	Enduring Understandings	
W hat provocative questions will foster inquiry,	W hat will students understand about the big ideas?	
understanding, and transfer of tearning:	Students will understand that	
	Students will understand that	
• In what ways are positive and negative	• In order to solve problems with positive and	
numbers used in the real world?	negative integers, you must know how to do all four operations.	
• How can adding, subtracting, multiplying		
and dividing rational numbers help me in	• Absolute value is the distance of a number from	
my career or life?	zero.	
• How can rational numbers help solve real world problems involving area/perimeter,		
cooking, remodeling, etc.?	• It is important to know how to add, subtract,	
	multiply and divide rational numbers in order to	
	modify recipes.	

Areas of Focus: Proficiencies (Cumulative Progress Indicators)	Examples, Outcomes, Assessments
Students will:	Instructional Focus:
Students will: 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.NS.2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	 Instructional Focus: Compare and order integers. Use models to describe real-world situations in which rational numbers are combined. Find absolute values of integers. Add, subtract, multiply, and divide integers using models and rules. Apply order of operations with rational numbers. Sample Assessment: 4 unit quizzes 2 unit tests
7. NS.3. Solve real-world and mathematical	• 2 unit tests
rational numbers. Career-Ready Practices CRP1: Act as a responsible and contributing citizen	 Sample Assessment 7.NS.1. Example 1: Can two different numbers have the same absolute value? Explain. Example 2: Cive a list of colf accres (+ or _ in relation)
CRP2 : Apply appropriate academic and technical skills. CRP3 : Attend to personal health and financial well-being.	 Example 2: Give a list of golf scores (+ or – in relation to par = 0), order the scores from least to greatest. Is it better to have a score closer to 0 or further from it? Explain in terms of absolute value.
 CRP4: Communicate clearly and effectively and with reason. CRP5: Consider the environmental, social and economic impacts of decisions. CRP6: Demonstrate creativity and innovation. CRP7: Employ valid and reliable research strategies. CRP8: Utilize critical thinking to make sense of problems and persevere in solving them. CRP9: Model integrity, ethical leadership and effective management. 	 Instructional Strategies: Interdisciplinary Connections Science: Integers are used to represent elevation above and below sea level. Patterns in integer temperatures can represent daily and seasonal averages. Physical Education: In many games, positive and negative numbers are needed.
CRP10 : Plan education and career paths aligned to	Technology Integration
personal goals. CRP11 :. Use technology to enhance productivity. CRP12 : Work productively in teams while using cultural global competence.	Excel Spreadsheet – create a bank or credit card statement using formulas for deposits & withdrawals. What are the advantages to keeping track of your expenses electronically?
	Brainpop videos – use an alternate medium for reinforcement of skills
	iMovie/Podcast – student-generated explanations of rational number operations to be shared with peers
	Global Perspectives
	• Graph temperatures for various locations in the world

	on a coordinate grid. Compare current temperature
	data to data from 50 years ago. How might this be
	evidence of global warming?
The following skills and themes listed to the	21st Century Skills:
right should be reflected in the design of units	Creativity and Innovation
and lessons for this course or content area:	Critical Thinking and Problem Solving
	Communication and Collaboration
	Information Literacy
	Media Literacy
	Life and Career Skills
	21 st Century Themes (as applies to content area):
	Financial, Economic, Business, and
	Entrepreneurial Literacy
	Civic Literacy
	Health Literacy

Unit 2: Expressions and Equations

E-manaiana and E-matiana		
Expressions and Equations		
Big Lines: DLDA 2001, 21.26, 25.26, 5.7.5.8		
Big Ideas: PHPA 2001: 2.1-2.6, 3.5-3.6, 5.7-5.8		
• To use the properties of addition and multiplication to add, subtract, multiply and divide rational		
numbers.		
• To write and evaluate algebraic expressions.		
• To solve one-step equations using number sense, mental math and estimation.		
• Recognize rational numbers in the context of	of one-step equations.	
• Solve one-step equations/inequalities with r	ational numbers using inverse operations.	
Write and graph one and two-step inequalities	es.	
Essential Questions	Enduring Understandings	
What provocative questions will foster inquiry,	W hat will students understand about the big ideas?	
understanding, and transfer of learning?		
• When do we use equations to solve	Students will understand that	
everyday problems?	• You can use equations to help solve everyday	
	problems. Equations can be used to find how	
	much change you will receive after purchasing	
• Why do we use inverse operations to solve	certain items, now much money you will make in a	
equations?	day/per nour, etc.	
1	• Inverse operations "undo" each other and are used	
	to isolate the variable Number properties are	
	applied when using inverse operations.	
• How does the solution to an equation		
differ from the solution to an inequality?	• To understand the equivalences of each type of	
	number when presented in real-world situations	
Areas of Focus: Proficiencies	Examples, Outcomes, Assessments	
(Cumulative Progress Indicators)		
Students will:	Instructional Focus:	
	• Evaluating and Writing Algebraic Expressions	
7.EE.1. Apply properties of operations as	 Using Number Sense to Solve 	

	 Evaluating and Writing Algebraic Expressions
7.EE.1. Apply properties of operations as	 Using Number Sense to Solve
strategies to add, subtract, factor, and expand	Equations/Inequalities
linear expressions with rational coefficients.	 Solving Equations/Inequalities by Adding,
7.EE.3. Apply properties of operations to	Subtracting, Multiplying and Dividing.
calculate with numbers in any form; convert	Sample Assessments:
between forms as appropriate; and assess the	• 3 unit quizzes
reasonableness of answers using mental	• 1 unit test
computation and estimation strategies.	Sample Assessment 7.EE.4
7.EE.4. Use variables to represent quantities in	• Example 1: Write and solve an equation: If your target
a real-world or mathematical problem, and	heart rate is 130 bpm, which is 58 bpm more than your
1 ,	resting heart rate, find your resting heart rate.

 construct simple equations and inequalities to solve problems by reasoning about the quantities. Career-Ready Practices CRP1: Act as a responsible and contributing citizen and employee. CRP2: Apply appropriate academic and technical skills. CRP3: Attend to personal health and financial well-being. CRP4: Communicate clearly and effectively and with reason. CRP5: Consider the environmental, social and economic impacts of decisions. CRP6: Demonstrate creativity and innovation. CRP7: Employ valid and reliable research strategies. CRP8: Utilize critical thinking to make sense of problems and persevere in solving them. CRP9: Model integrity, ethical leadership and effective management. CRP10: Plan education and career paths aligned to personal goals. CRP11:. Use technology to enhance productivity. CRP12: Work productively in teams while using cultural global competence. 	 Example 2: Write and solve an inequality: The total weight limit for a truck is 100,000lbs. If the truck weighs 36,000lbs empty, what is the truck's maximum possible load? Instructional Strategies: Interdisciplinary Connections Science – Determine maximum load bridges can bear based on different engineering structures Technology Integration Khan Academy – video clips on solving equations and inequalities Complete a short instant response quiz for a formative self-assessment (Google forms, quizlet, etc) Media Literacy Pear Deck presentation/discussion – name some instances of inequalities in the real world. How many can you list? (speed limit maximum occupancy etc.)
The following skills and themes listed to the right should be reflected in the design of units and lessons for this course or content area:	21 st Century Skills: Creativity and Innovation Critical Thinking and Problem Solving Communication and Collaboration Information Literacy Media Literacy Life and Career Skills
	21 st Century Themes (as applies to content area): Financial, Economic, Business, and Entrepreneurial Literacy Civic Literacy Health Literacy

Unit 2A: Expressions and Equations (Exponent Rules) (from Grade 8 Standards - 8.EE.A.1 and 8.EE.A.3)

Expressions and Equations

Students will be able to apply the properties of integer exponents to generate equivalent numerical expressions.

Big Ideas:

- Use the Laws of Exponents to generate equivalent expressions.
- Use scientific notation to estimate very large or very small quantities.

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 repetitive patterns be written using exponents? How can computations involving very large or very small numbers be simplified? 	 Students will understand that The properties of integer exponents can generate equivalent numerical expressions. Numbers expressed in the form of a single digit times an integer power of 10 can be used to estimate very large or very small quantities and to express how many times as much one is than the other.
Areas of Focus: Proficiencies (Cumulative Progress Indicators)	Examples, Outcomes, Assessments
Students will: 8.EE.A.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5}$ $= 3^{-3} = 1/3^3 = 1/27$. 8.EE.A.3 Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3 times 10 ⁸ and the population of the world as 7 times 10 ⁹ , and determine that the world population is more than 20 times larger.	 Instructional Focus: Use the order of operations and the properties of exponents to simplify expressions. Converting numbers in standard form to scientific notation and scientific notation to standard form Sample Assessments: 2 unit quizzes 1 unit test Sample Assessment 8.EE.A.3 List powers of 10 in descending order until you reach 10°. Explain why 10° = 1. Does this work for any base to a zero power? Sample Assessment 8.EE.A.1 Simplify the expression a⁵b/ab⁴ Instructional Strategies: Interdisciplinary Connections Science – Comparison of the nucleus of an atom to the distance of particular stars from Earth. Scientific notation is necessary to represent such large and small quantities.

 Career-Ready Practices CRP1: Act as a responsible and contributing citizen and employee. CRP2: Apply appropriate academic and technical skills. CRP3: Attend to personal health and financial well-being. CRP4: Communicate clearly and effectively and with reason. CRP5: Consider the environmental, social and economic impacts of decisions. CRP6: Demonstrate creativity and innovation. CRP7: Employ valid and reliable research strategies. CRP8: Utilize critical thinking to make sense of problems and persevere in solving them. CRP9: Model integrity, ethical leadership and effective management. CRP10: Plan education and career paths aligned to personal goals. CRP11:. Use technology to enhance productivity. 	 Use flashcardexchange.com to create, share, and print flashcards for studying the exponent rules On the SMART board, use a graphing application to show exponential growth rates graphically. Students can use the application to change the graph and observe its properties as it changes. Global Perspectives View a graph of human population growth over the last 12000 years. (http://mathbench.umd.edu/modules/popn-dynami cs_exponential-growth/page18.htm) Exponents are used to represent growth that occurs very rapidly. Research online sources to determine what this means for the world population in the next century.
CRP12 : Work productively in teams while using	
The following skills and themes listed to the right should be reflected in the design of units and lessons for this course or content area:	 21st Century Skills: Creativity and Innovation Critical Thinking and Problem Solving Communication and Collaboration Information Literacy Media Literacy Life and Career Skills 21st Century Themes (as applies to content area): Financial, Economic, Business, and Entrepreneurial Literacy Civic Literacy Health Literacy

Unit 3: Ratios and Proportional Reasoning

Ratios and Proportional Reasoning

Analyze proportional relationships and use them to solve real-world

and mathematical problems.

Big Ideas: Ratio and Proportion (PHPA 2001 6.1-6.3, 6.5-6.9)

- 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,	What will students understand about the big ideas?
understanding, and transfer of learning?	
• How can ratios and proportions allow you to determine your travel time on a road trip?	 Students will understand that The graph of a proportional relationship is a straight line through the origin.
• How can you identify a proportional relationship from a table? Graph? Equation?	 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.
• How can understanding unit rate, markup, and discount make you a smart and thrifty consumer?	 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
• When you get a job, why is it important to know the difference between a fixed salary or a salary based only on commission?	 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,
• How do proportions help determine measurements of very tall objects?	sales tax, and markup 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.RP.1. Compute unit rates associated with	• Find unit rates
ratios of fractions, including ratios of lengths,	• Determine if two ratios form a proportion.
	 Solve proportions.

 areas and other quantities measured in like or different units. 7.RP.2. Recognize and represent proportional relationships between quantities. 7.RP.3. Use proportional relationships to solve multi-step ratio and percent problems. Career-Ready Practices CRP1: Act as a responsible and contributing citizen and employee. CRP2: Apply appropriate academic and technical skills. CRP3: Attend to personal health and financial well-being. CRP4: Communicate clearly and effectively and with reason. CRP5: Consider the environmental, social and economic impacts of decisions. CRP6: Demonstrate creativity and innovation. CRP7: Employ valid and reliable research strategies. CRP8: Utilize critical thinking to make sense of problems and persevere in solving them. CRP9: Model integrity, ethical leadership and 	 Use proportions to find parts of similar figures, and to solve problems involving maps and scale drawings. Use proportions to find percent of a number Sample Assessments: 2 unit quizzes 1 unit test Sample Assessment 7.RP.A.1 Example 1: If a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2/1/4 miles per hour. Sample Assessment 7.RP.2a Example 1: Given a graph, determine if a proportional relationship is present. Example 2: Given a graph, identify the unit rate and determine the y value if x = (given number) Example 3: On a road trip, the driver averages 60mph. Write an equation to represent the distance traveled d after h hours.
effective management. CRP10 : Plan education and career paths aligned to	Instructional Strategies:
personal goals.	Interdisciplinary Connections
CRP1 : Use technology to enhance productivity. CRP12 : Work productively in teams while using	• Geography: use unit rate to find population density.
cultural global competence.	 Social Studies: In government, delegates are proportional to the population in each state.
	Global Perspectives Use the exchange rates of various countries to figure out how much foreign money you can get in exchange for \$100 U.S. dollars. Use this to help make a decision about the most affordable travel destination.
	Media Literacy
	 Photos on Instagram must be in a square format and must be cropped to be displayed properly. Is the cropped photo similar to the original? If so, how can you find the scale factor? On certain smartphones, the photo editing feature offers the option to "constrain" the photo. How does this relate to proportionality?
The following skills and themes listed to the right should be reflected in the design of units and lessons for this course or content area:	21 st Century Skills: Creativity and Innovation Critical Thinking and Problem Solving Communication and Collaboration

Information Literacy Media Literacy Life and Career Skills
21 st Century Themes (as applies to content area): Financial, Economic, Business, and Entrepreneurial Literacy Civic Literacy Health Literacy

Unit 4: Statistics and Probability

Statistics and P	robability
Use random sampling to draw inferences about a population.	
Draw informal comparative inferences about two populations.	
Investigate chance processes and o	levelop, use, and evaluate probability models.
Big Ideas: Probability and Statistics (PHPA 2001	3.3, 6.4, 12.4-12.8)
 Determine measures of central tendency a Identify random samples, how to write a sproportions. Students will become familiar with theore sample space to show the outcomes in an 	and which best represents a set of data. Survey question, and how to estimate population sizes using tical and experimental probability and be able to make a experiment.
Essential Questions	Enduring Understandings
What provocative questions will foster inquiry,	What will students understand about the big ideas?
understanding, and transfer of learning?	
 What relationships can you find between sports and probability? How can probability be used to predict future increases or decreases in populations of animals in specific areas? Do you think it is practical to survey every student in a school about the kind of music they like? If not, why not, and how would you go about the survey? How can patterns in historical data be used to predict extreme weather conditions? 	 Students will understand that The sum of a probability and its complement is one. Theoretical probability is the actual probability of an event and experimental is based on the results of an experiment. All possible outcomes of an experiment constitute the sample space. Random samples and surveys are used to represent information about a larger group. The data from random samples and surveys are often used to predict outcomes or estimate preferences of larger populations.
Areas of Focus: Proficiencies	Examples, Outcomes, Assessments
(Cumulative Progress Indicators)	
Students will:	Instructional Focus:
7.SP.1. Understand that statistics can be used	• Estimate a population size using proportions
to gain information about a population by	and random samples.
examining a sample of the population;	• Find the probability and complement of an
generalizations about a population from a	 Find experimental probability
representative of that population. Understand	 Construct and use a sample space and the
that random sampling tends to produce	counting principle to find probabilities.
representative samples and support valid	Sample Assessments:
inferences.	• 2 unit quizzes
7.SP.2. Use data from a random sample to	• 1 unit test
draw inferences about a population with an	
unknown characteristic of interest. Generate	Sample Assessment 7.SP.4 &6

multiple samples (or simulated samples) of the	• Example 1: Students will design a survey question
same size to gauge the variation in estimates or	and gather data from 30 people. Using their data,
predictions.	they will:
7.SP.4. Use measures of center and measures of	1) estimate data for the entire 7^{th} grade
variability for numerical data from random	2) decide whether their survey data alone is
samples to draw informal comparative	enough to accurately portray the preferences of
inferences about two populations.	the 7^{th} grade
7.SP.5. Understand that the probability of a	3) use measures of central tendency to summarize the data
chance event is a number between 0 and 1 that	
expresses the likelihood of the event occurring.	• Example 2: Roll a 6-sided die a number of times
Larger numbers indicate greater likelihood. A	and record the results. From the data, calculate
probability near 0 indicates an unlikely event. a	experimental probabilities.
probability around $1/2$ indicates an event that is	1 1
neither unlikely nor likely and a probability near	Instructional Strategies:
1 indicates a likely event	Interdisciplinary Connections
7 SP.6 Approximate the probability of a	• Science: Use probability to find out of a group of
chance event by collecting data on the chance	1000 people, how many would be colorblind.
process that produces it and observing its	
long run relative frequency, and predict the	Technology Integration
approximate relative frequency, and predict the	Design an experiment, such as tessing a gain 100 times
approximate relative frequency given the	Calculate theoretical probabilities, then perform the
7 SP 7 Develop a probability model and was it	experiment. Record the results in an Excel spreadsheet
7.5P.7. Develop a probability model and use it	and nucluos a corresponding graph to compare
to find probabilities of events. Compare	and produce a corresponding graph to compare
probabilities from a model to observed	experimental data with theoretical data.
frequencies; if the agreement is not good,	Media Literacy
explain possible sources of the discrepancy.	Post a survey question to your class on Edmodo about
7.SP.8. Find probabilities of compound events	inherited traits (eve color, handedness, tongue curling, etc.)
using organized lists, tables, tree diagrams, and	Do the results accurately portray a larger population?
simulation.	Do the results accurately portray a larger population:
Career-Ready Practices	
CRPI : Act as a responsible and contributing citizen	
CRP2 : Apply appropriate and demis and technical	
ckr2: Apply appropriate academic and technical	
CRP3 : Attend to personal health and financial	
well-being	
CBP4 : Communicate clearly and effectively and	
with reason	
CRP5 : Consider the environmental, social and	
economic impacts of decisions.	
CRP6 : Demonstrate creativity and innovation.	
CRP7 : Employ valid and reliable research strategies.	
CRP8 : Utilize critical thinking to make sense of	
problems and persevere in solving them.	
CRP9: Model integrity, ethical leadership and	
effective management.	
CRP10 Plan education and career paths aligned to	

personal goals. CRP11 : Use technology to enhance productivity. CRP12 : Work productively in teams while using cultural global competence.	
The following skills and themes listed to	21 st Century Skills:
the right should be reflected in the design	Creativity and Innovation
of units and lessons for this course or	Critical Thinking and Problem Solving
content area:	Communication and Collaboration
	Information Literacy
	Media Literacy
	Life and Career Skills
	21 st Century Themes (as applies to content area):
	Financial, Economic, Business, and
	Entrepreneurial Literacy
	Civic Literacy
	Health Literacy

Unit 5: Geometry

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: PHPA 2001 (9.1-9.3, 9.6, 9.8-9.10, 10.1-10.3)

- Classify and identify angle relationships, solve equations using knowledge of angle relationships
- Find the areas of polygons, including triangles, parallelograms, and trapezoids.
- Find the area and circumference of circles.

Essential Questions	Enduring Understandings
What provocative questions will foster inquiry,	What will students understand about the big ideas?
understanding, and transfer of learning?	
 Why learn how to classify angles? How can the area formulas for certain polygons be used to develop area formulas for other polygons? 	 Students will understand that Architects use angles and geometric patterns to plan and design various structures. Depth of knowledge in how different shapes form a pattern is essential. The formula for the area of a triangle is proven using the area formula of a parallelogram. The area formula for a trapezoid can be found using two parallelograms. Find the area of any regular polygon by dividing the polygon into equal triangular pieces, finding the area of one triangle and multiplying the answer by the amount of triangles.

Areas of Focus: Proficiencies	Examples, Outcomes, Assessments
(Cumulative Progress Indicators)	
Students will:	Instructional Focus:
7.G.1. Solve problems involving scale	Area of Parallelograms
drawings of geometric figures, including	• Perimeter and Area of Triangles and Trapezoids.
computing actual lengths and areas from a	• Areas of complex figures that combine basic shapes
scale drawing and reproducing a scale drawing	(e.g. a semi-circle on top of a rectangle)
at a different scale.	• Circumference and Area of a Circle
7.G.2. Draw (freehand, with ruler and	
protractor, and with technology) geometric	Sample Assessments:
shapes with given conditions. Focus on	• 2 unit quizzes
constructing triangles from three measures of	• 1 unit test
angles or sides, noticing when the conditions	
determine a unique triangle, more than one	Sample Assessment 7.G. 4
triangle, or no triangle.	The high school track appears to be a rectangle with a
7.G.4. Know the formulas for the area and	semi-circle on each end. Given the dimensions of the
circumference of a circle and use them to	rectangle, find:
solve problems; give an informal derivation of	a) The distance around the track
the relationship between the circumference	b) The area of the field inside the track
and area of a circle.	c) How much it would cost to fertilize the grass on the
	field at \$2.50 per square yard

7.G.5. Use facts about supplementary,	
complementary, vertical, and adjacent angles in	Sample Assessment 7.G.1
a multi-step problem to write and solve simple	Two triangles have the same area. Must they have the same
equations for an unknown angle in a figure.	base and height?
Career-Ready Practices	
CRP1 : Act as a responsible and contributing	Instructional Strategies:
citizen and employee.	Interdisciplinary Connections
CRP2 : Apply appropriate academic and technical	• Social Studies – strong evidence of geometric patterns
skills.	in Mayan architecture, including reflective and
CRP3 : Attend to personal health and financial	rotational symmetry
well-being.	(http://www.ethnomath.org/resources/ISGEm/067.h
with reason	<u>tm</u>)
CRP5 : Consider the environmental, social and	
economic impacts of decisions.	Life and Career Skills
CRP6 : Demonstrate creativity and innovation.	• Home remodeling -Determining price of carpeting per
CRP7 : Employ valid and reliable research	square foot, finding cost of paint to cover walls,
strategies.	measuring tiles to fit in a specific geometric pattern to
CRP8: Utilize critical thinking to make sense of	minimize waste.
problems and persevere in solving them.	
CRP9: Model integrity, ethical leadership and	
effective management.	
CRP10 : Plan education and career paths aligned to	
personal goals.	
CRP12 : Work productively in terms while using	
cultural global competence	
The following skills and themes listed to	21 st Century Skills:
the right should be reflected in the	Creativity and Innovation
design of units and lessons for this	Critical Thinking and Problem Solving
course or content area:	Communication and Collaboration
	Information Literacy
	Media Literacy
	Life and Career Skills
	21 st Century Themes (as applies to content area):
	Financial, Economic, Business, and
	Entrepreneurial Literacy
	Civic Literacy
	Health Literacy

Geometry (3D Figures - Naming, Drawing, Surface Area and Volume)

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

Big Ideas: Measurement of 3-D Figures PHPA(2001) 10.4, 10.5, 10.7

- Identify, draw, and name parts of 3-dimensional figures.
- Find the surface areas and volumes of rectangular prisms and cylinders.
- Solve real world problems involving the volume of 3-dimensional shapes.

Enduring Understandings
What will students understand about the big ideas?
 Students will understand that 3-dimensional figures are composed of 2-dimensional shapes. Surface area is the sum of the areas of each face. To find the volume of prisms and cylinders, multiply the area of the base times the height of the prism.
Examples, Outcomes, Assessments
Instructional Focus:
 Manipulate 2-dimensional shapes to create 3-D
figures
 Classify and draw 3-dimensional figures.
 Identify faces, edges, bases, and vertices of
3-dimensional figures.
• Find surface area and volume of rectangular prisms
and cylinders.
• Compare rectangular prisms that have the same
volume, but different surface areas.
Sample Assessments:
• 2 unit quizzes
• 1 unit test
Sample Assessment 7.G.3
-Given different views of an object, choose the 3D object that
matches those views.
Sample Assessment 7.G.6
-A fish tank with length 12 inches, width 9 inches, and height
12 inches is filled to 75% capacity. Find how many cubic
inches of water will be needed.

CRP8 : Utilize critical thinking to make sense of	Instructional Strategies:
problems and persevere in solving them.	Interdisciplinary Connections
CRP9: Model integrity, ethical leadership and	• Art: Importance of the ability to visualize and draw
effective management.	3-dimensional objects to show depth and perspective.
CRP10 : Plan education and career paths aligned	• Manufacturing: Knowing how to find surface area and
to personal goals.	volume will help manage packaging expenses
CRP11 :. Use technology to enhance productivity.	
CRP12 : Work productively in teams while using	Technology Integration
cultural global competence.	Display 3D figures on SMART board and have students draw
	corresponding nets or cross-sections
	Life and Career Skills
	Based on the surface area of an item you need to ship to
	California, decide which shipping company has the best rates
	for your size package. (e.g. FedEx, UPS, DHL, USPS)
	To help your family move, you need to calculate how many
	moving boxes will fit in the truck. Find the volume of the
	truck and decide how many of different size boxes can fit
	(small, medium, large).
The following skills and themes listed	21 st Century Skills:
to the right should be reflected in the	Creativity and Innovation
design of units and lessons for this	Critical Thinking and Problem Solving
course or content area:	Communication and Collaboration
	Information Literacy
	Media Literacy
	Life and Career Skills
	est Contum Thomas (as annulise to contant energy)
	21 Century Themes (as applies to content area):
	Entropropourial Literacy
	Civic Literacy
	Health Literacy
	Heatth Eiteracy

Instruc	Instructional Strategies: Differentiation Strategies: Accommodations		Differentiation Strategies:		
Supports for English			Accommodations	Interventions	Modifications
Sensory Supports	Graphic Supports	Interactive Supports	Allow for verbal	Multi-sensory techniques	Modified tasks/
Real-life objects (realia)	Charts	In pairs or partners	responses		expectations
Manipulatives Pictures & photographs Illustrations, diagrams, & drawings Magazines & newspapers	Graphic organizers Tables Graphs Timelines	In triads or small groups In a whole group Using cooperative group structures	Repeat/confirm directions	Increase task structure (e.g., directions, checks for understanding, feedback)	Differentiated materials
Physical activities Viceos & films Broadcasts Models & figures	Number lines	With the Internet (websites) software programs In the home language With mentors	Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding (e.g., writing, reading aloud, answering	Individualized assessment tools based on student need

from <u>https://wida.wisc.edu</u>		questions in class)	
	Audio Books	Utilize prereading strategies and activities: previews, anticipatory guides, and semantic mapping	Modified assessment grading

Curricular Addendum

Career-Ready Practices CRP1: Act as a responsible and contributing citizen and employee. CRP2: Apply appropriate academic and technical skills. CRP3: Attend to personal health and financial well-being. CRP4: Communicate clearly and effectively and with reason. CRP5: Consider the environmental, social and economic impacts of decisions. CRP6: Demonstrate creativity and innovation. CRP7: Employ valid and reliable research	 Interdisciplinary Connections Close Reading of works of art, music lyrics, videos, and advertisements Use <u>Standards for Mathematical Practice</u> and <u>Cross-Cutting Concepts</u> in science to support debate/inquiry across thinking processes Technology Integration Ongoing: Listen to books on CDs, Playaways, videos, or podcasts if available. Use document camera or overhead projector for shared reading of texts.
strategies. CRP8: Utilize critical thinking to make sense of problems and persevere in solving them. CRP9: Model integrity, ethical leadership and effective management. CRP10: Plan education and career paths aligned to personal goals. CRP11:. Use technology to enhance productivity. CRP12: Work productively in teams while using cultural global competence.	 Other: Use Microsoft Word, Inspiration, or SmartBoard Notebook software to write the words from their word sorts. Use available technology to create concept maps of unit learning.

Instructional Strategies: Supports for English Language Learners:

Sensory Supports	Graphic Supports	Interactive Supports
Real-life objects (realia)	Charts	In pairs or partners
Manipulatives	Graphic organizers	In triads or small groups
Pictures & photographs	Tables	In a whole group
Illustrations, diagrams, & drawings	Graphs	Using cooperative group
Magazines & newspapers	Timelines	structures
Physical activities	Number lines	With the Internet (websites) or
Videos & films	Martine Boundary Providence	software programs
Broadcasts		In the home language
Models & figures		With mentors

Media Literacy Integration

• Use multiple forms of print media (including books, illustrations/photographs/artwork, video clips, commercials, podcasts, audiobooks, Playaways, newspapers, magazines) to practice reading and comprehension skills.

Global Perspectives

• The Global Learning Resource Library

Differentiation Strategies:

from	https://wida.wisc.edu	

Accommodations	Interventions	Modifications
Allow for verbal responses	Multi-sensory techniques	Modified tasks/ expectations
Repeat/confirm directions	Increase task structure (e.g., directions, checks for understanding, feedback)	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding (e.g., writing, reading aloud, answering questions in class)	Individualized assessment tools based on student need
Audio Books	Utilize prereading strategies and activities: previews, anticipatory guides, and semantic mapping	Modified assessment grading