Tunkhannock Area School District
Grade Seven Mathematics
Curriculum Map 2014

Quarter 1

Targeted Standard(s):

Domain

7.NS The Number System

7.AR Ratios and Proportional Relationships

PA Core Standards

CC.2.1.7.E.1 Apply and extend previous understandings of operations with fractions to operations with rational numbers.

CC.2.1.7.D.1 Analyze proportional relationships and use them to model and solve real-world and mathematical problems.

PA Core Assessment Anchors

M07.A-N.1 Apply and extend previous understandings of operations to add, subtract, multiply, and divide rational numbers.

M07.A-R.1 Demonstrate an understanding of proportional relationships.

PA Core Assessment Anchor Descriptors

M07.A-N.1.1 Solve real-world and mathematical problems involving the four operations with rational numbers.

M07.A.R.1.1 Analyze, recognize, and represent proportional relationships and use them to solve real-world and mathematical problems.

PA Core Eligible Content

M07.A-N.1.1.1 Apply properties of operations to add and subtract rational numbers, including real world contexts.

M07.A-N.1.1.2 Represent addition and subtraction on a horizontal or vertical number line.

M07.A-N.1.1.3 Apply properties of operations to multiply and divide rational numbers, including real world contexts; demonstrate that the decimal form of a rational number terminates or eventually repeats.

M07.A-R.1.1.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.

M07.A-R.1.1.2 Determine whether two quantities are proportionally related (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).

M07.A-R.1.1.3 Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

M07.A-R.1.1.4 Represent proportional relationships by equations.

M07.A-R.1.1.5 Explain what a point (*x, y*) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r*) where *r* is the unit rate.

M07.A-R.1.1.6 Use proportional relationships to solve multi-step ratio and percent problems.

Enduring Understandings:

- Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.
- Use properties of operations to generate equivalent expressions.
- Analyze proportional relationships and use them to solve real-world and mathematical problems.

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Essential Questions:

1. How are rational numbers related and used to represent real world situations including those dealing with rates and scale of factors?
2. How is computation with rational numbers similar and different to whole number computation?
3. How can we use proportionality represented through models of and models for ratio tables, factor-of-change (scale factor), a unit rate, and cross-multiplication to solve real world problems?

Core Content/Objectives		Instructional Actions	
Concepts What students will know	**Competencies** What students will be able to do	**Activities/Strategies/Materials** Learning Activities/Differentiation Interdisciplinary Connections	**Assessment** How learning will be assessed
I. Operations of Rational Numbers A. Apply properties to add, subtract, multiply, and divide rational numbers.	A. Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. A. Compute fluently and solve problems using positive and negative rational numbers (including integers).	**Fluency Activities** • Math dash • Rocket Math • Math Minute A. Adding and Subtracting on a Number Line A. Interactive Number Line A. Rational Numbers, Lesson and Practice Problems A. Video Explaining Opposite Quantities A. Homework Video Tutor, Identifying Properties of Real Numbers A. Interactive Quiz on Identifying Properties A. Convert between fractions, decimals, and whole numbers	Formative Assessments -Daily Homework -Peer-teaching -Problem Solving Activities -Vocabulary Summative Assessments -Chapter Tests -Section Quizzes Quarter Projects Classroom Diagnostic Tool
B. Apply the Four Operations to Real-World Situations II. Order of Operations	B. Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	B. Examples of Multiplication and Division in Real World Contexts	

A. Add, Subtract, Multiply, and Divide Signed Rational Numbers. B. Calculate Numeric Expressions with Exponents C. Evaluating Expressions Involving Fractions, Decimals, and Whole Numbers.	A. Use properties of operations to generate equivalent expressions.	A. Order of Operations Rap Video A. Simplify numeric expressions involving exponents A. Order of Operations Game A. Evaluating Expressions, Interactive Study Guide A. Order of Operations - PEMDAS	
II. Unit Rates & Scale Factors A. Identify & Calculate Unit Rate B. Determine Equivalency Between Ratios	A. Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.	A. Writing Ratios A. Writing Unit Ratios from Word Problems A. Interactive Activity for Calculating Rate A. How to Video/Examples for Unit Rate A. Identify and write ratios A. Calculate unit rate A. Determine equivalency between ratios	
C. Write & Solve Proportional Relationships	C. Recognize and represent proportional relationships between quantities: Decide whether two quantities are in a proportional relationship.	C. Complete the Proportions C. Teacher Resource, Teaching Word Problems Using Proportions	
D. Proportional Relationships on Graphs	D. Recognize and represent proportional relationships between quantities: b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and	D. Identify and/or create a scale	

	verbal descriptions of proportional relationships. c. Represent proportional relationships by equations. d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.		
E. Identify, Create and Solve Problems using Scale Factors	E. 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.	E. Solve problems using proportions or scale factors E. Using Scale to Create a Floor Plan for your Classroom E. Scale Drawings and Models Worksheet E. Statue of Liberty Tutorial	
F. Calculate Perimeter/Area of Scale Drawings		F. Comparing Measurements of Scaled Objects F. Using Microsoft Word Drawings to Teach Dimensional Measurements of Scale Drawings	
G. Apply Real-World Situations	G. Use proportional relationships to solve multi-step ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease.	G. Sales! G. Brain Pop, Animated Educational Site, Comparing Prices	

Quarter 2

Targeted Standard(s):

Domain

7.EE Expressions and Equations

PA Core Standards

CC.2.2.7.B.1 Apply properties of operations to generate equivalent expressions.

CC.2.2.7.B.3 Model and solve real world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.

PA Core Assessment Anchors

M07.B-E.1 Represent expressions in equivalent forms.

M07.B-E.2 Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities.

PA Core Assessment Anchor Descriptors

M07.B-E.1.1 Use properties of operations to generate equivalent expressions.

M07.B-E.2.1 Solve multi-step real-world and mathematical problems posed with positive and negative rational numbers.

M07.B-E.2.2 Use variables to represent quantities in a real-world or mathematical problem and construct simple equations and inequalities to solve problems.

M07.B-E.2.3 Determine the reasonableness of the answer(s) in problem-solving situations.

PA Core Eligible Content

M07.B-E.1.1.1 Apply properties of operations to add, subtract, factor, and expand linear expressions with rational coefficients.

M07.B-E.2.1.1 Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate.

M07.B-E.2.2.1 Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers.

M07.B-E.2.2.2 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, and graph the solution set of the inequality.

M07.B-E.2.3.1 Determine the reasonableness of an answer(s), or interpret the solution(s) in the context of the problem.

Enduring Understandings:

- Solve real-life and mathematical problems using numerical and algebraic expressions and equations.
- Use properties of operations to generate equivalent expressions.

Essential Questions:

1. How do you translate given situations into math expressions and equations and formulas and use these to solve problems?
2. What are the connections among the different representations of a linear relationship?
3. How does the representation support the linear relationship? (ie. Where in each representation can you find the rate of change, the y-intercept, etc.?)

Core Content/Objectives		Instructional Actions	
Concepts What students will know	**Competencies** What students will be able to do	**Activities/Strategies/Materials** Learning Activities/Differentiation Interdisciplinary Connections	**Assessment** How learning will be assessed
I. Expressions and Equations A. Rewrite Expressions in Equivalent Forms B. Recognize and Identify Multiple Representations for an Expression and Equation C. Write and Solve Multi-Step Equations for Real-World Situations Using all Forms of Signed Numbers D. Write and Solve Inequalities for Real-World Situations with Special Attention Given to the	A. Use properties of operations to generate equivalent expressions. C. 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. D. Use variables to represent quantities in a real-world or mathematical problem, and	**Fluency Activities** • Math dash • Rocket Math • Math Minute A. Equivalent Expressions B. Pan Balance C. Video on solving multi-step equations and Real World Connection D. Inequalities Word Problems E. Graphing Inequalities	Formative Assessments -Daily Homework -Peer-teaching -Problem Solving Activities -Vocabularyy Summative Assessments -Chapter Tests -Section Quizzes Quarter Projects Classroom Diagnostic Tool

Order of Operations E. Graph the Solutions for Inequalities	construct simple equations and inequalities to solve problems by reasoning about the quantities.		
F. Convert Numbers Between All Forms G. Apply Estimation Strategies to Verify the Answers to Word Problems H. Interpret the Meaning of a Solution Based on the Context of the Problem	F. 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.	G. Estimation Strategies H. Algebraic Word Problem Tutorial	
II. Graphing in Two Variables A. Plot Ordered Pairs in the Coordinate Plane B. Determine Whether a Set of Points Represents a Linear Relationship C. Determine Whether an Equation Represents a Linear Relationship	A. Recognize and represent proportional relationships between quantities: a. 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.	A. Plotting Coordinates B. Input-Output Graphs C. Linear Equations and Matching Graphs	
D. Calculate the Slope Between	D. Recognize and represent	D. Rise Over Run	

two Points E. Graph a Linear Relationship Using a Point and the Slope F. Graph a Linear Equation in 2 Variables	proportional relationships between quantities: b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. E. Recognize and represent proportional relationships between quantities.	E. Slope Slider Relationships E. Graphing Interactive F. Create-A-Graph F. Graphing Game with Differentiation	

Quarter 3

Targeted Standard(s):

Domain

7.SP Statistics and Probability

PA Core Standards

CC.2.4.7.B.1 Draw inferences about populations based on random sampling concepts.
CC.2.4.7.B.2 Draw informal comparative inferences about two populations.
CC.2.4.7.B.3 Investigate chance processes and develop, use, and evaluate probability models.

PA Core Assessment Anchors

M07.D-S.1 Use random sampling to draw inferences about a population.
M07.D-S.2 Draw comparative inferences about populations.
M07.D-S.3 Investigate chance processes and develop, use, and evaluate probability models.

PA Core Assessment Anchor Descriptors

M07.D-S.1.1 Use random samples.
M07.D-S.2.1 Use statistical measures to compare two numerical data distributions.
M07.D-S.3.1 Predict or determine the likelihood of outcomes.
M07.D-S.3.2 Use probability to predict outcomes.

PA Core Eligible Content

M07.D-S.1.1.1 Determine whether a sample is a random sample given a real-world situation.
M07.D-S.1.1.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest.
M07.D-S.2.1.1 Compare two numerical data distributions using measures of center and variability.
M07.D-S.3.1.1 Predict or determine whether some outcomes are certain, more likely, less likely, equally likely, or impossible (i.e., a probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event).
M07.D-S.3.2.1 Determine the probability of a chance event given relative frequency. Predict the approximate relative frequency given the probability.
M07.D-S.3.2.2 Find the probability of a simple event, including the probability of a simple event **not** occurring.
M07.D-S.3.2.3 Find probabilities of independent compound events using organized lists, tables, tree diagrams, and simulation.

Enduring Understandings:

- 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.

Essential Questions:

1. How can we use the mean, median, mode, and range to describe a set of data? Why do we need three different measures of central tendency?
2. How does the collection, analysis, organization, and interpretation of data help us to answer real world questions? What kind of questions can and cannot be answered from the data set and its display?
3. How do we make predictions based on the outcomes of a probability experiment?

Core Content/Objectives		**Instructional Actions**	
Concepts What students will know	**Competencies** What students will be able to do	**Activities/Strategies/Materials** Learning Activities/Differentiation Interdisciplinary Connections	**Assessment** How learning will be assessed
I. Population and Inferences A. Determine if a Sample is Random B. Use Data from Random Samples to Make Conclusions About Populations C. Use Proportions and the Random Sample to Represent the Entire Population	A. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. B. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.	**Fluency Activities** • Math dash • Rocket Math • Math Minute A. Population Sampling Activities B. Description of Possible Biased Samples C. Capture and Release Activity	Formative Assessments -Daily Homework -Peer-teaching -Problem Solving Activities - Vocabulary Summative Assessments -Chapter Tests -Section Quizzes Quarter Projects Classroom Diagnostic Tool

D. Compare Measures of Central Tendency	D. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. D. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.	D. Random Number Generator	
J. Probability			
A. Explain Probability as a Number Between 0 and 1	A. Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.	A. Probability and Complements A. Probability Activities and Worksheets	
B. Calculate the Experimental Probability of an Event	B. Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative	B. Compare Theoretical and Experimental Probability B. What is the Experimental	

	frequency, and predict the approximate relative frequency given the probability.	Probability?	
C. Calculate Theoretical Probability of Uniform Events	C. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.	C. Probability Calculator C. Fun with Probability	
D. Calculate Theoretical Probability of Non-Uniform Events	D. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.	D. Adjustable Spinner D. Probability Games	
E. Communicate Visually or Verbally How the Outcomes from 2 Individual Events can be Combined to Represent a Compound Event	E. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.	E. Event Calculator E. World Series Probability	
F. Represent Sample Spaces in a Variety of Formats	F. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the	F. Sample Spaces F. Tree Diagrams	

G. Design a Simulation/ Conduct an Experiment to Generate Frequencies for Compound Events	event. G. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. c. Design and use a simulation to generate frequencies for compound events.	G. Experimental Probability--Spinners and Dice G. Compound Probabilities Activity	

Quarter 4

Targeted Standard(s):
Domain
7G Geometry

PA Core Standards
CC.2.3.7.A.1 Solve real-world and mathematical problems involving angle measure, area, surface area, circumference, and volume.
CC.2.3.7.A.2 Visualize and represent geometric figures and describe the relationships between them.

PA Core Assessment Anchors
M07.C-G.1 Demonstrate an understanding of geometric figures and their properties.
M07.C-G.2 Solve real-world and mathematical problems involving angle measure, circumference, area, surface area, and volume.

PA Core Assessment Anchor Descriptors
M07.C-G.1.1 Describe and apply properties of geometric figures.
M07.C-G.2.1 Identify, use and describe properties of angles and their measures.
M07.C-G.2.2 Determine circumference, area, surface area, and volume.

PA Core Eligible Content
M07.C-G.1.1.1 Solve problems involving scale drawings of geometric figures, including finding length and area.
M07.C-G.1.1.2 Identify or describe the properties of all types of triangles based on angle and side measure.
M07.C-G.1.1.3 Use and apply the triangle inequality theorem.
M07.C-G.1.1.4 Describe the two-dimensional figures that result from slicing three-dimensional figures.
M07.C-G.2.1.1 Identify and use properties of supplementary, complementary, and adjacent angles in a multistep problem to write and solve simple equations for an unknown angle in a figure.
M07.C-G.2.1.2 Identify and use properties of angles formed when two parallel lines are cut by a transversal (e.g., angles may include alternate interior, alternate exterior, vertical, corresponding).
M07.C-G.2.2.1 Find the area and circumference of a circle. Solve problems involving area and circumference of a circle(s). Formulas will be provided.
M07.C-G.2.2.2 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. **Formulas will be provided.**

Enduring Understandings:
- 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.

Essential Questions:
1. How can the decomposition of 3-dimensional shapes aid in the understanding of surface areas and volumes?

2.	How can we use the relationship between surface area and volume to help us draw, construct, model, and represent real situations and/or solve problems of surface area and volume?

Core Content/Objectives		**Instructional Actions**	
Concepts What students will know	**Competencies** What students will be able to do	**Activities/Strategies/Materials** Learning Activities/Differentiation Interdisciplinary Connections	**Assessment** How learning will be assessed
I. Geometry - Angles A. Identify and Draw Supplementary, Complementary, Vertical, and Adjacent Angles B. Solve Simple Equations for Angle Measures C. Identify and Apply Angle Relationships to solve Multi-Step Real-World Problems D. Define and use angles formed by parallel lines cut by a transversal II. Properties of Triangles and Constructing Triangles A. Describe and Classify Triangles by Angles B. Describe and Classify Triangle by Side Length	A. 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. A. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from	**Fluency Activities** • Math dash • Rocket Math • Math Minutes A. Jeopardy Game A. Matching Supplementary / Complementary Angles B. Worksheets of Algebraic Equations Involving Angle Relationships C. Using Complementary and Supplementary Angles A. Classifying Triangles Worksheet B. Classify Triangles by Angles, Interactive Activity	Formative Assessments -Daily Homework -Peer-teaching -Problem Solving Activities -Vocabulary Summative Assessments -Chapter Tests -Section Quizzes Quarter Projects Classroom Diagnostic Tool

C. Triangle Inequality Theorem D. Construct Triangles Using a Protractor, Ruler, and Technology	three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.	D. Animated Geometric Constructions	
III. 2 and 3 Dimensional Figures			
A. Find the Area and Circumference of a Circle B. Solve Problems involving Area and Circumference of a Circle	A. 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 circumference and area of a circle.	A. Basketball Geometry A. Interactive Lesson on Circumference	
C. Solve Real World Problems Using Area, Volume, and Surface Area	C. 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.	C. Interactive Area and Perimeter Lesson	
D. Describe and Draw the Net for Right Rectangular Prisms and Pyramids	D. Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.	D. Net Activity	