Middle Schools (5-8)
Moss Side Middle School (5-6)
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Monroeville, PA 15146
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Gateway Middle School
4450 Old William Penn Highway
Monroeville, PA 15146
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Gateway School District
Curriculum Map

Curriculum Map: Moss Side Middle School – Gr. 6 Mathematics

Course: Math - 6

Grade(s): 6

Unit 1: Ratios and Unit Rates

Subject: Mathematics

Brief Summary of Unit
Students build on their prior work in measurement and in multiplication and division as they study the concepts and language of ratios and unit rates. They use proportional reasoning to solve problems. In particular, students solve ratio and rate using tape diagrams, tables of equivalent ratios, double number line diagrams, and equations. Students will be introduced to percentages as a rate per 100.   A detailed progression of the Ratios and Proportional Relationships domain with examples can be found at http://commoncoretools.me/category/progressions/

Stage One - Desired Results

Established Goals:(Standards of Learning, content standards)

1. Use ratio language and notation to describe a ratio relationship between two quantities.
2. Find the unit rate a/b associated with a ratio a: b (with b ≠ 0) and use rate language in the context of a ratio relationship.
3. Construct tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and/or plot the pairs of values on the coordinate plane. Use tables to compare ratios.
4. Solve unit rate problems including those involving unit pricing and constant speed.
5. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.
6. Represent ratio relationships in various forms.
7. Determine unit rates in context.
8. Convert measurement units using equivalent ratios
9. Solve problems using ratio and rate reasoning.

Understandings: What will students understand (about what big ideas) as a result of the unit? "Students will understand that..."	**Essential Questions:** What arguable, recurring, and thought-provoking questions will guide inquiry and point toward the big ideas of the unit?
1. Mathematical relationships can be	

represented as expressions, equations, and inequalities in mathematical situations.
2. Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.
3. Data can be modeled and used to make inferences.
4. Geometric relationships can be described, analyzed, and classified based on spatial reasoning and/or visualization.
5. Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.
6. Mathematical relationships among numbers can be represented, compared, and communicated.
7. Measurement attributes can be quantified and estimated using customary and non-customary units of measure.
8. Patterns exhibit relationships that can be extended, described, and generalized.

1. How are relationships represented mathematically?
2. How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations?
3. What does it mean to estimate or analyze numerical quantities?
4. When is it is appropriate to estimate versus calculate?
5. What makes a tool and/or strategy appropriate for a given task?
6. How does the type of data influence the choice of display?
7. How can probability and data analysis be used to make predictions?
8. How are spatial relationships, including shape and dimension, used to draw, construct, model, and represent real situations or solve problems?
9. How can the application of the attributes of geometric shapes support mathematical reasoning and problem solving?
10. How can geometric properties and theorems be used to describe, model, and analyze situations?
11. How can data be organized and represented to provide insight into the relationship between quantities?
12. How is mathematics used to quantify, compare, represent, and model numbers?
13. How can mathematics support effective communication?
14. Why does "what" we measure influence "how" we measure?
15. In what ways are the mathematical attributes of objects or processes measured, calculated, and/or interpreted?
16. How precise do measurements and calculations need to be?
17. How can patterns be used to describe relationships in mathematical situations?
18. How can recognizing repetition or regularity assist in solving problems more efficiently?

Stage Two - Assessment Evidence

Performance Tasks: What evidence will be collected to determine whether or not the understandings have been developed, the knowledge and skill attained, and the state standards met?
Teacher observation, Show what you know – Checking for understanding by randomly calling out

names to verify mastery of concepts. Homework- as needed, and relevant to unit. Common assessments, projects related to real world application. On-line skills practice with Study Island.

Other Evidence:(quizzes, tests and so on)

Stage Three - Learning Plan

Learning activities will include: Problem of the day, associated and aligned to grade 6, PSSA Math.

Vocabulary review of math terminology.

Differentiated learning activities based off of pre assessed materials aligned to PA Core.

Houghton Mifflin/Math Gr. 6 text, along with on-line math resources will be utilized as instructional resources.

Unit 2: Arithmetic Operations

Subject: Mathematics

Brief Summary of Unit
Students expand their understanding of the number system and build their fluency in arithmetic operations. Students learned in Grade 5 to divide whole numbers by unit fractions and unit fractions by whole numbers. Now, they apply and extend their understanding of multiplication and division to divide fractions by fractions. The meaning of this operation is connected to real-world problems as students are asked to create and solve fraction division word problems. Students continue (from Fifth Grade) to build fluency with adding, subtracting, multiplying, and dividing multi-digit decimal numbers using the standard algorithms. Students also extend the concepts of factors and multiples to include Greatest Common Factor and Least Common Multiple. A detailed progression of the Ratios and Proportional Relationships with examples can be found at http://commoncoretools.me/category/progressions/

Stage One - Desired Results

Established Goals:(Standards of Learning, content standards)

1. Interpret and compute quotients of fractions (including mixed numbers), and solve word problems involving division of fractions by fractions.
2. Solve problems involving operations ($+, -, \times, \div$) with whole numbers, decimals (through thousandths), straight computation, or word problems.
3. Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12.
4. Apply the distributive property to express a sum of two while numbers, 1 through 100, with a common factor as a multiple of a sum two whole numbers with no common factor.

Understandings: What will students understand (about what big ideas) as a result of the unit? "Students will understand that..."	**Essential Questions:** What arguable, recurring, and thought-provoking questions will guide inquiry and point toward the big ideas of the unit?

Stage Two - Assessment Evidence

Performance Tasks: What evidence will be collected to determine whether or not the understandings have been developed, the knowledge and skill attained, and the state standards met?

Other Evidence:(quizzes, tests and so on)

Stage Three - Learning Plan

Unit 3: Rational Numbers

Subject: Mathematics

Brief Summary of Unit
Students understand rational numbers as points on the number line and extend previous understandings of numbers to the system of rational numbers, which now include negative numbers. They extend coordinate axes to represent points in the plane with negative number coordinates and, as part of doing so, see that negative numbers can represent quantities in real-world contexts. Students use the number line to order numbers and to understand the absolute value of a number. They begin to solve real-world and mathematical problems by graphing points in all four quadrants, a concept that continues throughout to be used into high school and beyond.

Stage One - Desired Results

Established Goals:(Standards of Learning, content standards)

1. Represent quantities in real-world contexts using positive and negative numbers, explaining the meaning of 0 in each situation.
2. Determine the opposite of a number and recognize that the opposite of the opposite of a number is the number itself.
3. Locate and plot integers and other rational numbers on a horizontal or vertical number line; locate and plot pairs of integers and other rational numbers on a coordinate plane.
4. Interpret and compute quotients of fraction.
5. Solve problems and compute fluently with whole numbers and decimals.
6. Find common multiples and factors including greatest common factor and least common multiple.

Understandings: What will students understand (about what big ideas) as a result of the unit? "Students will understand that..."	**Essential Questions:** What arguable, recurring, and thought-provoking questions will guide inquiry and point toward the big ideas of the unit?

Stage Two - Assessment Evidence

Performance Tasks: What evidence will be collected to determine whether or not the understandings have been developed, the knowledge and skill attained, and the state standards met?

Other Evidence:(quizzes, tests and so on)

Stage Three - Learning Plan

Unit 4: Expressions and Equations

Subject: Mathematics

Brief Summary of Unit
With their sense of number expanded to include negative numbers, students begin formal study of algebraic expressions and equations. They learn equivalent expressions by continuously relating algebraic expressions back to arithmetic and the properties of arithmetic (commutative, associative, and distributive). Students write, interpret, and use expressions and equations as they reason about and solve one variable equations and inequalities and analyze quantitative relationships between two variables.
Stage One - Desired Results

Established Goals:(Standards of Learning, content standards)

1. Write and evaluate numerical expressions involving whole-number exponents.
2. Write algebraic expressions from verbal descriptions.
3. Identify parts of an expression using mathematical terms (e.g., sum, term, product, factor, quotient, coefficient, quantity).
4. Evaluate expressions at specific values of their variables, including expressions that arise from formulas used in real-world problems.
5. Apply the properties of operations to generate equivalent expressions.
6. Use substitution to determine whether a given number is a specified set makes an equation or inequality true.
7. Write algebraic expressions to represent real-world or mathematical problems.
8. Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q, and x are all non-negative rational numbers.
9. Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem and/or represent solutions of such inequalities on number lines.
10. Write an equation to express the relationship between the dependent and independent variables.
11. Analyze the relationship between the dependent and independent variables using graphs and tables, and/or relate these to an equation.
12. Write, identify and evaluate numerical expressions involving exponents.
13. Write, read and evaluate algebraic expressions.
14. Apply the properties of operations to generate equivalent expressions.
15. Represent and analyze quantitative relationships between Independent and dependent variables.
16. Solve and interpret one variable equations or inequalities in real world and mathematical problems.

Understandings: What will students understand (about what big ideas) as a result of the unit? "Students will understand that..."	**Essential Questions:** What arguable, recurring, and thought-provoking questions will guide inquiry and point toward the big ideas of the unit?

Stage Two - Assessment Evidence

Performance Tasks: What evidence will be collected to determine whether or not the understandings have been developed, the knowledge and skill attained, and the state standards met?

Other Evidence:(quizzes, tests and so on)

Stage Three - Learning Plan

Unit 5: Area, Surface Area and Volume

Subject: Mathematics

Brief Summary of Unit
Students apply their newly acquired capabilities with expressions and equations to solve for unknowns in area, surface area, and volume problems. They find the area of triangles and other two-dimensional figures and use the formulas to find the volumes of right rectangular prisms with fractional edge lengths. Students use negative numbers in coordinates as they draw lines and polygons in the coordinate plane. They also find the lengths of sides of figures, joining points with the same first coordinate or the same second coordinate and apply these techniques to solve real-world and mathematical problems.

Stage One - Desired Results

Established Goals:(Standards of Learning, content standards)

1. Determine the area of triangles and special quadrilaterals (i.e., square, rectangle, parallelogram, rhombus, and trapezoid) *formulas will be provided*.
2. Determine the area of irregular or compound polygons.
3. Determine the volume of right rectangular prisms with fractional edge lengths. *Formula will be provided*.
4. Given coordinates for the vertices of a polygon in the plane, use the coordinates to find side lengths and area of the polygon (limited to triangles and special quadrilaterals). *Formulas will be provided*.
5. Represent three-dimensional figures using nets made up of rectangles and triangles.
6. Determine the surface area of triangular and rectangular prisms (including cubes). *Formulas will be provided.*
7. Represent and analyze quantitative relationships between Independent and dependent variables.
8. Find volumes of right rectangular prisms with fractional edge lengths.
9. Use nets to find surface area of 3 – dimensional figures.
10. Determine the area of triangles, quadrilaterals, irregular polygons and compound polygons.
11. Calculate the area of a polygon on a plane given the coordinates of the vertices.

Understandings: What will students understand (about what big ideas) as a result of the unit? "Students will understand that..."	**Essential Questions:** What arguable, recurring, and thought-provoking questions will guide inquiry and point toward the big ideas of the unit?

Stage Two - Assessment Evidence

Performance Tasks: What evidence will be collected to determine whether or not the understandings have been developed, the knowledge and skill attained, and the state standards met?

Other Evidence:(quizzes, tests and so on)

Unit 6: Statistics

Subject: Mathematics

Brief Summary of Unit
Students develop an understanding of statistical variability and apply that understanding as they summarize, describe, and display distributions. In particular, careful attention is given to measures of center (e.g., mean, median, mode) and variability (e.g., range, interquartile range, and/or mean absolute deviation).

Stage One - Desired Results

Established Goals:(Standards of Learning, content standards)

1. Display numerical data in plots on a number line, including dot plots, histograms, and box-and-whisker plots.
2. Determine quantitative measures of center (e.g., median, mean, and/or mode) and variability (e.g., range, interquartile range, and/or mean absolute deviation).
3. Describe any overall pattern and any deviations from the overall pattern with reference to the context in which the data were gathered.
4. Relate the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.
5. Display data in dot plots, histograms and box-and-whisker plots.
6. Determine quantitative measures of center and variability.
7. Choose the appropriate measure of center and variability for a set of data.

Understandings: What will students understand (about what big ideas) as a result of the unit? "Students will understand that..."	**Essential Questions:** What arguable, recurring, and thought-provoking questions will guide inquiry and point toward the big ideas of the unit?

Stage Two - Assessment Evidence

Performance Tasks: What evidence will be collected to determine whether or not the understandings have been developed, the knowledge and skill attained, and the state standards met?

Other Evidence:(quizzes, tests and so on)

Stage Three - Learning Plan

Gr. 6 - Standards for Mathematical Practice

Subject: Mathematics

Brief Summary of Unit

Standards for Mathematical Practice
[Mathematical Practices](#) resource page on SAS

Unit 1:
MP# 1. Make sense of problems and persevere in solving them
MP# 2. Reason abstractly and quantitatively
MP# 3. Construct viable arguments and critique the reason of others
MP# 6. Attend to precision
MP# 7. Look for and make use of structure (Deductive Reasoning)
MP# 8. Look for and express regularity in repeated reasoning

Unit 2:
MP# 1. Make sense of problems and persevere in solving them
MP# 2. Reason abstractly and quantitatively
MP# 3. Construct viable arguments and critique the reason of others
MP# 4. Model with mathematics
MP# 5. Use appropriate tools strategically
MP# 6. Attend to precision
MP# 8. Look for and express regularity in repeated reasoning

Unit 3:
MP# 4. Model with mathematics
MP# 5. Use appropriate tools strategically

Unit 4:
MP# 1. Make sense of problems and persevere in solving them
MP# 2. Reason abstractly and quantitatively
MP# 4. Model with mathematics
MP# 6. Attend to precision
MP# 7. Look for and make use of structure (Deductive Reasoning)
MP# 8. Look for and express regularity in repeated reasoning

Unit 5:
MP# 1. Make sense of problems and persevere in solving them
MP# 3. Construct viable arguments and critique the reason of others
MP# 5. Use appropriate tools strategically
MP# 6. Attend to precision
MP# 7. Look for and make use of structure (Deductive Reasoning)

Unit 6:
MP# 1. Make sense of problems and persevere in solving them
MP# 3. Construct viable arguments and critique the reason of others
MP# 4. Model with mathematics

MP# 5. Use appropriate tools strategically
MP# 6. Attend to precision
MP# 8. Look for and express regularity in repeated reasoning

Stage One - Desired Results

Established Goals:(Standards of Learning, content standards)

Understandings: What will students understand (about what big ideas) as a result of the unit? "Students will understand that..."	**Essential Questions:** What arguable, recurring, and thought-provoking questions will guide inquiry and point toward the big ideas of the unit?

Stage Two - Assessment Evidence

Performance Tasks: What evidence will be collected to determine whether or not the understandings have been developed, the knowledge and skill attained, and the state standards met?

Other Evidence:(quizzes, tests and so on)

Stage Three - Learning Plan