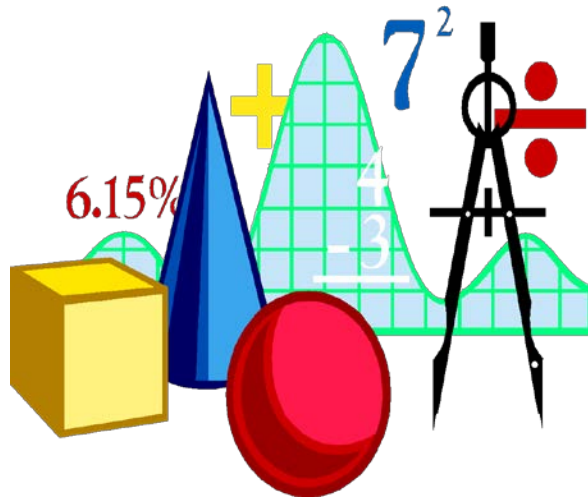


Planned Course of Study

Mathematics

Grade 6



**NORTHWESTERN LEHIGH SCHOOL DISTRICT
6493 ROUTE 309
NEW TRIPOLI, PA 18066**

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2020

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INTRODUCTION

The Grade 6 Mathematics curriculum guide contains planned course formats for the Northwestern Lehigh School District. The content of this document describes the objectives, activities, assessments, content, time frame, and standard alignment that serve as a guide to the specific units of study offered in Grade 6 Mathematics.

The Grade 6 Mathematics curriculum guide is the product of much diligent work on the part of the following staff members of the Task Force:

Dr. Lou Ann Smacchi

Kelly Fornauf

This document reflects their efforts to establish a well-defined and organized approach to teaching Mathematics in the Northwestern Lehigh School District.

Approved by Northwestern Lehigh School District Board of Education
2020

GRADE 6 MATHEMATICS

Math Unit	Ratios and Proportional Relationships
PA Core Standards:	M06.A-R.1 Understand ratio concepts and use ratio reasoning to solve problems.
Curriculum Framing Questions:	Essential Questions: - How can math help me understand relationships? Unit Questions: - How can I represent and/or solve real world and mathematical problems using rates, ratios, and/or percents? - How can I use ratios to solve problems? Content Questions: - What is a ratio and how is it written? - How do I describe the relationship between ratio and unit rate? - How can I construct tables to compare ratios? - How do I solve unit rate problems? - How can I use ratios to find percent or convert measurement units?
Desired Results, Concepts, & Competencies	Students will: - Use ratio language and notation (such as 3 to 4, 3:4, $\frac{3}{4}$) to describe a ratio relationship between two quantities. - Find the unit rate a/b associated with a ratio $a:b$ (with b not equal to 0), and use rate language in the context of a ratio relationship. - 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. - Solve unit rate problems including those involving unit pricing and constant speed. - 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.
Materials:	- Textbook Resources - Chromebooks - Math at Hand handbook (MAH) - Teacher created materials
Assessments:	2 quizzes per section - Chapter test - CDT/PSSA review packets

	• Class sharing/discussion about activities they completed and strategies they used to complete them
Differentiated Instruction Strategies:	• Project directions/rubrics are differentiated – some include more challenging extensions • Tests/quizzes will be differentiated after we have completed the chapters and students have taken them to help us determine the differentiated levels that are needed
Predicted 3-4 weeks	

Math Unit	The Number System
PA Core Standards:	M06.A-N.1 Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
Curriculum Framing Questions:	Essential Questions: • What are numbers? • How do we use numbers? Unit Questions: • How do I solve real world and mathematical problems involving division of fractions? • How do the properties of multiplication and division work together? Content Questions: • How do I divide fractions and interpret my answer in relation to the word problem? • How can I describe the inverse relationship between multiplying and dividing fractions?
Desired Results, Concepts, & Competencies	• Interpret and compute quotients of fractions (including mixed numbers) and solve word problems involving division of fractions by fractions.
Materials:	• Textbook resources • Chromebooks • Math at Hand handbook (MAH) • Teacher created materials
Assessments:	• Recipe project • 2 quizzes per section • Chapter test • CDT/PSSA review packets • Class sharing/discussion about activities they completed and strategies they used to complete them
Differentiated Instruction Strategies:	• Project directions/rubrics are differentiated – some include more challenging extensions • Tests/quizzes will be differentiated after we have completed the chapters and students have taken them to help us determine the differentiated levels that are needed
Predicted 3-4 weeks	

Math Unit	The Number System
PA Core Standards:	M06.A-N.2 Compute with multi-digit numbers and find common factors and multiples.
Curriculum Framing Questions:	Essential Questions: • What are numbers? • How do we use numbers? Unit Questions: • How do I compute multi-digit numbers using all four mathematical operations? • Why is it important to understand/follow an algorithm? • How does understanding the relationship between numbers help me to solve problems? Content Questions: • How can I solve computation or word problems using whole numbers and/or decimals in all four mathematical operations? • How do I find the greatest common factor and the least common multiple for two whole numbers? • How can I show greatest common factor using the distributive property?
Desired Results, Concepts, & Competencies	• Solve problems involving operations (+, -, x, ÷) with whole numbers, decimals (through thousandths), straight computation, or word problems. • 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. • Apply the distributive property to express a sum of two whole numbers, 1 through 100, with a common factor as a multiple of a sum of two whole numbers with no common factor.
Materials:	• Textbook resources • Chromebooks • Math at Hand handbook (MAH) • Teacher created materials
Assessments:	• Tree project • Out to Dinner project • 2 quizzes per section • Chapter test • CDT/PSSA review packets • Class sharing/discussion about activities they completed and strategies they used to complete them

Differentiated Instruction Strategies:	• Project directions/rubrics are differentiated – some include more challenging extensions • Tests/quizzes will be differentiated after we have completed the chapters and students have taken them to help us determine the differentiated levels that are needed
Number Sense (GCF, LCM, whole number operations, divisibility, prime and composite) - predicted 3 weeks Decimals Part - predicted 3 weeks	

Math Unit	The Number System
PA Core Standards:	M06.A-N.3 Apply and extend previous understandings of numbers to the system of rational numbers.
Curriculum Framing Questions:	Essential Questions: • What are numbers? • How do we use numbers? Unit Questions: • What types of numbers exist on a number line? • What do I need to know about positive and negative numbers to describe quantities, values, and/or locations on the number line and coordinate plane? Content Questions: • How can I use positive and negative numbers, and zero, to represent real world quantities? • How can I use a number line to show absolute value and numbers with their opposites? • How do I locate and plot numbers on a coordinate plane? • Using all four coordinate planes, how can I plot points to solve real world problems? • How can I use the coordinate plane and absolute value to find distances between points? • How do I order rational numbers in real world contexts?
Desired Results, Concepts, & Competencies	• Represent quantities in real-world context using positive and negative numbers, explaining the meaning of zero in each situation. • Determine the opposite of a number and recognize that the opposite of the opposite of a number is itself. • 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. • Write, interpret, and explain statements of order for rational numbers in real-world contexts. • Interpret the absolute value of a rational number as its distance from 0 on the number line and as a magnitude for a positive or negative quantity in a real-world situation. • Solve real-world mathematical problems by plotting points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
Materials:	• Textbook resources • Chromebooks • Math at Hand handbook (MAH)

	• Teacher created materials
Assessments:	• Coordinate Plane project • 2 quizzes per section • Chapter test • CDT/PSSA review packets • Class sharing/discussion about activities they completed and strategies they used to complete them
Differentiated Instruction Strategies:	• Project directions/rubrics are differentiated – some include more challenging extensions • Tests/quizzes will be differentiated after we have completed the chapters and students have taken them to help us determine the differentiated levels that are needed
Predicted 3 weeks	

Math Unit	Expressions and Equations
PA Core Standards:	M06.B-E.1 • Apply and extend previous understandings of arithmetic to numerical and algebraic expressions.
Curriculum Framing Questions:	Essential Questions: • How can relationships be modeled symbolically? • Why is mathematical language important? Unit Questions: • What are different ways of communicating math with clarity? • What is the most appropriate way of communicating a math idea in a particular situation? Content Questions: • How can I use mathematical terms to write, identify and/or describe algebraic expressions? • How can I evaluate real world problems using expressions derived from formulas? • How can I write and evaluate expressions using exponents? • Using the properties of operations, how can I write and/or identify equivalent expressions?
Desired Results, Concepts, & Competencies	• Write and evaluate numerical expressions involving whole number exponents. • Write algebraic expressions from verbal descriptions. • Identify parts of an expression using mathematical terms. • Evaluate expressions at specific values of their variables, including expressions that arise from formulas used in real-world problems. • Apply the properties of operations to generate equivalent expressions.
Materials:	• Textbook Resources • Chromebooks • Math at Hand handbook (MAH) • Teacher created materials
Assessments:	• Variable Me • 2 quizzes per section • Chapter test • CDT/PSSA review packets • Class sharing/discussion about activities they completed and strategies they used to complete them

Differentiated Instruction Strategies:	• Project directions/rubrics are differentiated – some include more challenging extensions • Tests/quizzes will be differentiated after we have completed the chapters and students have taken them to help us determine the differentiated levels that are needed
Predicted 2-3 weeks	

Math Unit	Expressions and Equations
PA Core Standards:	M06.B-E.2 Interpret and solve one-variable equations and inequalities
Curriculum Framing Questions:	Essential Questions: - How can relationships be modeled symbolically? - Why is mathematical language important? Unit Questions: - How do I create, solve, and interpret one-variable equations or inequalities in real world and mathematical problems? - How can real world problems be solved algebraically? - How can I write and evaluate an expression that represents a real-life problem? Content Questions: - How do I use substitution to determine if an equation or inequality is true? - How can I write algebraic expressions to represent real world problems? - How do I write and solve equations and inequalities in real world problems?
Desired Results, Concepts, & Competencies	- Use substitution to determine whether a given number in a specified set makes an equation or inequality true. - Write algebraic expressions to represent real-world or mathematical problems. - 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 non-negative rational numbers. - Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in the real-world or mathematical problem and/or represent solutions of such inequalities on number lines.
Materials:	- Textbook resources - Chromebooks - Math at Hand handbook (MAH) - Teacher created materials
Assessments:	2 quizzes per section - Chapter test - CDT/PSSA review packets - Class sharing/discussion about activities they completed and strategies they used to complete them

Differentiated Instruction Strategies:	• Project directions/rubrics are differentiated – some include more challenging extensions • Tests/quizzes will be differentiated after we have completed the chapters and students have taken them to help us determine the differentiated levels that are needed
Predicted 3 weeks	

Math Unit	Expressions and Equations
PA Core Standards:	M06.B-E.3 Represent and analyze quantitative relationships between dependent and independent variables.
Curriculum Framing Questions:	Essential Questions: • How can relationships be modeled symbolically? • Why is mathematical language important? Unit Questions: • In a real world problem, how do I use variables to represent two quantities that change in relationship to one another? • How can I model the relationship between two unknown quantities? Content Questions: • How can I write an equation to show the relationship between dependent and independent variables? • How can I use graphs, tables, and equations to analyze relationships between dependent and independent variables?
Desired Results, Concepts, & Competencies	• Write an equation to express the relationship between the dependent and independent variables. • Analyze the relationship between the dependent and independent variables using graphs and tables, and/or relate these to an equation.
Materials:	• Textbook resources • Chromebooks • Math at Hand handbook (MAH) • Teacher created materials
Assessments:	• 2 quizzes per section • Chapter test • CDT/PSSA review packets • Class sharing/discussion about activities they completed and strategies they used to complete them
Differentiated Instruction Strategies:	• Project directions/rubrics are differentiated – some include more challenging extensions • Tests/quizzes will be differentiated after we have completed the chapters and students have taken them to help us determine the differentiated levels that are needed
Predicted 3 weeks	

Math Unit	Geometry
PA Core Standards:	M06.C-G.1 Solve real-world and mathematical problems involving area, surface area, and volume.
Curriculum Framing Questions:	Essential Questions: • How can math help me understand my world? • How can relationships be expressed symbolically? Unit Questions: • How can we use models and/or formulas to find specific measures of selected 2D and 3D figures? Content Questions: • How do I find the area for triangles, special quadrilaterals, irregular and/or compound polygons? • How can I find the volume of a right rectangular prism? • How can I use the coordinate plane to find side lengths and areas of given polygons? • How do I use nets to represent 3D figures? • How do I find surface area of triangular and rectangular prisms and cubes?
Desired Results, Concepts, & Competencies	• Determine the area of triangles and special quadrilaterals. • Determine the area of irregular or compound polygons. • Determine the volume of right rectangular prisms with fractional edge lengths. • 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). • Represent three-dimensional figures using nets made up of rectangles and triangles. • Determine the surface area of triangular and rectangular prisms and cubes.
Materials:	• Textbook resources • Chromebooks • Math at Hand handbook (MAH) • Teacher created materials
Assessments:	• Making nets • Polygon Art • Surface area activity • Quizzes • CDT/PSSA review packets

	• Class sharing/discussion about activities they completed and strategies they used to complete them
Differentiated Instruction Strategies:	• Project directions/rubrics are differentiated – some include more challenging extensions • Tests/quizzes will be differentiated after we have completed the chapters and students have taken them to help us determine the differentiated levels that are needed
Predicted 4 weeks	

Math Unit	Statistics and Probability
PA Core Standards:	M06.D-S.1 Demonstrate understanding of statistical variability by summarizing and describing distributions.
Curriculum Framing Questions:	Essential Questions: - How can data help me organize my world? Unit Questions: - How do I display, analyze, and summarize numerical data? - How do I determine measures of central tendency and variability? Content Questions: - How can I recognize a statistical question and describe ways that the data can be represented? - How can I display numerical data on a number line? - How do I determine quantitative measures of center and variability? - How can I describe patterns and deviations in a data set?
Desired Results, Concepts, & Competencies	- Display numerical data in plots on a number line, including dot plots, histograms, and box-and-whisker plots. - Determine quantitative measures of center (median, mean, and/or mode) and variability (range, interquartile range, and/or mean absolute deviation). - Describe any overall pattern and any deviations from the overall pattern with reference to the context in which the data was gathered. - Relate the choice of measure of center and variability to the shape of the data distribution and the context in which the data was gathered.
Materials:	- Textbook resources - Chromebooks - Math at Hand handbook (MAH) - Teacher created materials
Assessments:	- Quizzes and/or test - CDT/PSSA review packets - Histogram and box-and-whisker Survey Project - Class sharing/discussion about activities they completed and strategies they used to complete them
Differentiated Instruction Strategies:	Cross team data collection project
Predicted 6-7 weeks	