7th Grade Math

Course Syllabus

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1. INTRODUCTION

Primary Resource: Ohio Department of Education Academic Standards and Learning Targets and Youngstown City Schools Pacing Guides

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The following document provides a detailed layout of how a 7th grade math class can be taught. The pacing guide table provides information on each lesson, when a lesson should be taught, and the length of time each lesson will take.

2. PACING GUIDE

The intent of this course pacing guide is to provide a practical guide that educators can follow for a yearlong 7th grade math class. The pacing guide is based on Ohio Content Standards and Learning Targets. The content pacing guide provides the Domain from which the content comes. The percentage of questions from each Domain that will appear on the Ohio AIR State Test is also included as well as the Ohio Content Standard(s) and the Ohio Learning Target that each lesson covers. The title of each lesson, the order in which each lesson should be taught, and the amount of time each lesson should take is also given. Finally, a column is provided to allow for teacher notes regarding the effectiveness of changes a lesson might need, offering each teacher the opportunity to edit the document to fit their individual classroom needs.

2.1. PACING GUIDE KEYS

Table 1 provides a Key so teachers can gain a better understanding of the pacing guide that follow.

Table 1: Pacing Guide Format

Font Style	Description
Green	Critical Areas of Focus on State Testing
Black	Minor Areas of Focus on State Testing
Bold	Standard(s) covered
<u>Underline</u>	Percentage of questions from each Domain appearing on the Ohio AIR State Test

Table 2 provides a Key so teachers understand what percentage of questions are on the state test, what domain each unit falls into, as well as what standard is in each lesson and if it is a major or minor area for state testing.

Table 2: Pacing Guide

Percentage of Questions on State Test	Unit & Domain	Major Areas	Minor Areas
22% - 31%	*Unit 1* Proportional Relationships	7.RP.1 / 7.RP.2.a / 7.RP.2.b / 7.RP.2c / 7.RP.2.d / 7.RP.3	
28% - 37%	*Unit 2* The Number System	7.NS.1.a / 7.NS.1.b / 7.NS.1.c / 7.NS.1.d / 7.NS.2.a / 7.NS.2.b / 7.NS.2.c / 7.NS.2.d / 7.NS.3	
28% - 37%	*Unit 3* Expressions & Equations	7. EE.1 / 7.EE.2 / 7.EE.3 / 7.EE.4.a / 7.EE.4.b / 7. NS.3	
20% - 25%	*Unit 4* Geometry		7.G.2 / 7.G.5
20% - 25%	*Unit 5* Geometry		7.G.1 / 7.G.3 / 7.G.4 / 7.G.6 / 7.G.2 / 7.G.5
22% - 29%	*Unit 6* Statistics & Probability		7.SP.1 / 7.SP.2 / 7.SP.3 / 7.SP.4
22% - 29%	*Unit 7* Statistics & Probability		7.SP.5 / 7.SP.6 / 7.SP.7.a / 7.SP.7.b / 7.SP.8.a / 7.SP.8.b / 7.SP.8.c

2.2. SEMESTER 1

Domain	Standards	Learning Target	Lesson	Pacing	Teacher Notes
Unit 1: ***Proportional*** ***Relationship*** 40 Days	**7.RP.1** **7.RP.2.a** **7.RP.2.b** **7.RP.2c** **7.RP.2.d** **7.RP.3**		**Pre-Test**	1 Day	
Proportional Relationship 40 Days *Major Area*	**7. RP-1.** Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.	• I can compute a unit rate from a ratio.	**Domain 1:** **Lesson 1-** Problem Solving with Equivalent Ratios & Rates / Proportions:	2 Days	
Proportional Relationship 40 Days *Major Area*	**7. RP-2a.** Recognize and represent proportional relationships between quantities.	• I can recognize when two quantities are in a proportional relationship by looking at a table of values or graph of the relationships.	**Domain 1:** **Lesson 2 -** Proportions & Direct Variation	2 Days	
Proportional Relationship 40 Days *Major Area*	**7. RP-2b.** Recognize and represent proportional relationships between quantities.	• I can determine the constant of proportionality in a proportional relationship.	**Domain1: Lesson 3 -** Direct Variation Models & Graphs	4 Days	

Proportional Relationship 40 Days <u>Major Area</u>	**7. RP-2c.** Recognize and represent proportional relationships between quantities.	• I can write an equation to represent a proportional relationship.	**Domain1: Lesson 4 -** Equations of Direct Variation	4 Days	
Proportional Relationship 40 Days <u>Major Area</u>	**7. RP-2d.** Recognize and represent proportional relationships between quantities.	• I can explain the meaning of each coordinate of the ordered pair taken from a graph of the proportional relationships.	**Domain 1: Lesson 5 -** Graphs of Direct Variation	4 Days	
Proportional Relationship 40 Days <u>Major Area</u>	**7. RP-3.** Use proportional relationships to solve multistep ratio and percent problems. - Simple Interest, Tax Markups & Markdowns, Gratuities & Commissions, fees, percent increase & decrease, and percent error.	• I can solve a variety of real-world problems involving proportional reasoning.	**Domain 1: Lesson 6 -** Fraction, Decimal, and Percent Conversions / Percent Conversions/ Percent's and Proportions / Percent Change	6 Days	
Unit 1: Proportional Relationship 40 Days	**7.RP.1 7.RP.2.a 7.RP.2.b 7.RP.2c 7.RP.2.d 7.RP.3**		**Post-Test & Summative Assessment**	2 Days	
Unit 2: The Number System 16 Days	**7.NS.1.a 7.NS.1.b 7.NS.1.c 7.NS.1.d 7.NS.2.a 7.NS.2.b 7.NS.2.c**		**Pre-Test**	1 Day	

	7.NS.2.d 7.NS.3				
The Number System 16 Days *Major Area*	**7. NS-1a.** Apply and extend previous understanding of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. - Situations in which opposite quantities combine to make 0.	• I can describe real-world situations in which opposite quantities add together to zero.	**Domain 2: Lesson 7 -** Real Number System / Integer Addition & Subtraction	3 Days	
The Number System 16 Days *Major Area*	**7. NS-1b.** 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. - Understand p + q as the number located a distance |q| from p, in the positive or negative direction.	• I can explain how each rational number has an opposite that adds to zero. • I can explain how the sum of p+q is actually a distance of |q| from the value of p.	**Domain 2: Lesson 8 -** Integer Addition & Subtraction	2 Days	
The Number System 16 Days *Major Area*	**7. NS-1c.** 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. - Understand subtraction of rational numbers as adding the inverse, p-q = p + (-q).	• I can explain why p-q and p+ (-q) are the same value. • I can explain why the distance between two rational numbers on the number line is the absolute value of their difference. • I can solve real-world problems involving the previous concepts.	**Domain 2: Lesson 8 Cont. -** Integer Addition & Subtraction	1 Day	
The Number System 16 Days *Major Area*	**7. NS-1d.** 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. - Apply properties of operations as strategies to add and subtract rational numbers.	• I can efficiently add and subtract rational numbers.	**Domain 2: Lesson 8 Cont. -** Integer Addition & Subtraction	1 Day	
The Number System 16 Days	**7. NS-2.a.** Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. - Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to	• I can explain the multiplication rules for rational numbers by relating it to the rules I learned for whole numbers and fractions. • I can explain the multiplication of	**Domain 2: Lesson 9 -** Integer Multiplication & Division	2 Days	

Major Area	satisfy the properties of operations, particularly the distributive property, leading to products such as (−1)(−1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.	rational number by using real-world examples.			
The Number System 16 Days *Major Area*	**7. NS-2.b.** Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. - Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then −(p/q) = (−p)/q = p/(−q). Interpret quotients of rational numbers by describing real-world contexts.	• I can explain the division rules for integers by relating it to the rules I learned for whole numbers and how they expand to fit the division of integers. • I can explain the division of rational numbers by using real-world examples	**Domain 2: Lesson 9 Cont. -** Integer Multiplication & Division	1 Day	
The Number System 16 Days *Major Area*	**7. NS-2.c.** Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. - Apply properties of operations as strategies to multiply and divide rational numbers.	• I can explain the multiplication and division rules for rational numbers by relating it to the rules I learned for fractions.	**Domain 2: Lesson 9 Cont. -** Integer Multiplication & Division	1 Day	
The Number System 16 Days *Major Area*	**7. NS-2.d.** Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. - Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.	• I can convert any rational number to a decimal number. • I can convert any rational number to a decimal number.	**Domain 2: Lesson 9 Cont. -** Integer Multiplication & Division	. 1 Day	
The Number System 16 Days *Major Area*	**7. NS-3.** Solve real-world and mathematical problems involving the four operations with rational numbers.	• I can solve real-world problems involving the four operations and rational numbers.	**Domain 2: Lesson 10 -** Order of Operations with Rational Numbers	1 Day	

Unit 2: The Number System 16 Days	7.NS.1.a 7.NS.1.b 7.NS.1.c 7.NS.1.d 7.NS.2.a 7.NS.2.b 7.NS.2.c 7.NS.2.d 7.NS.3		Post-Test & Summative Assessment	2 Days	
Unit 3: Expressions & Equations 40 Days	7.EE.1 7.EE.2 7.EE.3 7.EE.4.a 7.EE.4.b 7. NS.3		Pre-Test	1 Day	
Expressions & Equations 40 Days _Major Area_	**7. EE-1.** Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients	• I can apply the properties of operations to simplify and change linear expressions.	**Domain 2: Lesson 11 -** Writing Algebraic Expressions / Linear Expression Factoring	3 Days	
Expressions & Equations 40 Days _Major Area_	**7. EE-2.** Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."	• I can explain the advantages of rewriting an expression to better explain how quantities are related in a real world context.	**Domain 2: Lesson 12 –** Order of Operations with Variable Expressions	4 Days	
Expressions & Equations 40 Days _Major Area_	**7. EE-3.** Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.	• I can solve real-world problems that involve positive and negative rational numbers. / I can calculate and/or convert between the various forms of rational numbers. • I can determine the reasonableness of my answers using estimation strategies.	**Domain 2: Lesson 13 –** Add & Subtract Algebraic Expressions / Problem Solving with Expressions	8 Days	

Expressions & Equations 40 Days <u>Major Area</u>	**7. EE-4.a** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. 4a. 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. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.	• I can represent problems in real-world context with a linear equation. • I can easily and accurately solve linear equations. • I can compare the algebraic solution to a problem with an arithmetic solution. Part of this comparison is the steps necessary in each method.	**Domain 2: Lesson 14 -** Writing Algebraic Equations / Patterns & Two-Step Equations	6 Days	
Expressions & Equations 40 Days <u>Major Area</u>	**7. EE-4.b** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. 4b. Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.	• I can represent problems in real-world context with a inequality. • I can graph the solution set of an inequality. • I can explain the solution of the equality as it relates to the context of the problem.	**Domain 2: Lesson 15 –** Two Step Inequalities / Problem Solving with Inequalities	6 Days	
Expressions & Equations 40 Days <u>Major Area</u>	**7.NS.3 / 7.EE-3 / 7.EE-4a / 7.EE-4b**		**Domain 2: Lesson 16 -** Solving and Graphing Equations and Inequalities	10 Days	
Unit 3: Expressions & Equations 40 Days	**7.EE.1** **7.EE.2** **7.EE.3** **7.EE.4.a** **7.EE.4.b** **7. NS.3**		**Post-Test & Summative Assessment**	2 Days	

Domain	Standards	Learning Target	Lesson	Pacing	Teacher Notes
Unit 4: Geometry 12 Days _Minor Area_	**7.G.2** **7.G.5**		**Pre-Test**	1 Day	
Geometry 12 Days _Minor Area_	**7. G-2.** Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.	• I can draw geometric figures, especially triangles, freehand (with ruler and protractor)./I can draw geometric figures, especially triangles, using software. (i.e. Sketchpad, Cabri, etc.)/I can determine under what conditions a particular drawing would be a unique triangle, many triangles, or no triangle.	**Domain 2: Lesson 17 -** Constructing Geometric Shapes / Triangle Properties	4 Days	
Geometry 12 Days _Minor Area_	**7. G-5.** Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.	• I can define supplementary, complementary, vertical, and adjacent angles./I can use the properties of supplementary, complementary, vertical, and adjacent angles to solve for unknown values in a figure.	**Domain 2: Lesson 18 -** Angles and Angle Pairs	5 Days	
Geometry **- 12 Days** _Minor Area_	**7.G.2** **7.G.5**		**Post-Test & Summative Assessment**	2 Days	
Unit 5: Geometry	**7.G.1** **7.G.3**				

			Pre-Test	1 Day	
24 Days	**7.G.4** **7.G.6** **7.G.2** **7.G.5**		**Pre-Test**	1 Day	
Geometry 24 Days *Minor Area*	**7. G-1.** Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.	• I can solve problems using scale drawings of geometric figures. • I can find missing sides and/or areas from similar geometric figures. • I can create a scale drawing from a given figure.	**Domain 2: Lesson 19 -** Similar Figures / Scale Drawing	8 Days	
Geometry 24 Days *Minor Area*	**7. G-3.** Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.	• I can describe the various two-dimensional figures formed when slicing particular three-dimensional figures with a plane.	**Domain 2: Lesson 20 –** Cross Sections of 3D Figures	1 Day	
Geometry 24 Days *Minor Area*	**7. G-4.** Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	• I can use the formula for the area of a circle to solve problems. • I can use the formula for the circumference of a circle to solve problems. • I can describe the ways in which the circumference of a circle is related to its area.	**Domain 2: Lesson 21 -** Circumference & Area of a Circle	6 Days	
Geometry 24 Days *Minor Area*	**7. G-6.** Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	• I can solve real-world problems involving the area of triangles, quadrilaterals, and other polygons. • I can solve real-world problems involving the volume and surface area of cubes and right prisms.	**Domain 2: Lesson 22 -** Surface Area & Volume of Prisms & Pyramids	7 Days	
Unit 5: Geometry	**7.G.1** **7.G.3** **7.G.4**		**Post-Test & Summative Assessment**	2 Days	

24 Days	**7.G.6** **7.G.2** **7.G.5**				
Unit 6: *Statistics &* *Probability* 10 Days	**7.SP.1** **7.SP.2** **7.SP.3** **7.SP.4**		**Pre-Test**	1 Day	
Statistics & *Probability* 10 Days *Minor Area*	**7. SP-1.** 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.	• I can explain how statistics about a sample can be used to describe a population. • I can explain what conditions need to be met for a sample to be a good representation of a population. • I can explain the reasons why a random sample is the most desirable type of sample.	**Domain 2:** **Lesson 23 -** Samples	2 Days	
Statistics & *Probability* 10 Days *Minor Area*	**7. SP-2.** 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. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might	• I can use a random sample to infer a particular item of interest about the population. • I can use multiple samples from a population to explain the possible variation in predictions about the population.	**Domain 2:** **Lesson 24 -** Samples 7 Predictions	1 Days	
Statistics & *Probability* -10 Days *Minor Area*	**7. SP-3.** 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. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the	• I can find the variability of a group of data by finding the standard deviation or mean absolute deviation. • I can observe the overlap and differences of two data sets with similar spread (variability).	**Domain 2:** **Lesson 25 –** MAD / Categorical Data Display Comparisons	2 Days	

	variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.	• I can express the difference of the center of the two data sets as a multiple of the standard deviation or mean absolute deviation.			
Statistics & Probability 10 Days *Minor Area*	**7. SP-4.** Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.	• I can generate random samples from two different populations and determine whether their mean is significantly different. • I can generate random samples from two different populations and determine whether their variance is significantly different.	**Domain 2: Lesson 26 -** Measure of Central Tendencies / Numerical Data Display Comparisons	2 Days	
Unit 6: Statistics & Probability 10 Days	**7.SP.1 7.SP.2 7.SP.3 7.SP.4**		**Post-Test & Summative Assessment**	2 Days	
Unit 7: Statistics & Probability 10 Days	**7.SP.5 7.SP.6 7.SP.7.a 7.SP.7.b 7.SP.8.a 7.SP.8.b 7.SP.8.c**		**Pre-Test**	1 Day	
Statistics & Probability 10 Days *Minor Area*	**7. SP-5.** 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.	• I can explain that probability is expressed as a number from 0 to 1. • I can explain that numbers nearer to 1 mean the event is more likely to happen. • I can explain that numbers nearer to 0 mean the event is less likely to happen. • I can explain that numbers near 0.5 mean the event is neither	**Domain 2: Lesson 27 -** Single Event Probability	1 Day	

		more likely nor less likely to happen.			
Statistics & Probability 10 Days *Minor Area*	**7. SP-6.** Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.	• I can approximate the likelihood of an event by collecting data on the event over numerous trials. • I can explain the difference between the probability observed on many trails and the theoretical probability of the event.	**Domain 2: Lesson 28 -** Compound Events / Theoretical & Experimental Probability	2 Days	
Statistics & Probability 10 Days *Minor Area*	**7. SP-7.a.** Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. - Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.	• I can describe a model where the outcomes are equally likely and then calculate the probability that event 1 AND event 2 both occurring.	**Domain 2: Lesson 29 -** Modeling	2 Days	
Statistics & Probability 10 Days *Minor Area*	**7. SP-7.b.** Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. - Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?	• I can create a probability experiment and compare the results to my predictive model and explain potential differences.	**Domain 2: Lesson 30 –** Tree Diagrams	1 Day	
Statistics & Probability	**7. SP-8.a.** Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. - Understand that, just as with simple	• I can explain that the probability of a compound event is the fraction of desirable outcomes	**Domain 2: Lesson 31 –** Tree Diagrams	1 Day	

10 Days *Minor Area*	events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.	over all possible outcomes - just like simple probability.			
Statistics & Probability 10 Days *Minor Area*	**7. SP-8.b.** Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. - 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 event occurs.	• I can create and explain the sample spaces for compound events.	**Domain 2: Lesson 32 -** Independent & Dependent Probabilities	1 Day	
Statistics & Probability 10 Days *Minor Area*	**7. SP-8.c.** Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. - Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A.	• I can create a simulation to help explain the probability of a compound event.	**Domain 2: Lesson 33 -** Simulation	2 Days	
Unit 7: Statistics & Probability 10 Days	**7.SP.5 7.SP.6 7.SP.7.a 7.SP.7.b 7.SP.8.a 7.SP.8.b 7.SP.8.c**		**Post-Test & Summative Assessment**	2 Days	