SWEETWATER COUNTY
SCHOOL DISTRICT #1

MATHEMATICS

K-12 CURRICULUM MAP

JUNE 2022

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Acknowledgements

Special thanks go to the members of the **Mathematics Subject Area Committee** for their hard work in creating this curriculum:

Also acknowledged are the members of the **Community Curriculum Council**:

Sweetwater County School District #1 Vision Statement

As an innovative district, united with our community, we empower and inspire ALL students to academic excellence in pursuit of their interests and passions.

Sweetwater County School District #1 Mission Statement

To provide a quality education for ALL students. The district will accomplish this by:
- making students our first priority
- utilizing community partnerships
- promoting professional excellence
- being committed to excellence in education
- providing a safe, orderly and efficient environment for learning

Mathematics Subject Mission Statement

Students in Sweetwater County School District #1 completing the K-12 math curriculum will analyze, apply, and demonstrate math skills and concepts in real-world applications through perseverance, communication and problem solving.

Sweetwater County School District No. 1 Curriculum Terms

Curriculum Term	Definition
Community Curriculum Council (CCC)	advisory council responsible for evaluating current systems and making recommendations regarding curriculum, instruction, and assessment practices
Subject Area Committee (SAC)	team of representatives from a specific subject area who will write the curriculum and common assessments
Curriculum map	what SCSD1 values and guarantees that students will learn
Purpose statement	identifies the purpose of a class
Benchmark	overall outcome for a unit
Learning target	individual skills that lead up to achieving the benchmark
Resource, textbook, program, etc.	resource adopted by the district to help teach the local curriculum
Pacing Guide	identifies when a benchmark will be taught and when it will be assessed
Priority Learning Target	a learning target that must be taught to mastery and should be given extra emphasis.
Proficiency Scale	a tool to show learning goals and the progression of learning for students.
Instructional Planning Resources (IPR)	organizational tool for planning lessons based on learning targets rather than days
Formative assessment	informal assessment used to direct instruction
Common Assessment	common assessment given within a benchmark by all teachers who teach the same class

How to Read the Mathematics Curriculum Map

Purpose Statement *identifies the purpose of a class and what is new or different at this level.*

Purpose Statement:	Students will demonstrate their understanding of the base-ten system, develop fluency in addition and subtraction using efficient strategies, use standard units of measurement, as well as describe and analyze two-dimensional and three-dimensional shapes.

Benchmarks:

Benchmark *overall objective for a unit*

M2.1		**Students will fluently add and subtract within 20 using mental strategies.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M2.1.1	**Solve math facts within 20 using mental strategies.** *(e.g., counting on by 1-3, making ten, doubles, doubles +/- 1/2, etc.).*	2.OA.B.2	L.3.4	major	
	M2.1.2	**Demonstrate composing and decomposing numbers within 20.**	2.OA.B.2	CV5.3.1, CV5.3.2, L.3.4, L.3.6	major	
	M2.1.3	**Solve problems with an unknown number in all positions.** A+B=__, __+B=A, B+__=A, A=__+B	2.OA.A.1			

Learning Target Code
*M*2.1.2 = Subject area (Math)
M*2*.1.2 = Grade/course level
M2.*1*.2 = Benchmark
M2.1.*2* = Learning target

Learning Targets *are individual skills that lead up to achieving the benchmark.*

CCSS Math Standard Reference
2.OA.B.2 = Grade
2.*OA*.B.2 = Domain
2.OA.*B*.2 = Cluster
2.OA.B.*2* = Standard

"Major or minor" *identifies standards that are emphasized on state tests for grades 3-10.*

ISTE – International Society for Technology in Education

Mathematics Curriculum at a Glance

Grade Level or Course	Purpose Statement
Math - Kindergarten	Students will represent whole numbers within 20. Students will apply mathematical strategies to answer quantitative questions within 10. Students will compare both quantities and shapes.
Math - 1st Grade	Students will expand their number sense to include: adding and subtracting within 20 (fluently to 10), applying the understanding of number value to measurement, telling time, analyzing data, composing and decomposing two-dimensional and three-dimensional shapes, understanding place value of tens and ones through 120, measuring using non-standard measurement, and identify and state the value of coins.
Math - 2nd Grade	Students will demonstrate their understanding of the base-ten system, develop fluency in addition and subtraction using efficient strategies, use standard units of measurement, as well as describe and analyze two-dimensional and three-dimensional shapes.
Math - 3rd Grade	Students will solve equations using multiplication and division strategies within 100; show representations of fractions, especially unit fractions (fractions with numerator 1); construct and use rectangular arrays for multiplication, division, and area; and describe and analyze two-dimensional shapes.
Math - 4th Grade	Students will demonstrate an understanding and fluency with multi-digit multiplication (up to 2x2) and division (up to 4x1) using place value strategies; develop an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers.
Math - 5th Grade	Students will fluently add and subtract fractions with like and unlike denominators and demonstrate an ability to multiply and divide. Students apply concepts of multiplying multi-digit whole numbers and decimals with relation to division. Students will identify, produce, and compare decimals. Students apply concepts of volume and will illustrate volume utilizing unit cubes. Students will apply real world applications.
Math - 6th Grade	Students will fluently add, subtract, multiply, and divide multi-digit integers and decimals. Students will analyze fractions to include division and connect with real-world statistics to identify, produce, and analyze rates and ratios. Students will illustrate rates and ratios through coordinate planes and number lines to identify and produce polygons and calculate their area and surface area. Students will

	calculate the volume of a right rectangular prism using area. Students will identify the relationship of variables within expressions and solve for the variable within equations.
Math - 7th Grade	Students will apply proportional relationships; manipulate and analyze rational numbers including expressions, linear equations and inequalities in one variable. Students will solve problems involving scale drawings, informal geometric constructions, two- and three-dimensional shapes involving area, surface area, and volume. Students will draw inferences about populations based on samples.
Math - 8th Grade	Students will formulate and reason about expressions and equations, including solving linear equations, systems of linear equations, and model an association in bivariate data with a linear equation. Students will use functions to describe quantitative relationships. Students will analyze two- and three- dimensional space figures using distance, angle similarity and congruence, and apply the Pythagorean Theorem to real-world problems.
Pre-Algebra **Resource Pre-Algebra**	Students will fluently add, subtract, multiply, and divide fractions, integers, and decimals. Students will analyze graphs and properties of geometric figures. Students will interpret data from graphs and tables.
Algebra I	Students will create and simplify algebraic expressions using laws of exponents and structures such as factored form; solve linear equations, inequalities, systems of linear equations, and factorable quadratic equations; write, graph and interpret linear and exponential functions; interpret, graph, and summarize one and two variable data.
Geometry	Students will apply inductive and deductive reasoning. Students will calculate lengths, areas, and volumes of plane and solid figures. Students will identify triangles and use their properties to solve equations, determine congruence, and determine similarity. Students will apply sine, cosine, and tangent ratios. Students will construct geometric shapes. Students will use all preceding skills to solve real life and mathematical problems.
Algebra II	Students will create, make sense of problems and persevere in solving algebraic expressions pertaining to radical, rational, polynomial, logarithmic, and exponential functions. Students will reason abstractly, quantitatively, construct viable arguments and critique the reasoning behind the arguments. Students will model with mathematics, use appropriate tools strategically, and attend to precision. Students will look for and make use of structure, express regularity in repeated reasoning.

Algebra III Trigonometry	Students will rewrite radical, rational, polynomial, logarithmic, and exponential expressions in equivalent forms. Additionally, students will create and solve linear, quadratic, radical, rational, logarithmic, and exponential equations that can model real-life problems. Students will also graph and analyze quadratic, exponential, and basic trigonometric functions, and utilize these graphs for problem solving. Finally, students will solve triangles using trigonometric ratios and the unit circle.
Pre-calculus/ Trigonometry **Pre-calculus**	Pre-calculus is intended to provide the mathematical background needed for calculus. This course will provide a general introduction to functions, operations with function, inverse functions, and graphs of functions using standard graphs with transformations. It will include an extensive study of linear functions, polynomial functions (including new methods of solving polynomial equations), rational and radical functions, exponential and logarithmic functions, circular and trigonometric functions, sequences and series. The course will include extensive use of the graphing calculator.
Consumer/Applied Math	Students will apply basic computational skills and mathematical concepts to essential consumer topics such as income, banking, saving, budgeting, taking out various types of loans, and expenses incurred in owning a business. Students will analyze and compare accounting and macro-economic concepts.

CCSS Math Progressions

K	1	2	3	4	5	6	7	8	HS
Counting & Cardinality									
Number & Operations in Base Ten						Ratios & Proportional Relationships			Number & Quantity
			Number & Operations – Fractions			The Number System			
Operations & Algebraic Thinking						Expressions & Equations			Algebra
								Functions	Functions
Geometry									Geometry
Measurement & Data						Statistics & Probability			Statistics & Probability

Fluency Expectations

(accurately, efficiently, and flexibly)

K	1	2	3	4	5	6	7	8
Add/subtract within 5	Add/subtract within 10	Add/subtract within 20 Add/subtract within 100 (pencil & paper)	Multiply/divide within 100 Add/subtract within 1,000	Add/subtract within 1,000,000	Multi-digit multiplication	Multi-digit division Multi-digit decimal operations	Solve $px+q=r$, $p(x+q)=r$	Solve simple 2x2 systems by inspection

Math - Kindergarten

	Pacing Guide					
Code	**Benchmark**	**Month(s) Taught**	**Common Assessment Period**			
			1	**2**	**3**	**4**
MK.1	Students will represent the relationship of numbers up to 5.	Aug - Oct	X			
MK.2	Students will represent and compare the relationship of numbers up to 10.	Oct - Nov		X		
MK.3	Students will identify two-dimensional and three-dimensional shapes. Students will be able to create patterns using objects. Students will describe, compare, and classify measurable attributes of objects.	Nov - Dec		X		
MK.4	Students will solve addition and subtraction word problems within 10 using objects or drawings. Students will fluently add and subtract within 5.	Jan - Mar			X	
MK.5	Students will represent the relationship of numbers up to 20. Students will orally count to 100.	Mar - May				X
MK.6	Students will build and draw shapes. Students will identify U.S. coins.	May				X

Math Standard Reference Code	
CC	Counting and Cardinality
OA	Operations & Algebraic Thinking
NBT	Number & Operations in Base Ten
MD	Measurement & Data
G	Geometry

Math - Kindergarten

Purpose Statement:	Students will represent whole numbers within 20. Students will apply mathematical strategies to answer quantitative questions within 10. Students will compare both quantities and shapes.

Vocabulary listed are essential for demonstration of benchmark mastery. Any additional words related to the benchmark may be used at the teacher's discretion.

Math practices are not explicitly listed as benchmarks or learning targets; however, all eight math practices should be incorporated into all benchmarks and learning targets (see Appendix A for Math Practices).

Fluently means accurately, efficiently, and flexibly; students need experiences beyond the standard or traditional algorithm.

Bolded items identify learning targets that are considered a priority. Please note, however, that all learning targets/standards in the curriculum map must still be taught, but those in bold should be taught to at least proficiency.

Quarter 1 Benchmark

MK.1		**Students will represent and compare the relationship of numbers up to 10.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	MK.1.1	**Identify and write numbers 0-10.**	K.CC.A.1a K.CC.A.3	K-ESS3-1 SK.K.5	

MK.1.2	Orally count forwards and backwards by ones to/from 10.	K.CC.A.1a K.CC.A.1b	K-ESS3-1	
MK.1.3	Using 1-1 correspondence, count to tell how many objects in a variety of arrangements 0-10.	K.CC.B.4a K.CC.B.4b K.CC.B.5	K-ESS3-1 SL.K.5	
MK.1.4	Count on from a given number other than 1 (0-10).	K.CC.A.2	K-ESS3-1 FPA4.I.D.4	
MK.1.5	State the number that is one more or one less of a given number 0-10.	K.CC.B.4c	K-ESS3-1 SL.K.5	
MK.1.6	Identify whether a number of objects in a group is greater than, less than, or equal to the number of objects in another group 1-10.	K.CC.C.6	K-PS2-2 RI.K.1 W.K.7 SL.K.5	
MK.1.7	Compare written numbers 1-10.	K.CC.C.7	K-PS2-2 K-ESS3-2 RI.K.1 W.K.7 SL.K.3	
Vocabulary	greater than, less than, equal to, compare, how many, one more, one less, zero			

Quarter 2 Benchmark

MK.2	Students will identify two-dimensional and three-dimensional shapes as well as compare and contrast their attributes.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
MK.2.1	Tell where an object is based on its position *(e.g., above, below, beside, in front of, behind, next to).*	K.G.H.1		
MK.2.2	Identify two-dimensional shapes including square, circle, rectangle, triangle, and hexagon.	K.G.H.2		

	MK.2.3	**Identify three-dimensional shapes including cube, cone, cylinder, and sphere.**	K.G.H.2		
	MK.2.4	**Analyze and compare two-dimensional and three-dimensional shapes based on their attributes.**	K.G.I.4 K.G.H.3		
	MK.2.5	Create patterns using objects.			
	MK.2.6	Describe measurable attributes of objects.	K.MD.F.1	K-PS2-2 K-ESS2-1 W.K.7 RI.K.1 HE2.3.4 HE2.4.8	3a 3d 5c
	MK.2.7	**Make direct comparisons of the length, capacity, weight, and temperature of objects.**	K.MD.F.2	K-PS2-2 K-PS3-1 RI.K.1 W.K.2 W.K7 SL.K.3	
	MK.2.8	Classify and count objects into categories.	K.MD.G.3	K-ESS2-1 W.K.7	5c
Vocabulary		flat, solid, vertices, above, below, beside, in-front of, next to, behind, circle, cone, cube, cylinder, face, hexagon, rectangle, solid, sphere, square, triangle, sort, compare, height, length, longer, shorter, taller, more, less, same, capacity, weight, temperature			

Quarter 3 Benchmark

MK.3		**Students will solve addition and subtraction word problems within 10 using objects or drawings. Students will fluently add and subtract within 5.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	MK.3.1	**Represent and solve addition and subtraction word problems within 10 using objects or drawings.**	K.OA.D.2	K-ESS3-1 CV.5.3.1	3a 3d 5c
	MK.3.2	Decompose numbers less than or equal to 10.	K.OA.D.3		
	MK.3.3	**Produce all combinations that make 10.**	K.OA.D.4		
	MK.3.4	**Fluently add and subtract problems within 5.**	K.OA.D.5		
Vocabulary		add, subtract, addition, subtraction, number bond, part, whole, number sentence, equal, compose, decompose			

Quarter 4 Benchmarks

MK.4		**Students will represent the relationship of numbers up to 20. Students will orally count to 100.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	MK.4.1	**Identify and write numbers 0-20.**	K.CC.A.1 K.CC.A.3	K-ESS3-1	
	MK.4.2	**Orally count by ones from 1-100.**	K.CC.A.1	K-ESS3-1	
	MK.4.3	**Orally count by tens from 10-100.**	K.CC.A.1	K-ESS3-1	
	MK.4.4	**Orally count backwards by ones from 20.**	K.CC.A.1	K-ESS3-1	
	MK.4.5	**Count objects 0-20 (1-1 correspondence).**	K.CC.B.4a	K-ESS3-1 SL.K.5	

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
MK.4.6	**Given a number 0-20, create a set of objects and count to answer how many.**	K.CC.B.4a K.CC.B.4b K.CC.B.5	SL.K.5	
MK.4.7	**State the number that is one more or one less of a given number 0-20.**	K.CC.B.4c	K-ESS3-1 SL.K.5	
MK.4.8	**Compose and decompose numbers 0-20 as ten ones and some more ones.**	K.NBT.E.1a K.NBT.E.1b		
Vocabulary	greater than, less than, equal to, compare, one more, one less, teen number			

MK.5	**Students will build and draw shapes. Students will identify U.S. coins.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
MK.5.1	**Draw two-dimensional shapes.**	K.G.B.5		
MK.5.2	Build three-dimensional shapes.	K.G.B.5		
MK.5.3	**Use simple shapes to build squares, rectangles, and hexagons.**	K.G.B.6		
MK.5.4	**Identify coins by name (penny, nickel, dime, quarter).**	K.MD.G.4	SS.2.3.2	
Vocabulary	penny, nickel, dime, quarter			

Math – 1ˢᵗ Grade

	Pacing Guide					
Code	**Benchmark**	**Month(s) Taught**	**Common Assessment Period**			
			1	**2**	**3**	**4**
M1.1	Students will use a variety of strategies to solve addition and subtraction with fluency to 10, including word problems. Students will use properties of operations in addition and subtraction problems. Students will work with addition and subtraction equations demonstrating an understanding of equal to.	Aug - Oct	X			
M1.2	Students will understand place value using a variety of strategies to add and subtract within 20, including word problems.	Oct - Dec		X		
M1.3	Students will order objects by length and measure objects in non-standard units; organize, represent, and interpret data with up to three categories; and create graphs and tally charts using student or class-collected data relevant to length.	Jan			X	
M1.4	Students will build, write, count, and draw numbers, understanding and using place value to create, compare, and solve addition and subtraction problems to 40.	Feb - Mar			X	
M1.5	Students will reason with shapes and their attributes. Students will organize, represent, and interpret data with up to three categories.	Mar - Apr				X
M1.6	Students will build, write, count, and draw numbers. Students will understand and use place value to create, compare and solve problems to 100.	Apr - May				X
M1.7	Students will tell and write time to the hour and half-hour using both analog and digital clocks. Students will identify coins and state the value of each.	Addressed all year but focused on and assessed in May				X

Math Standard Reference Code	
OA	Operations & Algebraic Thinking
NBT	Number & Operations in Base Ten
MD	Measurement & Data
G	Geometry

Math - 1ˢᵗ Grade

Purpose Statement:	Students will expand their number sense to include: adding and subtracting within 20 (fluently to 10), applying the understanding of number value to measurement, telling time, analyzing data, composing and decomposing two-dimensional and three-dimensional shapes, understanding place value of tens and ones through 120, measuring using non-standard measurement, and identify and state the value of coins.

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			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
M1.1		**Students will use a variety of strategies to solve addition and subtraction with fluency to 10, including word problems. Students will use properties of operations in addition and subtraction problems. Students will work with addition and subtraction equations demonstrating an understanding of equal to.**			
	M1.1.1	**Use addition and subtraction within 10 to solve word problems involving situations of adding to, taking from, putting together, taking**	1.OA.A.1	1-ESS1-2 W.1.7	

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
		apart, and comparing with unknowns in all positions, by using objects, drawings, or equations with a symbol for the unknown number to represent the problem.		W.1.8 CV5.3.1	
	M1.1.2	**Apply commutative and associative properties of addition as strategies to add and subtract.**	1.OA.B.3		
	M1.1.3	Write equations to show subtraction as an unknown-addend problem.	1.OA.B.4		
	M1.1.4	**Relate counting to addition and subtraction using strategies such as by counting on and back.**	1.OA.C.5		
	M1.1.5	**Add and subtract within ten fluently using a variety of strategies.**	1.OA.C.6		
	M1.1.6	**Explain equal to and the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false.**	1.OA.D.7	FPA4.1.M.3	
	M1.1.7	**Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. 8 + ? = 11, 5 = ? -3, 6+6=?.**	1.OA.D.8		
Vocabulary		count on, track, expression, addend, doubles, doubles+1, part, total, whole, label, +,-,= signs, equation , number sentence, 5-groups, a ten, ones, unit consisting of 10 things. equal, number bond, minus, plus			

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
M1.2		**Students will understand place value using a variety of strategies to add and subtract within 20, including word problems.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	M1.2.1	**Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing with unknowns in all positions, by using objects, drawings, or equations with a symbol for the unknown number to represent the problem.**	1.OA.A.1	1-ESS1-2 W.1.7 W.1.8 CV5.3.1	
	M1.2.2	**Solve word problems that call for the addition of three whole numbers whose sum is less than or equal to 20 by using objects, drawings, or equations.**	1.OA.A.2	CV5.3.1	
	M1.2.3	**Apply commutative and associative properties of addition as strategies to add and subtract.**	1.OA.B.3		

	M1.2.4	Write equations to show subtraction as an unknown-addend problem.	1.OA.B.4		
	M1.2.5	**Relate counting to addition and subtraction using strategies such as by counting on and back.**	1.OA.C.5		
	M1.2.6	**Add and subtract within ten fluently using a variety of strategies.**	1.OA.C.6		
	M1.2.7	**Explain equal to and the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false.**	1.OA.D.7	FPA4.1.M.3	
	M1.2.8	**Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. 8 + ? = 11, 5 = ? -3, 6+6=?.**	1.OA.D.8		
	M1.2.9	**Model the two digits of a two-digit number represent amounts of tens and ones.** ● **10 ones can be bundled into 1 ten.** ● **Teen numbers (11-19) are composed of a ten and some ones.** **Decade numbers (10, 20, 30, etc.) are a number of tens and zero ones.**	1.NBT.F.2		
Vocabulary		count on, track, expression, addend, doubles, doubles+1, part, total, whole, label, +,-,= signs, equation , number sentence, 5-groups, a ten, ones, unit consisting of 10 things, equal, number bonds, minus, plus			

M1.3		**Students will order objects by length and measure objects in non-standard units; organize, represent, and interpret data with up to three categories; and create graphs and tally charts using student or class-collected data.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	M1.3.1	**Order three objects by length**; compare the lengths of two objects indirectly by using a third object.	1.MD.H.1	1-LS3-1 RI.1.1 W.1.7 W.1.8 FPA4.1.M.2	
	M1.3.2	**Use nonstandard units to show the length of an object as the number of same size units of lengths with no gaps or overlaps.**	1.MD.H.2	1-PS4-4 FPA4.1.M.5	
	M1.3.3	**Organize, represent and interpret data with up to three categories; ask and answer questions about the total number of data points, how many**	1.MD.J.4	W.1.7 W.1.8	

				Cross-curricular Standard Reference	
		in each category, and how many more or less are in one category than in another.		CV5.4.4	
Vocabulary		centimeter, centimeter cube, centimeter ruler, data, endpoint, height, length unit, poll(survey), table or graph, less than, longer than/taller than, more than, shorter than, tally marks			

M1.4		**Students will build, write, count, and draw numbers, understanding and using place value to create, compare, and solve addition and subtraction problems to 40.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	M1.4.1	**Use addition and subtraction within 40 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing with unknowns in all positions, by using objects, drawings, or equations with a symbol for the unknown number to represent the problem.**	1.OA.A.1	1-ESS1-2 W.1.7 W.1.8 CV5.3.1	
	M1.4.2	Extend the number sequence to 100. In this range: ● Count forward and backward starting at any number less than 100. ● Read numerals. ● Write numerals. Represent a number of objects with a written numeral.	1.NBT.E.1		
	M1.4.3	**Model two digits of a two-digit number represent amounts of tens and ones.** ● **10 ones can be bundled into 1 ten.** ● **Teen numbers (11-19) are composed of a ten and some ones.** **Decade numbers (10, 20, 30, etc.) are a number of tens and zero ones.**	1.NBT.F.2		
	M1.4.4	**Compare pairs of two-digit numbers based on the values of the tens digit and the ones digits, recording the results of comparisons with the words "is greater than," "is equal to," "is less than," and with the symbols >,<, and =.**	1.NBT.F.3	1-LS1-2 RI.1.1 RI.1.2 RI1.10	
	M1.4.5	Add within 40, using concrete models or drawings and strategies based on place value:	1.NBT.G.4	RI.1.1 RI.1.2	

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
		● Including adding a two-digit number and a one-digit number. ● Adding a two-digit number and a multiple of 10. ● Understand that in adding a two-digit numbers, adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. Relate the strategy to a written method and explain the reasoning used.		RI.1.10	
	M1.4.6	Given a two-digit number, mentally compute 10 more or 10 less than the number without having to count; explain the reasoning used.	1.NBT.G.5	RI.1.1 RI.1.2 RI.1.10	
	M1.4.7	Subtract multiples of 10 from an equal or larger multiple of 10 both within 90 using concrete models, drawings, and strategies based on place value.	1.NBT.G.6	1-LS1-2 RI.1.1 RI.1.2 RI.1.10	
Vocabulary		arrow notation, comparison symbols:<,>,=, greater than, less than, equal to, dime, hide zero cards, hundreds chart, number bond, penny, place value chart, quick ten, rekenrek, tape diagram			

M1.5		**Students will reason with shapes and their attributes.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	M1.5.1	**Distinguish defining attributes (e.g. triangles are closed and three-sided) versus non-defining attributes (e.g. color, orientation overall size); for a wide variety of shapes; build and draw shapes to possess defining attributes.**	1.G.K.1		
	M1.5.2	**Use two-dimensional shapes (rectangles, squares, trapezoids, rhombuses, and triangles) or three-dimensional shapes (cubes, rectangular prisms, cones, and cylinders) to create a composite figure** and create new figures from the composite figure**.**	1.G.K.2		
	M1.5.3	**Partition circles and rectangles into 2 and 4 equal shares and:** ● **Describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of.**	1.G.K.3		

		● Describe the whole as two of or four of the shares. Recognize that decomposing into more equal shares creates smaller shares.			
Vocabulary		attributes, composite shapes, three dimensional shapes: cone, rectangular prism, cube, cylinder, sphere, Two-dimensional shapes: rhombus, trapezoid, circle, hexagon, rectangle, square, triangle, clock, half of, quarter of, fourth of, halves, fourths, quarters, whole, equal share			

M1.6		**Students will build, write, count, and draw numbers. Students will understand and use place value to create, compare and solve problems to 100.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	M1.6.1	Use addition and subtraction within 100 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing with unknowns in all positions, by using objects, drawings, or equations with a symbol for the unknown number to represent the problem.	1.OA.A.1	1-ESS1-2 W.1.7 W.1.8 CV5.3.1	
	M1.6.2	Extend the number sequence to 120. In this range: ● Count forward and backward starting at any number less than 120. ● Read numerals. ● Write numerals. Represent a number of objects with a written numeral.	1.NBT.E.1		
	M1.6.3	Model two digits of a two-digit number represent amounts of tens and ones. ● 10 ones can be bundled into 1 ten. ● Teen numbers (11-19) are composed of a ten and some ones. Decade numbers (10, 20, 30, etc.) are a number of tens and zero ones.	1.NBT.F.2		
	M1.6.4	Compare pairs of two-digit numbers based on the values of the tens digit and the ones digits, recording the results of comparisons with the	1.NBT.F.3	1-LS1-2 RI.1.1 RI.1.2	

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
		words "is greater than," "is equal to," "is less than," and with the symbols >,<, and =.		RI1.10	
	M1.6.5	**Add within 100, using concrete models or drawings and strategies based on place value:** ● Including adding a two-digit number and a one-digit number. ● Adding a two-digit number and a multiple of 10. ● Understand that in adding a two-digit numbers, adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. Relate the strategy to a written method and explain the reasoning used.	1.NBT.G.4	RI.1.1 RI.1.2 RI.1.10	
	M1.6.6	Given a two-digit number, mentally compute 10 more or 10 less than the number without having to count; explain the reasoning used.	1.NBT.G.5	RI.1.1 RI.1.2 RI.1.10	
	M1.6.7	Subtract multiples of 10 from an equal or larger multiple of 10 both within 90 using concrete models, drawings, and strategies based on place value.	1.NBT.G.6	1-LS1-2 RI.1.1 RI.1.2 RI.1.10	
Vocabulary		compare, represent, arrow notation, comparison symbols:<,>,=, greater than, less than, equal to, dime, hide zero cards, hundreds chart, number bond, penny, place value chart, quick ten, rekenrek, tape diagram			

M1.7		**Students will tell and write time to the hour and half-hour using both analog and digital clocks. Students will identify coins and state the value of each.** *Note: To be instructed throughout the school year with the Common Assessment given in Quarter 4.*	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	M1.7.1	**Identify hour and minute hand.**	1.MD.I.3	SS2.3.2 SS2.4.2 CV5.5.2	
	M1.7.2	**Tell time to the hour.**	1.MD.I.3	SS2.3.2 SS2.4.2	

				CV5.5.2	
M1.7.3	**Tell time to the half-hour.**	1.MD.I.3	SS2.3.2 SS2.4.2 CV5.5.2	
M1.7.4	**Identify the penny, nickel, dime and quarter**	1.MD.I.3	SS2.3.2 SS2.4.2 CV5.5.2	
M1.7.5	**State the value of the penny, nickel, dime and quarter**	1.MD.I.3	SS2.3.2 SS2.4.2 CV5.5.2	
Vocabulary	dime, nickel, penny, quarter, compare, identify, digital clock, face, half-hour, half of, half past, hour, hour hand, minute, minute hand, O'clock, value, analog, ¢, $				

Math – 2ⁿᵈ Grade

Pacing Guide							
Code	**Benchmark**	**Month(s) Taught**	**Common Assessment Period**				
			1	**2**	**3**	**4**	
M2.1	Students will fluently add and subtract within 20 using mental strategies.	Aug - May	X	X	X	X	
M2.2	Students will count, build, read, write, and identify the three digits in a three digit number to show their understanding of place value and compare numbers within 1,000.	Aug - Sep	X				
M2.3	Students will solve addition and subtraction problems within 100, including word problems, using multiple strategies.	Sep - Dec		X			
M2.4	Students will add and subtract within 1,000 using multiple strategies and explain why they work.	Jan - Feb			X		
M2.5	Students will determine if a number is even or odd, build arrays, create arrays from rectangles by partitioning, and write an equation to express the array.	Feb - Mar			X		
M2.6	Students will solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using appropriate dollar and cents symbols.	Mar			X		
M2.7	Students will measure, compare, and estimate the length of objects and solve word problems involving length.	Apr - May				X	
M2.8	Students will generate data to create line plots, picture graphs and bar graphs in order to compare the data that is represented.	Apr - May				X	
M2.9	Students will identify and draw two-dimensional and three-dimensional shapes.	Apr - May				X	
M2.10	Students will partition rectangles and circles into two, three, or four equal shares.	Apr - May				X	

M2.11	Students will tell and write time from analog and digital clocks in 5 minute increments using a.m. and p.m.	May				X

Math Standard Reference Code	
OA	Operations & Algebraic Thinking
NBT	Number & Operations in Base Ten
MD	Measurement & Data
G	Geometry

Math - 2nd Grade

Purpose Statement:	Students will demonstrate their understanding of the base-ten system, develop fluency in addition and subtraction using efficient strategies, use standard units of measurement, as well as describe and analyze two-dimensional and three-dimensional shapes. *Note: By the end of grade 2, know from memory all sums of two 1-digit number*

Vocabulary listed are essential for demonstration of benchmark mastery. Any additional words related to the benchmark may be used at the teacher's discretion.

Math practices are not explicitly listed as benchmarks or learning targets; however, all eight math practices should be incorporated into all benchmarks and learning targets (see Appendix A for Math Practices).

Fluently means accurately, efficiently, and flexibly; students need experiences beyond the standard or traditional algorithm.

Bolded items identify learning targets that are considered a priority. Please note, however, that all learning targets/standards in the curriculum map must still be taught, but those in bold should be taught to at least proficiency.

M2.1		**Students will fluently add and subtract within 20 using mental strategies.** *Note: This benchmark needs to be taught all year long. There is an assessment for the end of each quarter.*	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	M2.1.1	**Solve math facts within 20 using mental strategies.** *(e.g., counting on by 1-3, making ten, doubles, doubles +/- 1/2, etc.).*	2.OA.B2		
	M2.1.2	**Demonstrate composing and decomposing numbers within 20.**	2.OA.B2		
	M2.1.3	**Solve problems with an unknown number in all positions.** **A+B=__, __+B=A, B+__=A, A=__+B**	2.OA.A.1		
Vocabulary		addend, compose, decompose, equals, equation, minuend, number			

M2.2		**Students will count, build, read, write, and identify the three digits in a three-digit number to show their understanding of place value and compare numbers within 1,000.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	M2.2.1	**Skip count by 5's, 10's and 100's within 1000 starting at any given number.**	2.NBT.D.2		
	M2.2.2	**Build, read, and explain the place values of three-digit numbers up to 1,000 in a variety of ways: unit form, standard form, expanded form, word form, and picture form.**	2.NBT.D.1 2.NBT.D.3	2-ESS1-1	
	M2.2.3	**Compare pairs of three-digit numbers using the words "is greater than", "is less than", "is equal to", and the symbols <, >, and = to record the results of comparisons.**	2.NBT.D.4		
Vocabulary		expanded form, skip counting, standard form, word form, greater than, less than, equal to			

M2.3		Students will solve addition and subtraction problems within 100, including word problems, using multiple strategies.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	M2.3.1	**Add and subtract fluently within 100 using place value, properties of operations, and/or the relationship between addition and subtraction.**	2.NBT.E.5	2-ESS2-1	
	M2.3.2	**Solve problems, including word problems, with an unknown number in all positions.** **A+B=___, ___+B=A, B+___=A, A=___+B**	2.OA.A.1		
	M2.3.3	Use a number line to add and subtract whole numbers and show that a given number is between two whole numbers.	2MD.G.6		
	M2.3.4	**Solve one and two-step word problems within 100.**	2.OA.A.1 2.NBT.E.5	2-ESS2-1	
Vocabulary		hundreds place, place value, strategies, unknown, number line			

M2.4		Students will add and subtract within 1,000 using multiple strategies and explain why they work.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	M2.4.1	Add and subtract 10 and 100 from any given number 100-900 mentally.	2.NBT.E.8		
	M2.4.2	**Add and subtract within 1,000 using concrete models or drawings, and strategies based on place value.**	**2.NBT.E.7**	RI.2.1, RI2.3, W2.6, W2.7, W2.8, SL2.2	
	M2.4.3	Add up to four two-digit numbers, using strategies based on place value and properties of operations.	2.NBT.E.6	RI.2.1, RI2.3, W2.6, W2.7, W2.8, SL2.2	

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	M2.4.4	Explain why addition and subtraction strategies work, using concrete objects, drawings or words (orally or written).	2.NBT.E.9	RI.2.1, RI2.3, W2.6, W2.7, W2.8, SL2.2	
Vocabulary		thousands place			

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
M2.5		**Students will determine if a number is even or odd, build arrays, create arrays from rectangles by partitioning, and write an equation to express the array.**			
	M2.5.1	Determine whether a group of objects (up to 20) has an odd or even number of members (i.e. by pairing objects or counting by 2's). *If a number is even, write an equation to express this as the sum of two equal addends.* *If the number is odd, write an equation to express this as a sum of a doubles plus one fact.*	2.OA.C.3	FPA4.1.A.1	
	M2.5.2	**Build arrays using rows and columns (up to 5x5).**	2.OA.C.4		
	M2.5.3	**Use repeated addition to find the total sum of objects in the array and write an equation to solve.**	2.OA.C.4		
	M2.5.4	Partition a rectangle, without manipulatives, into rows and columns of same-size squares and count to find the total number of them.	2.G.J.2		
Vocabulary		array, column, equal groups, even, odd, repeated addition, row			

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
M2.6		**Students will solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using appropriate dollar and cents symbols.**			
	M2.6.1	**Identify names and values of dollar bills, quarters, dimes, nickels and pennies.**	2.D		

M2.6.2	Count different combinations of coins and bills up to $10.	2.D		
M2.6.3	Solve word problems up to $10 involving dollar bills, quarters, dimes, nickels and pennies.	2.MD.H.8		
Vocabulary	cent, coins, dollar, bills, quarter, dime, nickel, penny			

M2.7	Students will measure, compare, and estimate the length of objects and solve word problems involving length.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
M2.7.1	Measure the length of an object by selecting appropriate tools.	2.MD.F.1		
M2.7.2	Measure the length of an object twice, using different units of measure and compare them.	2.MD.F.2	FPA.4.1.M.2	
M2.7.3	Estimate lengths using inches, feet, centimeters and meters.	2.MD.F.3		
M2.7.4	Measure to determine how much longer one object is than another.	2.MD.F.4		
M2.7.5	Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units.	2.MD.G.5		
Vocabulary	centimeter, equal length, foot, height, inch, length, measure, meter, width, yard			

M2.8	Students will generate data to create line plots, picture graphs and bar graphs in order to compare the data that is represented.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
M2.8.1	Collect measurement data based on whole units and create a line plot to show the data.	2.MD.I.9		
M2.8.2	Collect data and create a picture graph with up to 4 categories, labeling x and y-axis (horizontal and vertical), title, and key.	2.MD.I.10	2-ETS1-1, 2ETS1-3,	

				2-PS1-1, PE.2.2.1, RI.2.1, RI.2.8, W.2.6, W.2.8, SL.2.5, SS2.5.3, CVE5.4.4	
M2.8.3	**Read and interpret picture graphs comparing the data represented.**	2.MD.I.10	2-ETS1-1, 2ETS1-3, 2-PS1-1, PE.2.2.1, RI.2.1, RI.2.8, W.2.6, W.2.8, SL.2.5, SS2.5.3, CVE5.4.4	
M2.8.4	**Collect data and create a bar graph with up to 4 categories,, labeling x and y-axis (horizontal and vertical), title, and key.**	2.MD.I.10	2-ETS1-1, 2ETS1-3, 2-PS1-1, PE.2.2.1, RI.2.1, RI.2.8, W.2.6, W.2.8, SL.2.5, SS2.5.3, CVE5.4.4	
M2.8.5	**Read and interpret bar graphs comparing the data represented.**	2.MD.I.10	2-ETS1-1, 2ETS1-3, 2-PS1-1, PE.2.2.1, RI.2.1, RI.2.8, W.2.6, W.2.8, SL.2.5, SS2.5.3, CVE5.4.4	
Vocabulary	bar graph, data, horizontal, key, least, line plot, most, picture graph, vertical				

M2.9		Students will identify and draw two-dimensional and three-dimensional shapes.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	M2.9.1	Identify and describe the attributes of two-dimensional shapes *(e.g. angles, sides etc.)*.	2.G.J.1	FPA4.1.A.2	
	M2.9.2	Draw two-dimensional shapes with given attributes.	2.G.J.1	FPA4.1.A.2	
	M2.9.3	Identify and describe the attributes of three-dimensional shapes *(e.g., faces, edges, vertices etc.)*.	2.G.J.1	FPA4.1.A.2	
	M2.9.4	Draw three-dimensional shapes with given attributes.	2.G.J.1	FPA4.1.A.2	
Vocabulary		angle, attributes, base, face, edge, parallel, parallelogram, quadrilateral, symmetrical, vertices			

M2.10		Students will partition rectangles and circles into two, three, or four equal shares.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	M2.10.1	Determine whether rectangles and circles are divided equally into halves, thirds and fourths.	2.G.J.3		
	M2.10.2	Recognize that equal shares of identical wholes do not need to be the same shape.	2.G.J.3		
	M2.10.3	Draw and partition rectangles and circles into halves, thirds, and fourths.	2.G.J.3		
Vocabulary		divide, equal shares, fourths, halves, identical, thirds, whole			

M2.11		Students will tell and write time from analog and digital clocks in 5-minute increments using a.m. and p.m.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	M2.11.1	Tell and write time from analog and digital clocks in five minute increments.	2MD.H.7		
	M2.11.2	Use a.m. or p.m. to tell whether the time/activity presented happened in the morning or afternoon.	2.MD.H.7		
Vocabulary		a.m., half past, hour, minute, p.m., quarter to, quarter past			

Math – 3rd Grade

Pacing Guide						
Code	**Benchmark**	**Month(s) Taught**	**Common Assessment Period**			
			1	**2**	**3**	**4**
M3.1	Students will solve problems using multiplication and division strategies with factors 2, 3, 4, 5, and 10 within 100.		X			
M3.2	Students will solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.		X			
M3.3	Use place value understanding and properties of operations to perform multi-digit arithmetic (a range of algorithms may be used).		X			
M3.4	Students will represent and solve problems involving multiplication and division strategies using 0, 1, and 6-9 within 100, and identify arithmetic patterns and multiply one-digit whole numbers by multiples of 10.			X		
M3.5	Students will demonstrate concepts of area and relate area to multiplication and addition including real world problems.			X		
M3.6	Students will develop understanding of fractions as numbers.				X	
M3.7	Students will use measuring tools to solve problems involving measurement. Students will generate data, create graphs and interpret graphs.				X	
M3.8	Students will categorize shapes that share attributes and solve real world word problems, involving perimeters of polygons *(e.g., rhombus, rectangles, etc.)*.					X

Math Standard Reference Code	
OA	Operations & Algebraic Thinking
NBT	Number & Operations in Base Ten
MD	Measurement & Data
G	Geometry

Math - 3rd Grade

Purpose Statement:	Students will solve equations using multiplication and division strategies within 100; show representations of fractions, especially unit fractions (fractions with numerator 1); construct and use rectangular arrays for multiplication, division, and area; and describe and analyze two-dimensional shapes.

Vocabulary listed are essential for demonstration of benchmark mastery. Any additional words related to the benchmark may be used at the teacher's discretion.

Math practices are not explicitly listed as benchmarks or learning targets; however, all eight math practices should be incorporated into all benchmarks and learning targets (see Appendix A for Math Practices).

Fluently means accurately, efficiently, and flexibly; students need experiences beyond the standard or traditional algorithm.

Bolded items identify learning targets that are considered a priority. Please note, however, that all learning targets/standards in the curriculum map must still be taught, but those in bold should be taught to at least proficiency.

M3.1		**Students will fluently add and subtract within 1,000.** *Note: This benchmark needs to be taught all year long.*	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M3.1.1	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of addition, and/or the relationship between addition and subtraction.	3.NBT.E.2		minor	

Vocabulary	difference, standard algorithm				

M3.2		**Students will solve problems using multiplication and division strategies with factors 2, 3, 4, 5, and 10 within 100.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M3.2.1	**Represent the concept of multiplication of whole numbers using models.**	3.OA.A.1	L.3.4	major	
	M3.2.2	Represent the concept of division of whole numbers using models.	3.OA.A.2	CV5.3.1, CV5.3.2, L.3.4, L.3.6	major	
	M3.2.3	**Solve multiplication and division word problems within 100 using appropriate modeling strategies and equations.**	3.OA.A.3	CV5.3.1 CV5.3.2	major	
	M3.2.4	Determine the unknown whole number in a multiplication or division equation.	3.OA.A.4	L.3.4	major	
	M3.2.5	Apply properties of multiplication (commutative, distributive, associative) as strategies to multiply and divide with factors 2, 3, 4, 5 and 10, understanding division as an unknown factor problem. (Students do not need to use formal terms for these properties.)	3.OA.B.5 3.OA.B.6		major	
	M3.2.6	**Fluently multiply and divide with factors 2-5 and 10 using mental strategies such as the relationship between multiplication and division or properties of operations.**	3.OA.C.7	L.3.4	major	
	M3.2.7	Solve two-step word problems using the four basic operations. Students should apply Order of Operations	3.OA.D.8	L.3.4 L.3.6	major	3c,d

				Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
		when there are no parentheses to specify a particular order.				
Vocabulary		array, compare, digit, division, equation, estimate, expression, equal groups, tape diagram, unit, multiplication, parentheses, rotate, row, column, unknown, distribute				

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M3.3		**Students will represent and solve problems involving multiplication and division strategies using 0, 1, and 6-9 within 100, and identify arithmetic patterns and multiply one-digit whole numbers by multiples of 10.** *Note: By the end of grade 3, know automatically all products of two one-digit numbers.*				
	M3.3.1	**Solve word problems with multiplication and division using appropriate modeling strategies and equations.**	3.OA.A.3		major	
	M3.3.2	Determine the unknown whole number in a multiplication and/or division equation.	3.OA.A.4		major	
	M3.3.3	Apply properties of multiplication (commutative, distributive, associative) as strategies to multiply and divide with factors 0, 1 and 6-9. (Students do not need to use formal terms for these properties.)	3.OA.B.5		major	
	M3.3.4	Fluently multiply and divide with factors 1-10 using mental strategies such as the relationship between multiplication and division or properties of operations.	3.OA.C.7	L.3.4	major	
	M3.3.5	**Solve two-step word problems using the four basic operations. Students should apply Order of Operations.**	3.OA.D.8	L.3.4 L.3.6	major	

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M3.3.6		Identify arithmetic patterns and explain the relationships using properties of operations. (*e.g., 4 times a number is always even or 4 times a number can be decomposed into 2 equal addends*).	3.OA.D.9		major	
M3.3.7		Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9x80, 5x60) using strategies based on place value and properties of multiplication.	3.NBT.E.3		major	
Vocabulary		array, compare, digit, division, equation, estimate, expression, equal groups, tape diagram, unit, multiplication, parentheses, rotate, row, column, unknown, distribute, multiple, product				

M3.4		Students will demonstrate concepts of area and relate area to multiplication and addition including real world problems.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M3.4.1	Understand area as an attribute of plane figures and understand concepts of area measurement, such as square units without gaps or overlaps.	3.MD.I.5		major	
	M3.4.2	Measure areas by counting unit squares (square cm, square m, square in., square ft., and improvised units).	3.MD.I.6	L.3.4 L.3.6	major	
	M3.4.3	Find the area of a rectangle with whole-number side lengths (dimensions) by multiplying them. Show that this area is the same as when counting unit squares.	3.MD.I.7A	L.3.4 L.3.6	major	
	M3.4.4	Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.	3.MD.I.7B	L.3.4 L.3.6	major	

		Use area models to represent the distributive property in mathematical reasoning. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a x b and a x c.	3.MD.I.7C	L.3.4 L.3.6	major	
	M3.4.5					
	M3.4.6	**Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different area or with the same area and different perimeter.**	3.MD.J.8	L.3.4 L.3.6	major	
Vocabulary		area, area model, square unit, tile, unit square, whole number, array, geometric shape, length				

M3.5		**Students will develop an understanding of fractions as numbers.** *Note: Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8. Use horizontal fractions.*	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M3.5.1	Partition rectangles, regular polygons, and circles into equal parts with equal areas. Express the area of each part as a unit fraction of the whole.	3.G.A.2		major	
	M3.5.2	Understand a fraction as 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b.	3.NF.A.1		major	
	M3.5.3	**Understand and represent fractions as a number on a number line diagram defining the interval from 0. Represent a fraction a/b on a number line diagram by**	3.NF.A.2a-b	L.3.4 L.3.6	major	

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
		marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.				
	M3.5.4	**Understand two fractions as equivalent if they are the same size *(e.g., 3/4 = 6/8)*, or on the same point on a number line.**	3.NF.A.3a	CV5.3.1 CV5.3.2 L.3.4 L.3.5	major	
	M3.5.5	Recognize and **generate simple equivalent fractions** *(e.g., 1/2 = 2/4, 4/6 = 2/3)* and explain why the fractions are equivalent.	3.NF.A.3b	CV5.3.1 CV5.3.2 L.3.4 L.3.5	major	
	M3.5.6	**Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers (*e.g., express 3 as 3/1, and 4/4 is the same as 1).***	3.NF.A.3c	CV5.3.1 CV5.3.2 L.3.4 L.3.5	major	
	M3.5.7	Compare two fractions with the same numerator or the same denominator by reasoning about their size, using the inequality symbols (<, >, or =) (e.g., 5/7 > 1/7 or 1/8 < 1/5).	3.NF.A.3d	CV5.3.1 CV5.3.2 L.3.4 L.3.5	major	
Vocabulary		copies, equivalent fractions, fraction form, fractional unit, non-unit fraction, unit form, unit fraction, unit interval, equal parts				

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M3.6		**Students will use measuring tools to solve problems involving measurement. Students will generate data, create graphs and interpret graphs.**				
	M3.6.1	**Generate measurement data by measuring lengths using rulers marked with whole numbers, halves and quarters of an inch.**	3.MD.H.4		major	5b

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M3.6.2	Use measurement data to create a line plot, where the horizontal scale is marked off in appropriate units (whole numbers, halves, or quarters).	3.MD.H.4		major	5b
	M3.6.3	Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information represented in scaled graphs.	3.MD.H.3, 3.MD.B.4	3ESS2-1 CV5.3.1 CV5.3.2 PE5.2.1 HE4.4.7	major	5b
	M3.6.4	Solve one and two-step word problems using the information in the scaled graphs (*e.g., "how many more" and "how many less"*).	3.MD.H.3	3ESS2-1 CV5.3.1 CV5.3.2 PE5.2.1 HE4.4.7	major	
Vocabulary		frequent, key, measurement data, scaled graphs, bar graph, picture graph, line plot, data, scale, survey				

M3.7		Students will categorize shapes that share attributes and solve real world word problems, involving perimeters of polygons (*e.g., rhombus, rectangles, etc.*).	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M3.7.1	Use attributes of quadrilaterals to classify rhombuses, rectangles, and squares. Understand that the shared attributes can define a larger category (e.g., quadrilaterals).	3.G.K.1	SL.3.1 L.3.6 CV5.3.1 CV5.3.2 FPA.4.1.A.3 FPA.4.4.A.1	major	
	M3.7.2	Draw examples of quadrilaterals that do not belong to any of these subcategories: rhombuses, rectangles, and squares.	3.G.K.1	SL.3.1 L.3.6 CV5.3.1 CV5.3.2	major	

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
				FPA.4.1.A.3 FPA.4.4.A.1		
M3.7.3		**Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different area or with the same area and different perimeter.**	3.MD.J.8	L.3.4 L.3.6	major	
Vocabulary		diagonal, perimeter, regular polygon, attribute, quadrilateral, rectangle, rhombus, square, polygon, right angle, octagon, hexagon, parallelogram				

Note: the following benchmark may be taught and assessed after Spring WyTOPP testing.

M3.8		**Students will fluently add and subtract within 1,000 using strategies and algorithms based on place value, properties of addition and/or the relationship between addition and subtraction.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M3.8.1	**Use place value understanding to round whole numbers to the nearest 10 or 100.**	3.NBT.E.1		minor	
	M3.8.2	Solve one-step word problems, using the four operations, involving volume or masses that are given in the same unit.	3.MD.G.2	CV5.3.1 CV5.3.2	minor	
	M3.8.3	Use analog clocks to tell and write time to the nearest minute.	3.MD.G.1		minor	
	M3.8.4	**Solve word problems involving addition and subtraction of time intervals in minutes.**	3.MD.G.1		minor	
	M3.8.5	Estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).	3.MD.G.2	C.5.3.1 CV5.3.2	minor	

		Note: Emphasize students developing benchmarks for measurement (e.g., a paper clip is approximately 1 gram).			
	M3.8.6	Measure liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).	3.MD.G.2	minor	
Vocabulary		about, capacity, continuous, endpoint, gram, interval, halfway, kilogram, liquid volume, liter, milliliter, plot, point, reasonable, round, second, standard algorithm			

Math – 4th Grade

	Pacing Guide					
Code	**Benchmark**	**Month(s) Taught**	**Common Assessment Period**			
			1	**2**	**3**	**4**
M4.1	Students will indicate that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.	Aug	X			
M4.2	Students will read, write, analyze, round, and illustrate their understanding of place value up to 1,000,000.	Sept	X			
M4.3	Students will fluently use standard algorithms in addition and subtraction and explain why they work. Students will solve multi-step word problems using addition and subtraction.	Oct	X			
M4.4	Students multiply a whole number up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and properties of operations, including word problems. Students will illustrate and explain using, rectangular arrays, area models, and/or equations.	Nov		X		
M4.5	Students will find whole number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division, including word problems. Students will illustrate and explain the calculation by rectangular arrays, area models, and/or equations.	Dec		X		
M4.6	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money.	Jan			X	
M4.7	Students will analyze fraction equivalence and compare fractions.	Feb			X	
M4.8	Students will build fractions from unit fractions by applying and extending previous understanding of operations on whole numbers, including measurement and interpreting data, to solve real-world problems using addition, subtraction and multiplication.	Feb - Mar			X	

M4.9	Students will identify decimal notation for fractions and compare decimal fractions and justify comparisons of decimals using visual models. Students will solve words problems using the four operations involving simple fractions or decimals.	Mar - Apr				X
M4.10	Students will draw and identify lines and angles, and classify two-dimensional figures by properties of their lines and angles. Students will draw and identify lines of symmetry and create patterns using shapes.	Apr - May				X
M4.11	Students will use concepts of angles and angle measurement to sketch and find unknown angles in real world and math problems.	May				X

Math Standard Reference Code	
OA	Operations & Algebraic Thinking
NBT	Number & Operations in Base Ten
NF	Number & Operations – Fractions
MD	Measurement & Data
G	Geometry

Math - 4th Grade

Purpose Statement:	Students will demonstrate an understanding and fluency with multi-digit multiplication (up to 2x2) and division (up to 4x1) using place value strategies; develop an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers.

Vocabulary listed are essential for demonstration of benchmark mastery. Any additional words related to the benchmark may be used at the teacher's discretion.

Math practices are not explicitly listed as benchmarks or learning targets; however, all eight math practices should be incorporated into all benchmarks and learning targets (see Appendix A for Math Practices).

Bolded items identify learning targets that are considered a priority. Please note, however, that all learning targets/standards in the curriculum map must still be taught, but those in bold should be taught to at least proficiency.

M4.1		**Students will indicate that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M4.1.1	**Identify place value up to 1,000,000.**	4.D			
	M4.1.2	**Multiply a given multi-digit whole number by 10 to determine the value of a digit in a larger number**	4.NBT.D.1		major	

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
		(e.g., 354x10=3,540, the four in the product is ten times more than the four in the first number).				
	M4.1.3	**Use strategies for powers of 10 to multiply and divide multiples of 10.**	4.NBT.D.1		major	
	M4.1.4	**Find the product of ten and any other number, then justify why the number now has a 0 at the end.**	4.NBT.D.1		major	
Vocabulary		hundred-thousands, millions, multi-digit				

		Students will read, write, analyze, round, and illustrate their understanding of place value up to 1,000,000.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M4.2						
	M4.2.1	**Read and write multi-digit whole numbers in standard, expanded, written, and unit form.**	4.NBT.D.2	ELA L.3.4, L.3.6	major	
	M4.2.2	**Compare two multi-digit numbers using >, < and = symbols and explain with place value reasoning.**	4.NBT.D.2	ELA L.3.4, L.3.6	major	
	M4.2.3	**Use place value to round multi-digit whole numbers to the millions place.**	4.NBT.D.3		major	
	M4.2.4	Explain why a number is rounded to a given place.	4.NBT.D.3		support	
	M4.2.5	Show place value understanding through drawings, charts, tables, diagrams and more.	4.NBT.D.3		support	
Vocabulary		compare, expanded form, number form, unit form, word form				

M4.3		Students will use standard algorithms in addition and subtraction and explain why they work. Students will solve multi-step word problems using addition and subtraction.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M4.3.1	Demonstrate regrouping with drawings, charts, or tables and explain why it works.	4.NBT.D.4		major	
	M4.3.2	Add and subtract multi-digit whole numbers using the standard algorithm up to 1,000,000.	4.NBT.D.4		major	
	M4.3.3	Use variables to represent unknown quantities in addition and subtraction word problems.	4.OA.A.3	ELA-L.3.4, L.3.6 CVE-CV5.3.1, CV5.3.2	major	
	M4.3.4	Solve multi-step word problems by applying mental computation and estimation strategies to assess the reasonableness of answers in addition and subtraction problems.	4.OA.A.3 4.NBT.E.4	ELA-L.3.4, L.3.6 CVE-CV5.3.1, CV5.3.2	major	
Vocabulary		algorithm				

M4.4		Students will multiply a whole number up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and properties of operations, including word problems. Students will illustrate and explain using, rectangular arrays, area models, and/or equations.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M4.4.1	Identify all factor pairs for a whole number and count the multiples of a factor up to 100. Explain why the numbers are prime or composite.	4.OA.B.4	ELA-L.3.4, L.3.6	support	

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M4.4.2		Use a strategy *(e.g., rectangular arrays, distributive property, partial product, area model),* to solve multi-digit by one digit, and two-digit by two digit multiplication problems, including word problems.	4.NBT.E.5 4.OA.A.2		major	
M4.4.3		Use the area formula *A=lw* and the perimeter formula *P=2l + 2w* to solve real-world mathematical problems.	4.MD.I.3 4.OA.A.2		major	
M4.4.4		Generate a number pattern that follows a given rule, using multiplication.	4.OA.C.5	FPA4.1.M.4		
Vocabulary		area model, operations, formula, area, perimeter, length, width				

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M4.5		**Students will find whole number quotients and remainders with up to four-digit dividends and one-digit divisors, using a strategy based on place value, the properties of operations, and/or the relationship between multiplication and division, including word problems.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M4.5.1	**Use a strategy and/or appropriate models based on place value, and the relationship between multiplication and division to find quotients and remainders with up to four-digit dividends and one-digit divisors.**	4.NBT.E.6 4.OA.A.2 4.OA.A.3	ELA-L.3.4, L.3.6 CVE-CV5.3.1, CV5.3.2	major	
	M4.5.2	**Use the area formula A=lw and the perimeter formula P=2l + 2w to find unknown variables.**	4.MD.I.3 4.OA.A.3	ELA-L.3.4, L.3.6 CVE-CV5.3.1, CV5.3.2	major	
	M4.5.3	**Apply the area and perimeter formulas for rectangles to find the unknown variable in real world mathematical problems.**	4.MD.I.3		major	

	M4.5.4	Generate a number pattern that follows a given rule, using multiplication or division.	4.OA.C.5			
Vocabulary		dividend, divisor, quotient, remainder, growing pattern, repeating pattern, rule, features				

M4.6		**Students will use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M4.6.1	**Identify relative sizes of measurement units within one system of units (km, m, cm; kg, g; lb, oz; l, ml; hr, min, sec, ft, in, gal, qt, pt, c) and use appropriate tools for measuring.**	4.MD.I.1	ELA-L.3.4, L.3.6	major	
	M4.6.2	**Record measurement equivalents in a two-column table.**	4.MD.I.1	ELA-L.3.4, L.3.6	major	
	M4.6.3	**Solve multi-step word problems involving measurement unit conversions with distance, elapsed time, money, and capacity.**	4.MD.I.2		major	ISTE-3c
Vocabulary		convert, customary, equivalent, metric, standard, unit, diagram, elapsed time, capacity, volume				

M4.7		**Students will analyze fraction equivalence and compare fractions.** *Note: Grade 4 expectations are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.*	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M4.7.1	**Explain why fraction a/b is equivalent to a fraction (n x a)/(n x b) using visual fraction models.**	4.NF.F.1		major	

	M4.7.2	Recognize and generate equivalent fractions.	4.NF.F.1		major	
	M4.7.3	Compare two fractions with different numerators and different denominators by creating common denominators and using the symbols <, >, or =.	4.NF.F.2	FPA-4.1.M.5	major	
Vocabulary		numerator, denominator, equivalent, benchmark fraction, common denominator, thirds, fifths, sixths, eighths, tenths, twelfths, hundredths				

		Students will build fractions from unit fractions by applying and extending previous understanding of operations on whole numbers, including measurement and interpreting data, to solve real-world problems using addition, subtraction and multiplication. *Note: Grade 4 expectations are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.*	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M4.8						
	M4.8.1	**Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording decomposition by an equation** *(e.g., 3/8= 1/8+1/8+1/8 and 3/8=1/8+2/8).*	4.NF.G.3b	ELA- L3.4, L3.6 CVE-CV5.3.1, CV5.3.2	major	
	M4.8.2	**Convert mixed numbers into fractions greater than one** *(e.g., 5/2)* **and add and subtract mixed numbers with like denominators.**	4.NF.G.3c	ELA- L3.4, L3.6 CVE-CV5.3.1, CV5.3.2	major	
	M4.8.3	**Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators.**	4.NF.G.3d	ELA- L3.4, L3.6 CVE-CV5.3.1, CV5.3.2	major	

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M4.8.4		**Identify fraction a/b as a multiple of 1/b** *(e.g., 5/4 is the product of 5 x (1/4))* **and use this understanding to multiply a fraction by a whole number.**	4.NF.G.4a 4.NF.G.4b	CVE-CV5.3.1, CV5.3.2	major	
M4.8.5		**Use the four operations to solve real-world problems involving multiplication of a fraction by a whole number by using visual fraction models and/or equations.**	4.NF.G.4c 4.MD.I.2	CVE-CV5.3.1, CV5.3.2	major	ISTE-3c
M4.8.6		**Create a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4 and 1/8) and solve problems involving addition and subtraction of fractions by using information presented in line plots.**	4.MD.J.4	PE-5.2.1 Health-HE4.4.7	support	ISTE-5b
Vocabulary		joining parts, separating parts, whole, sub, fraction greater than one, mixed number, line plot, data				

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M4.9		**Students will identify decimal notation for fractions and compare decimal fractions and justify comparisons of decimals using visual models. Students will solve words problems using the four operations involving simple fractions or decimals.** *Note: Use denominators of 2, 4, 8, and decimals up to hundredths.*	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M4.9.1	Identify the tenths and hundredths place.	4.D			
	M4.9.2	**Write fractions with denominator 10 as an equivalent fraction with denominator 100** *(e.g., 3/10 = 30/100).*	4.NF.H.5		major	
	M4.9.3	**Add two fractions with respective denominators 10 and 100** *(e.g., 3/10 + 4/100= 34/100).*	4.NF.H.5		major	

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M4.9.4	**Use decimal notation for fractions with denominators 10 or 100** *(e.g., 0.62=62/100).*	4.NF.H.6	ELA-L.3.4, L.3.6	major	
	M4.9.5	**Compare two decimals to the hundredths place by reasoning about their size and using <, >, and = symbols. Recognize that comparisons are valid only when the two decimals refer to the same whole.**	4.NF.H.7	ELA-L.3.4, L.3.6	major	
	M4.9.6	**Use the four operations to solve word problems involving measurement using simple fractions and decimals.**	4.MD.I.2		major	ISTE-3c
Vocabulary		tenths, hundredths, decimals				

M4.10		**Students will draw and identify lines and angles, and classify two-dimensional figures by properties of their lines and angles. Students will draw and identify lines of symmetry and create patterns using shapes.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M4.10.1	**Draw points, lines, line segments, rays, angles (right, obtuse, acute), and perpendicular and parallel lines. Identify these in two dimensional figures.**	4.G.L.1	ELA-L.3.4, L.3.6 FPA 4.1.A.3, FPA 4.4.A.1	support	
	M4.10.2	**Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size.**	4.G.L.2	FPA 4.1.A.3, FPA 4.4.A.1	support	
	M4.10.3	**Identify and categorize right triangles by property.**	4.G.L.2	FPA 4.1.A.3, FPA 4.4.A.1	support	
	M4.10.4	**Identify line-symmetric figures and draw lines of symmetry.**	4.G.L.3	FPA 4.1.A.3, FPA 4.4.A.1	support	
	M4.10.5	Generate a shape pattern that follows a given rule.	4.OA.C.5	FPA 4.1.M.4		

Vocabulary	acute, obtuse, right angle, parallel, perpendicular, ray, line segment, two-dimensional shapes, classify, right triangle, symmetry, polygons	

M4.11		Students will use concepts of angles and angle measurement to sketch and find unknown angles in real world and math problems.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M4.11.1	Recognize and identify angles as geometric shapes that are formed where two rays share a common endpoint.	4.MD.K.5		support	
	M4.11.2	Measure angles to show what a degree is within a circle.	4.MD.K.5a		support	
	M4.11.3	Measure angles in whole-number degrees using a protractor.	4.MD.K.6		support	
	M4.11.4	Sketch angles to a specified measure.	4.MD.K.6		support	
	M4.11.5	Compose and decompose angles.	4.MD.K.7		support	
	M4.11.6	Solve real world problems to find the unknown angle measurement.	4.MD.K.7		support	
Vocabulary		arc, endpoint, intersect, protractor, degrees, decompose				

Math – 5th Grade

			Common Assessment Period			
Code	Benchmark	Month(s) Taught	1	2	3	4
M5.1	Students will use the place value system to the thousandths place to solve problems extending to the use of rounding and comparing decimals.	Aug – Oct	X			
M5.2	Students will construct multi-digit numbers to include decimals representing patterns and the power of 10.	Aug - Oct	X			
M5.3	Students will add and subtract decimals to the hundredths place using a variety of strategies based on place value, properties of operations, relationship of addition and subtraction. Students will relate the strategy to a written method and explain the strategy used.	Oct - Nov	X			
M5.4	Students will fluently multiply multi-digit whole numbers and decimals using the standard algorithm to include real world application.	Oct - Nov		X		
M5.5	Students will find quotients of whole numbers and decimals with up to a two-digit divisor and four-digit dividends using a variety of strategies based on place value, properties of operations, relationship of multiplication and division. Students will relate the strategy to an illustration, equations, rectangular arrays or area models and explain the strategy used.	Nov - Dec		X		
M5.6	Students will add and subtract fractions with unlike denominators including mixed numbers using a variety of strategies, additionally solving real world problem.	Dec - Jan			X	
M5.7	Students will multiply fractions, which are parts of a whole, to include mixed numbers and real world problems, as well as interpret multiplication as scaling. Students will illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	Jan - Feb			X	

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M5.8	Students will interpret and explain dividing a fraction by a whole number using visual models and applying it to real world situations.	Feb - Mar			X	
M5.9	Students will use unit cubes and formulas to find the volume of rectangular prisms using the operations of multiplication and addition including real world problems.	Mar - Apr				X
M5.10	Students will convert various units of measurement within the customary and metric system and use these conversions in solving multi-step, real world problems. Additionally, students will create a line plot.	Apr - May				X
M5.11	Students will use ordered pairs to plot on a coordinate plane. Students will represent and interpret real world and math problems by plotting points on a coordinate plane.	Apr - May				X
M5.12	Students will identify and classify two-dimensional figures.	Apr - May				X

Math Standard Reference Code	
OA	Operations & Algebraic Thinking
NBT	Number & Operations in Base Ten
NF	Number & Operations – Fractions
MD	Measurement & Data
G	Geometry

Math - 5th Grade

Purpose Statement:	Students will fluently add and subtract fractions with like and unlike denominators and demonstrate an ability to multiply and divide. Students apply concepts of multiplying multi-digit whole numbers and decimals with relation to division. Students will identify, produce, and compare decimals. Students apply concepts of volume and will illustrate volume utilizing unit cubes. Students will apply real world applications.

Vocabulary listed are essential for demonstration of benchmark mastery. Any additional words related to the benchmark may be used at the teacher's discretion.

Math practices are not explicitly listed as benchmarks or learning targets; however, all eight math practices should be incorporated into all benchmarks and learning targets (see Appendix A for Math Practices).

Fluently means accurately, efficiently, and flexibly; students need experiences beyond the standard or traditional algorithm.

Bolded items identify learning targets that are considered a priority. Please note, however, that all learning targets/standards in the curriculum map must still be taught, but those in bold should be taught to at least proficiency.

M5.1		**Students will use the place value system to read, write, round and compare decimals to the thousandths place.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M5.1.1	Build and represent whole numbers.	NBT.A.3	L.5.4 L.5.6		

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M5.1.2	Build and represent decimals to the thousandths.	NBT.A.3	L.5.4 L.5.6		
	M5.1.3	**Read and write decimals in a variety of ways *(e.g., base-ten numerals, number names, and expanded form)*.**	NBT.A.3a	L.5.4 L.5.6		
	M5.1.4	Show the next nearest number to the designated decimal to the thousandths.	NBT.A.3 NBT.A.4	L.5.4 L.5.6		
	M5.1.5	**Order and compare decimals using the inequality symbols to demonstrate >, < or = to the thousandths.**	5.NBT.A.3	L.5.4 L.5.6		
	M5.1.6	**Round decimals to the nearest required place value to the thousandths.**	NBT.A.3	L.5.4 L.5.6		
Vocabulary		decimal, digit, inequality, tenths, hundredths, thousandths, increasing, ascending, decreasing, descending				

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M5.2		**Students will identify and explain patterns of multi-digit numbers when multiplying and dividing by powers of ten, to explain the value of the digits.**				
	M5.2.1	Demonstrate what the digits represent in a multi- digit number.	5.NBT.A.1			3a,d 5c
	M5.2.2	**Identify and explain patterns when multiplying numbers of power of 10. (e.g., In which number does the digit 6 have ten times the value of the digit 6 in 4,567? In which number does the digit 4 have 1/10 the value of the digit 4 in 4,567?)**	5.NBT.A.2			3a,d 5c
	M5.2.3	**Identify and explain the value of the digits when a number is multiplied or divided by a power of 10.**	5.NBT.A.1 5.NBT.A.2	L.5.4 L.5.6		
	M5.2.4	**Use whole number exponents to denote powers of 10.**	5.NBT.A.2	L.5.4 L.5.6		

Vocabulary	factors, product, ten times more, 1/10 less, quotient, base number, exponent

M5.3		**Students will add and subtract decimals to the hundredths place using a variety of strategies and real-life application.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M5.3.1	Use concrete or pictorial representation to add decimals to the hundredths using a variety of strategies.	NBT.B.7			
	M5.3.2	Use concrete or pictorial representation to subtract decimals to the hundredths using a variety of strategies.	NBT.B.7			
	M5.3.3	**Relate the strategies to a written method and real-life application to explain the reasoning used when adding and subtracting decimals.**	NBT.B.7			
Vocabulary		addend, minuend, subtrahend, sum, difference				

M5.4		**Students will fluently multiply multi-digit whole numbers and decimals using the standard algorithm to include real world application.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M5.4.1	**Multiply multi-digit whole numbers using place value strategies including the standard algorithm.**	5.NBT.B.5			
Vocabulary		standard algorithm, product, factors, multiples				

M5.5		**Students will find quotients of whole numbers and decimals with up to a two-digit divisor and four-digit dividends using a variety of strategies.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M5.5.1	**Identify the relationship between multiplication and division.**	5.NBT.B.6			
	M5.5.2	Illustrate and explain the calculation by using equations, rectangular arrays, concrete models, drawings and or area models.	5.NBT.B.6			
	M5.5.3	**Relate strategy to a written method and explain the reasoning used within a real-world problem.**	5.NBT.B.6			
Vocabulary		divisible, dividend, divisor, quotient				

M5.6		**Students will solve numerical expressions using order of operations to include, parentheses, brackets, etc.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M5.6.1	**Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.**	5.OA.A.1	L.5.4		
	M5.6.2	**Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.**	5.OA.A.2	L.5.4		
Vocabulary		parentheses, brackets, braces, exponents, expressions				

M5.7		Students will add and subtract fractions with unlike denominators including mixed numbers using a variety of strategies, additionally applying to real-world application.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M5.7.1	Demonstrate equivalent fractions.	5.NF.A.1			
	M5.7.2	Add fractions with unlike denominators (with mixed numbers).	5.NF.A.1			
	M5.7.3	Subtract fractions with unlike denominators (with mixed numbers).	5.NF.A.1			
	M5.7.4	Subtract fractions with unlike denominators to include regrouping.	5.NF.A.1			
	M5.7.5	Solve word problems involving addition and subtraction of fractions with uncommon denominators, must use visual fraction models, benchmark fractions, or equations to present the problem.	5.NF.A.2	CV5.3.1 CV5.3.2		
Vocabulary		equivalent, denominator, numerator, whole number, simplify, reduce, mixed number, improper fraction				

M5.8		Students will multiply fractions, which are parts of a whole, to include mixed numbers and real-world problems, as well as interpret multiplication as scaling.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M5.8.1	Multiply fractions or whole numbers by a fraction.	5.NF.B.4			
	M5.8.2	Find the area of a rectangle using fractional sides.	5.NF.B.4b			
	M5.8.3	Compare the size of a product to the size of one factor on the basis of the scaling factor, without performing the indicated multiplication (scaling).	5.NF.B.5a	SL.5.1 SL.5.1.a SL.5.1.b		

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
				SL.5.1.c SL.5.1.d SL.5.2 SL.5.3		
M5.8.4		**Explain why multiplying a given number by a fraction is greater than or less than 1 results in a product greater than or less than the given number.**	5.NF.B.5b	SL.5.1 SL.5.1.a SL.5.1.b SL.5.1.c SL.5.1.d SL.5.2 SL.5.3		
M5.8.5		**Solve real world problems involving multiplication of fractions and mixed numbers.**	5.NF.B.5b	CV5.3.1 CV5.3.2		3c
Vocabulary		scaling, factors greater than one, factors less than one				

M5.9		**Students will interpret and explain dividing a fraction by a whole number using visual models and applying it to real world situations.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M5.9.1	**Apply and extend previous understanding of division to divide unit fractions by whole numbers and whole numbers by unit fractions.**	5.NF.B.7	CV5.3.1 CV5.3.2		3c
	M5.9.2	**Explain the relationship between multiplication and division of whole numbers by fractions and fractions by whole numbers** *(e.g., 1/3 ÷4 =1/12 because 1/12 × 4=⅓, 4 ÷ 1/5=20 because 20 × 1/5=4)*	5.NF.B.7b	CV5.3.1 CV5.3.2		3c
	M5.9.3	**Interpret a fraction as division of the numerator by the denominator.** $(a/b = a \div b)$				

M5.9.4	Solve real world problems involving division of unit fractions by whole numbers and division of whole numbers by unit fractions by using visual fraction models *(e.g., How much chocolate will each person get if 3 people share a 1/2 pound of chocolate equally? Or How many 1/3 cup servings are in 2 cups of raisins?).*	5.NF.B.7c	CV5.3.1 CV5.3.2		3c
Vocabulary	quotient, dividend, divisor				

M5.10	Students will use unit cubes and formulas to find the volume of regular and irregular rectangular prisms using the operations of multiplication and addition including real world problems.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M5.10.1	Identify volume as an attribute of three - dimensional solid figures and understand concepts of volume measurement, with the label "unit cube".	5.MD.C.3 5.MD.C.3a 5.MD.C.3b	L.5.4 L.5.6		
M5.10.2	Measure volume by counting unit cubes (cubic cm., cubic in., cubic ft., and improvised units).	5.MD.C.4			
M5.10.3	Relate the concept of volume to the operations of multiplication to solve real world problems involving volume.	5.MD.C.5			
M5.10.4	Find volumes of rectangular prisms and solve real-world and mathematical problems given the formula V = (l)(w)(h) and V = (B)(h) for rectangular prisms.	5.MD.C.5b NBT.B.5			
Vocabulary	base, length, height, width, rectangular prism, cube, associative property, unit				

M5.11		Students will convert various units of measurement within the customary and metric system and use these conversions in solving multi-step, real world problems. Additionally, students will create a line plot.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M5.11.1	Convert among different sized standard measurement units within the customary system and use these conversions in solving multi-step, real world problems.	5.MD.A.1			
	M5.11.2	Convert among different sized standard measurement units within the metric system and use these conversions in solving multi-step, real world problems.	5.MD.A.1			
	M5.11.3	Create a line plot to display a data set of measurement in fractions of a unit (1/2, 1/4, 1/8).	5.MD.B.2			
Vocabulary		mass, capacity, weigh, centi, kilo, milli, hecto, deca, deci, unit, grams, liters, meters				

M5.12		Students will plot ordered pairs on a coordinate plane including real-world applications.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M5.12.1	Generate two numerical patterns using two given rules.	5.OA.B.3	L.5.4 FPA 8.1.M.4		
	M5.12.2	The x and y axes are perpendicular lines that intersect at 0 (the origin).		L.5.4 L.5.6 PE 5.2.1		5b 1B-DA-06 AB-DA-07
	M5.12.3	Identify the pattern and understand the relationship of given coordinates points.	5.OA.B.3	L.5.4 FPA 8.1.M.4		
	M5.12.4	Plot points on a coordinate grid, using x- and y-axis.	5.G.A.1	L.5.4 L.5.6 PE 5.2.1		5b 1B-DA-06 1B-DA-07

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M5.12.5		**Represent and interpret real world problems by graphing points in the first quadrant on the coordinate plane.**	5.G.A.2	L.5.4 L.5.6 5-ESS1-2 4-ESS2-1 CV5.3.1 CV5.3.2		5b 1B-DA-06 1B-DA-07
Vocabulary		axis, coordinate plane, quadrant, ordered pair,origin, x axes, y axes				

		Students will identify and classify two-dimensional figures.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M5.13		**Students will identify and classify two-dimensional figures.**				
	M5.13.1	Understand the attributes of two-dimensional figures. (polygons only)	5.G.B.3	FPA 8.1.A.3 FPA 8.4.A.1	5.G.K.3	
	M5.13.2	Identify the sub-categories of two-dimensional figures.	5.G.B.3	FPA 8.1.A.3 FPA 8.4.A.1	5.G.K.3	
	M5.13.3	Classify polygons in a hierarchy based on properties *(e.g., all rectangles have four right angles and squares are rectangles, so all squares have four right angles).*	5.G.B.4	FPA 8.1.A.3 FPA 8.4.A.1	5.G.K.4	
Vocabulary		congruent, perpendicular, isosceles, scalene, parallel, quadrilateral, parallelogram, polygon, trapezoid, square, rectangle, etc.				

Math – 6th Grade

	Pacing Guide					
Code	**Benchmark**	**Month(s) Taught**	**Common Assessment Period**			
			1	**2**	**3**	**4**
M6.1	Students will use ratio and rate reasoning to solve real-world and mathematical problems by interpreting tables of equivalent ratios, or equations.	Aug - Oct	X			
M6.2	Students will fluently multiply and divide multi-digit integers and decimals using the standard algorithm for each operation using concrete, pictorial, and abstract strategies. Students will identify the greatest common factor and least common multiple of two numbers.	Oct - Nov		X		
M6.3	Students will identify a number's distance from zero as absolute value to represent real world situations, write, interpret, and explain statements of order for rational numbers.	Nov - Dec		X		
M6.4	Students will explain that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. Students will use variables to represent numbers within written algebraic expressions including exponents and mathematical properties when solving real-world or mathematical problems. Students will write, read, and evaluate expressions and expressions.	Dec - Feb			X	
M6.5	Students will construct polygons within the coordinate plane, utilizing x, y coordinates for the vertices and calculate the dimensions of polygons to determine area and surface area. Students will calculate the volume of rectangular prisms, through real-world examples, and mathematical problems.	Mar - Apr				X
M6.6	Students will develop an understanding of statistical variability by recognizing a statistical question, collecting, analyzing, and summarize data, and represent through number line, dot plots, histograms, and box plots.	Apr - May				X

Math Standard Reference Code	
RP	Ratios & Proportional Relationships
NS	Number System
EE	Expressions & Equations
G	Geometry
SP	Statistics & Probability

Math - 6th Grade

Purpose Statement:	Students will fluently add, subtract, multiply, and divide multi-digit integers and decimals. Students will analyze fractions to include division and connect with real-world statistics to identify, produce, and analyze rates and ratios. Students will illustrate rates and ratios through coordinate planes and number lines to identify and produce polygons and calculate their area and surface area. Students will calculate the volume of a right rectangular prism using area. Students will identify the relationship of variables within expressions and solve for the variable within equations.

Vocabulary listed are essential for demonstration of benchmark mastery. Any additional words related to the benchmark may be used at the teacher's discretion.

Math practices are not explicitly listed as benchmarks or learning targets; however, all eight math practices should be incorporated into all benchmarks and learning targets (see Appendix A for Math Practices).

Fluently means accurately, efficiently, and flexibly; students need experiences beyond the standard or traditional algorithm.

Bolded items identify learning targets that are considered a priority. Please note, however, that all learning targets/standards in the curriculum map must still be taught, but those in bold should be taught to at least proficiency.

M6.1		Students will use ratio and rate reasoning to solve real-world and mathematical problems by interpreting tables of equivalent ratios, or equations.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M6.1.1	Analyze the relationship of unit rates to ratios.	6.RP.1 6.RP.2	MS-PS2-4 MS-PS3-1, 5 MS-PS4-1, MS-LS1-8 MS-LS4-4,6 MS-ESS1-1,2,3 MS-ESS3-1,3,4 FPA8.4.M.2	major	
	M6.1.2	Use ratio reasoning to convert and manipulate between measurement units (e.g., 12 in = 1 ft how many inches in 3 ft?).	6.RP.3d	MS-PS3-1 MS-ESS3-1	major	
	M6.1.3	Create table of equivalent ratios and rates.	6.RP.3a 6.RP.3b 6.RP.3c 6.RP.3d	MS-PS3-1,5 MS-PS2-4 MS-PS4-1 MS-LS1-8 MS-LS2-3,4,5 MS-ESS1-3 MS-ESS3-1 FPA8.4.M.2 SS8.3.4 CV.85.2	major	
	M6.1.4	Solve unit rate problems.	6.RP.3a 6.RP.3b 6.RP.3c 6.RP.3d	MS-PS3-1 MS-ESS3-1	major	

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M6.1.5		**Calculate a percent of a quantity using part to whole relationship and vice versa including fraction, decimal, percent *(e.g., 12 is 20% of the whole. What is the whole?)*.**	6.RP.3c	MS-PS3-1,5 MS-PS2-4 MS-PS4-1 MS-LS1-8 MS-LS2-3,4,5 MS-ESS1-3 MS-ESS3-1 FPA8.4.M.2 SS8.3.4 CV.85.2	major	
Vocabulary		ratio, rates, units, measurement				

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M6.2		**Students will fluently multiply and divide multi-digit integers and decimals using the standard algorithm for each operation using concrete, pictorial, and abstract strategies. Students will identify the greatest common factor and least common multiple of two numbers.**				
	M6.2.1	Interpret and compute quotients of fractions and solve word problems.	6.NS.1	MS-PS2-4	minor	
	M6.2.2	**All operations multi-digit integers and decimals using the standard algorithm.**	6.NS.2 6.NS.3		major	ISTE 1c
	M6.2.3	**Use greatest common factor and least common multiple of two whole numbers to identify common denominators.**	6.NS.4		major	ISTE 1c
Vocabulary		multiples, part to whole, numerator, denominator, mixed number, improper fraction, fraction greater than one				

M6.3		Students will identify a number's distance from zero as absolute value to represent real world situations, write, interpret, and explain statements of order for rational numbers.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M6.3.1	**Add and subtract integers and produce on a number line to represent real world situations.**	6.NS.5	MS-PS1-4 MS-PS2-1 MS-ESS2-5,6	major	ISTE 1c
	M6.3.2	Identify a number's distance from zero as absolute value.	6.NS.6a 6.NS.6b 6.NS.6c 6.NS.7a 6.NS.7b 6.NS.7c 6.NS.7d 6.NS.8		minor	ISTE 1c
	M6.3.3	Write, interpret, and explain statements of order for rational numbers in real-world context *(e.g. write -3 oC>-7oC to express the fact that -3 oC is warmer than -7oC).*	6.NS.7b		minor	ISTE 1c
	M6.3.4	Interpret statement of inequalities on a number line.	6.NS.7a		minor	ISTE 1c
	M6.3.5	Display x, y coordinates on a coordinate plane.	6.NS.8		minor	ISTE 1c
Vocabulary		integers, rational, irrational, credits/debits, quantities, positive and negative, inequalities, absolute value, coordinates				

M6.4	Students will explain that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. Students will use variables to represent numbers within written algebraic expressions including exponents and mathematical properties when solving real-world or mathematical problems. Students will write, read, and evaluate expressions and expressions.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M6.4.1	Write and evaluate numerical expressions involving whole-number exponents.	6.EE.1		major	ISTE 1c
M6.4.2	Write, read, and evaluate expressions in which letters stand for numbers.	6.EE.2a	MS-PS2-1,2	major	ISTE 1c
M6.4.3	Identify parts of an expression using mathematical terms including sum, term, product, factor, quotient, and coefficient.	6.EE.2b		major	ISTE 1c
M6.4.4	Evaluate expressions at specific values of variables.	6.EE.2c		major	ISTE 1c
M6.4.5	Apply the properties of operations to generate equivalent expressions including distributive, commutative, and associative properties.	6.EE.3		major	ISTE 1c
M6.4.6	Identify when two expressions are equivalent *(e.g., the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for).*	6.EE.4		major	ISTE 1c
M6.4.7	Determine if a value is a solution to a given equation or inequality.	6.EE.5		major	ISTE 1c
M6.4.8	Use variables to represent numbers when writing expressions.	6.EE.6	2-AP-11	major	ISTE 1c

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M6.4.9	**Solve real-world and mathematical problems by writing and solving equations.**	6.EE.7	MS-LS2-3,4,5 MS-ESS2-6	major	ISTE 1c
	M6.4.10	**Write an inequality *(e.g., 5>4)*.**	6.EE.8	CV8.3.1	major	ISTE 1c
	M6.4.11	**Use variables to represent two quantities (independent and dependent variables).**	6.EE.9	MS-PS3-1 MS-LS1-1,2,3,6,7 2-AP-11	major	ISTE 1c
Vocabulary		coefficient, term, unlike term, independent and dependent variable, distributive, associative, commutative, exponents, order of operations, unknown/known				

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M6.5		**Students will construct polygons within the coordinate plane, utilizing x, y coordinates for the vertices and calculate the dimensions of polygons to determine area and surface area. Students will calculate the volume of rectangular prisms, through real-world examples, and mathematical problems.**				
	M6.5.1	**Construct polygons in a coordinate plane.**	6.G.3		major	ISTE 1c
	M6.5.2	**Find area of right triangles, other triangles, special quadrilaterals, and polygons.**	6.G.1	MS-ESS2-1,2,3 2-AP-14	major	ISTE 1c
	M6.5.3	Represent 3-D figures using nets and use them to find the surface area.	6.G.4		minor	ISTE 1c
	M6.5.4	Calculate the volume of a rectangular prism including fractional edge lengths.	6.G.2	2-AP-14	minor	ISTE 1c
Vocabulary		polygons, parallelogram, trapezoid, quadrilateral, surface area, net, volume, prism, rectangular prism, three-dimensional, two-dimensional				

M6.6		Students will develop an understanding of statistical variability by recognizing a statistical question, collecting, analyzing, and summarize data, and represent through number line, dot plots, histograms, and box plots.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M6.6.1	Recognize a statistical question.	6.SP.1	MS-LS1-4,5,8 MS-LS2-1,2,4,5 MS-LS4-1,2,4,6 MS-ESS2-3,5 MS-ESS3-2 3 MS-ETS1-1,2 MS-ETS2-1 HE8.2.5	major	ISTE 1c ISTE 5b
	M6.6.2	Analyze a set of data.	6.SP.2	MS-LS1-3,4,5,8 MS-LS2-1,2,4,5 MS-LS4-4,6 MS-ESS2-3,5 MS-ESS3-2,3 MS-ETS1-1,2 MS-ETS2-1 HE8.2.5	major	ISTE 1c ISTE 5b
	M6.6.3	Recognize that a measure of center for a numerical data set.	6.SP.3	MS-LS1-4,5,8 MS-LS2-1,2,4,5 MS-LS4-1,2,4,6	major	ISTE 1c ISTE 3b

				MS-ESS2-3,5 MS-ESS3-1,2,3 MS-ETS1-3 MS-ETS2-1 RL.6.7		
	M6.6.4	Display numerical real- world data.	6.SP.4	MS-LS1-3,4,5,8 MS-LS2-1,2,4,5 MS-LS4-1,2,4,6 MS-ESS2-3,5 MS-ESS3-2,3 MS-ETS1-3 MS-ETS2-1 RL.6.1	minor	ISTE 1c ISTE 3b ISTE 5b ISTE 6a,c,d
	M6.6.5	Summarize, record, and describe the data.	6.SP.5a-b	MS-PS3-4 MS-LS1-3,4,5,8 MS-LS2-1,2,4,5 MS-LS4-1,2,4,6 MS-ESS2-3,5 MS-ESS3-1,2,3 MS-ETS1-3 MS-ETS2-1 RI.6.1 W.6.7	minor	ISTE 1c

				SS8.6.3 PE8.2.1		
	M6.6.6	Interpret the mean, median, mode, and range of data.	6.SP.5c-d	MS-PS3-4 MS-LS1-3,4,5,8 MS-LS2-1,2,4,5 MS-LS4-1,2,4,6 MS-ESS2-3,5 MS-ESS3-1,2,3 MS-ETS1-3 MS-ETS2-1 RI.6.1 W.6.7 SS8.6.3 PE8.2.1	minor	ISTE 1c
Vocabulary		statistical question, validity, variability, data set, stats, box plots, mean absolute deviation (MAD), mean, median, mode, range, probability, unlikely, likely, certainty				

Math – 7th Grade

Math Standard Reference Code	
RP	Ratios & Proportional Relationships
NS	Number System
EE	Expressions & Equations
G	Geometry
SP	Statistics & Probability

Math - 7th Grade

Purpose Statement:	Students will apply proportional relationships; manipulate and analyze rational numbers including expressions, linear equations and inequalities in one variable. Students will solve problems involving scale drawings, informal geometric constructions, two- and three-dimensional shapes involving area, surface area, and volume. Students will draw inferences about populations based on samples.

Vocabulary listed are essential for demonstration of benchmark mastery. Any additional words related to the benchmark may be used at the teacher's discretion.

Math practices are not explicitly listed as benchmarks or learning targets; however, all eight math practices should be incorporated into all benchmarks and learning targets (see Appendix A for Math Practices).

Bolded items identify learning targets that are considered a priority. Please note, however, that all learning targets/standards in the curriculum map must still be taught, but those in bold should be taught to at least proficiency.

Benchmarks:

M7.1		Students will analyze proportional relationships and use them to solve real-world and mathematical problems.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M7.1.1	**Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.**	7.RP.1		major	
	M7.1.2	**Decide whether two quantities are in a proportional relationship *(e.g., test for equivalent ratios in a table or graph on a coordinate plane and observe whether the graph is a straight line through the origin).***	7.RP.2a		major	
	M7.1.3	**Identify the constant of proportionality (k, unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.**	7.RP.2b		major	
	M7.1.4	**Represent proportional relationships by equations (y = kx).**	7.RP.2c		major	
	M7.1.5	**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.**	7.RP.2d		major	
	M7.1.6	**Use proportional relationships to solve multistep ratio and percent problems.**	7.RP.3		major	
	M7.1.7	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations	7.EE.4 7.EE.4a		supporting	

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
		and inequalities to solve problems by reasoning about the quantities. 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.				
	M7.1.8	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.	7.G.1		additional	
Vocabulary		proportional to, proportional relationship, constant of proportionality, one-to-one correspondence, scale drawing, scale factor

M7.2		**Students will apply operations with rational numbers including mathematical expressions, equations, inequalities and real-world situations.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M7.2.1	**Describe situations in which opposite quantities combine to make 0** *(e.g., a hydrogen atom has 0 charge because its two constituents are oppositely charged).*	7.NS.1a		major	
	M7.2.2	**Describe $p + q$ as the number located a distance $|q|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.**	7.NS.1b		major	

M7.2.3	Show subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.	7.NS.1c		major	
M7.2.4	Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Apply this principle in real-world contexts.	7.NS.1d			
M7.2.5	Apply properties of operations as strategies to add and subtract rational numbers.	7.NS.1e		major	
M7.2.6	Extend the properties of multiplication from fractions to rational numbers by requiring that operations continue to 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.	7.NS.2a		major	
M7.2.7	Demonstrate 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. (e.g., if p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$). Interpret quotients of rational numbers by describing real-world contexts.	7.NS.2b		major	
M7.2.8	Apply properties of operations as strategies to multiply and divide rational numbers.	7.NS.2c		major	
M7.2.9	Convert a rational number to a decimal using long division; show that the decimal form of a rational number terminates in 0s or eventually repeats.	7.NS.2d		major	

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M7.2.10		**Solve real-world and mathematical problems involving the four operations with rational numbers.**	7.NS.3		major	
	M7.2.11	Rewrite an expression in different forms in a problem context to show how the quantities are related.	7.EE.2		major	
	M7.2.12	Use variables to represent quantities in a real-world or mathematical problem, and build simple equations and inequalities to solve problems by reasoning about the quantities. • 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.	7.EE.4 7.EE.4a		major	
Vocabulary		additive identity, additive inverse, break-even point, distance formula, loss, multiplicative identity, profit, repeating decimal, terminating decimal				

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M7.3		**Students will use properties of operations to generate equivalent expressions. Students will solve real-life and mathematical problems using numerical and algebraic expressions.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M7.3.1	**Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.**	7.EE.1		major	
	M7.3.2	**Rewrite an expression in different forms showing how the quantities are related.**	7.EE.2		major	

M7.3.3	**Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form. Apply properties of operations to calculate and convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.**	7.EE.3		major	
M7.3.4	**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.** *(e.g., the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?).*	7.EE.4a		major	
M7.3.5	**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** *(e.g., As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions).*	7.EE.4b		major	
Vocabulary	an expression in expanded form, an expression in factored form, an expression in standard form, coefficient of the term, circle, diameter of a circle, circumference, pi, circular region or disk				

M7.4		Students will solve real-life and mathematical problems involving angle relationships and using geometric formulas.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M7.4.1	Use the formulas for the area and circumference of a circle to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	7.G.4		additional	
	M7.4.2	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.	7.G.5		additional	
	M7.4.3	Solve real world and mathematical problems involving area, of two-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	7.G.6		additional	
Vocabulary		circle, diameter of a circle, circumference, pi, circular region or disk				

M7.5		Students will convert between fractions, decimals and percents, represent multi-step percent scenarios using algebraic expressions and equations, solve percent increase and decrease problems with and without equations, find and interpret word problems involving mark up, mark down, simple interest, sales tax, commissions, fees and percent error and solve problems in which the scale factor is given as a percent. Identify the constant of proportionality (unit rate) in multiple forms.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M7.5.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.	7.RP.1		major	
	M7.5.2	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).*	7.RP.2a		major	
	M7.5.3	Identify the constant of proportionality (unit rate) in tables, graphs, equations, and verbal descriptions of proportional relationships.	7.RP.2b		major	
	M7.5.4	Represent proportional relationships by equations (y = kx).	7.RP.2c		major	
	M7.5.5	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.	7.RP.2d		major	
	M7.5.6	**Use proportional relationships to solve multistep ratio and percent problems. Use real-world application (i.e. mark up, mark down, simple interest, sales tax, commissions, fees, and percent error).**	7.RP.3		major	

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M7.5.7		**Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form. Apply properties of operations to calculate and convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.**	7.EE.3		major	
	M7.5.8	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.	7.G.1		additional	
Vocabulary		Absolute Error, Percent Error, Area, Circumference, Coefficient of the Term, Complex Fraction, Constant of Proportionality, Discount price, Equation, Equivalent Ratios				

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M7.6		Students will draw, construct, and describe geometric figures and describe the relationships. Students will solve real-life and mathematical problems involving angle measure, surface area, and volume.				
	M7.6.1	Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Construct triangles from three measures of angles or sides, noting when the conditions determine a unique triangle, more than one triangle, or no triangle.	7.G.2		additional	
	M7.6.2	Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.	7.G.3		additional	
	M7.6.3	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.	7.G.5		additional	

	M7.6.4	Solve real world and mathematical problems involving volume and surface area of three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	7.G.6		additional	
Vocabulary		Correspondence, Identical (Congruent) Triangles, Right Rectangular Pyramid, Surface of a Pyramid, Three Sides Condition, Two Angles and the Included Side Condition, Two Angles and the Side Opposite a Given Angle, Two Sides and a Non-Included Angle Condition, Two Sides and the Included Angle Condition, Unique Triangle				

M7.7		Students will use random sampling to draw inferences about a population by developing a probability model. Models include organized lists, tables, tree diagrams and simulation.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M7.7.1	Demonstrate that statistics can be used to gain information about a population by examining a valid sample, representative of that population. Explain that random sampling tends to produce representative samples and support valid inferences.	7.SP.1		supporting	
	M7.7.2	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.	7.SP.2		supporting	
	M7.7.3	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 *(e.g., the mean height of players on the basketball is 10 cm greater than the mean*	7.SP.3		additional	

		height of the players on the soccer team, about twice the variability on either team).				
	M7.7.4	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.	7.SP.4		additional	
	M7.7.5	Demonstrate that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring.	7.SP.5		supporting	
	M7.7.6	Determine 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.	7.SP.6		supporting	
	M7.7.7	Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events *(e.g., 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).*	7.SP.7a		supporting	
	M7.7.8	Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.	7.SP.7b		supporting	
	M7.7.9	Demonstrate 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.	7.SP.8a		supporting	
	M7.7.10	Explain 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*	7.SP.8b		supporting	

		double sixes"), identify the outcomes in the sample space, which compose the event.			
	M7.7.11	Design and use a simulation to generate frequencies for compound events.	7.SP.8c	supporting	
Vocabulary		compound event, Inference, Long-Run Relative Frequency, Probability, Probability Model, Random Sample, Simulation, Tree Diagram, Uniform Probability Model			

Math – 8th Grade

<table>
<tr>
<td colspan="6" align="center">Pacing Guide</td>
</tr>
<tr>
<td rowspan="2" align="center">Code</td>
<td rowspan="2" align="center">Benchmark</td>
<td rowspan="2" align="center">Month(s) Taught</td>
<td colspan="4" align="center">Common Assessment Period</td>
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<tr>
<td align="center">1</td>
<td align="center">2</td>
<td align="center">3</td>
<td align="center">4</td>
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<tr>
<td>M8.1</td>
<td>Students will extend concepts of linear equations and inequalities in one variable to more complex multi-step equations and inequalities in real-world and mathematical situations and identify equations having one, none or infinite solutions through simplifying equations.</td>
<td>Aug – Sept</td>
<td>X</td>
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<tr>
<td>M8.2</td>
<td>Students will verify experimentally basic rigid motions (i.e. translations, rotations, and reflections) properties preserving angle measurements, as well as segment lengths; verify experimentally the sequence of basic rigid motions leading to an image; apply rigid motions to explain angle relationships (angle pairs).</td>
<td>Sept –Oct</td>
<td>X</td>
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<tr>
<td>M8.3</td>
<td>Students will calculate the length of a missing side of a right triangle using the Pythagorean Theorem, apply the Pythagorean Theorem to real-world mathematical problems and investigate square and cube roots involving rational and irrational solutions.</td>
<td>Oct - Nov</td>
<td></td>
<td>X</td>
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<tr>
<td>M8.4</td>
<td>Students will transcribe written statements using symbolic notation; write and solve linear equations in real-world and mathematical situations; identify equations having one, none or infinite solutions through simplifying equations, organize them in a table, and plot the solutions on a coordinate plane; verify the graph of an equation in standard form (Ax + By = C); derive $y = mx$ and $y = mx + b$ for linear equations; generate graphs of linear equations in two variables; write equations of lines given slope and a point, write an equation given two points.</td>
<td>Nov -Dec</td>
<td></td>
<td>X</td>
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<tr>
<td>M8.5</td>
<td>Students will solve, graph and analyze simultaneous linear equations to find the point of intersection and then verify that the point of intersection is a solution to each equation in the system; verifying a system can have a unique solution, no solution, or infinitely many solutions and describe how those solutions</td>
<td>Jan -Feb</td>
<td></td>
<td></td>
<td>X</td>
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</table>

	appear on a graph; apply systems to solve problems in real-world contexts.					
M8.6	Students will represent linear functions by using tables and graphs and by specifying rate of change and initial value; use linear functions to model the relationship between two quantitative variables (bivariate); build scatter plots and analyze the associations; use linear and nonlinear models to answer questions in context; interpret the rate of change and the initial value in context; use the equation of a linear fun and its graph to make predictions; calculate and use the relative frequencies calculated from tables to informally assess possible associations between two categorical variables.	Feb - Mar			X	

Math Standard Reference Code	
NS	Number System
EE	Expressions & Equations
F	Functions
G	Geometry
SP	Statistics & Probability

Math - 8th Grade

Purpose Statement:	Students will formulate and reason about expressions and equations, including solving linear equations, systems of linear equations, and model an association in bivariate data with a linear equation. Students will use functions to describe quantitative relationships. Students will analyze two- and three- dimensional space figures using distance, angle similarity and congruence, and apply the Pythagorean Theorem to real-world problems.

Vocabulary listed are essential for demonstration of benchmark mastery. Any additional words related to the benchmark may be used at the teacher's discretion.

Math practices are not explicitly listed as benchmarks or learning targets; however, all eight math practices should be incorporated into all benchmarks and learning targets (see Appendix A for Math Practices).

Bolded items identify learning targets that are considered a priority. Please note, however, that all learning targets/standards in the curriculum map must still be taught, but those in bold should be taught to at least proficiency.

M8.1		**Students will analyze and solve linear equations and pairs of simultaneous linear equations.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M8.1.1	**Solve linear equations and inequalities with rational numbers including the distributive property,**	8.EE.D.7A	MS-PS3-4 MS-PS3-5 MS-PS4-1	Major	1c, 5a

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
		combining like terms, and variable terms on both sides.		MS-LS2-3 MS-LS2-4 MS-LS2-5 MS-LS2-6 MS-ESS3-4		
	M8.1.2	Recognize the three types of solutions to linear equations: one solution, infinitely many solutions, or no solutions.	8.EE.D.7B		Major	1c, 5a
	M8.1.3	Generate linear equations with the three types of solutions.	8.EE.D.7C		Major	1c, 5a
	M8.1.4	Justify why linear equations have a specific solution type.	8.EE.D.7D		Major	1c, 5a
Vocabulary		variable, coefficient, equation, solution				

M8.2		Students will understand congruence and similarity using physical models, transparencies, or geometry software.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M8.2.1	Verify experimentally the properties of rotations, reflections, and translations: • Lines are taken to lines, and line segments to line segments of the same length. • Angles are taken to angles of the same measure. • Parallel lines are taken to parallel lines.	8.G.G.1	MS-PS3-3 MS-ESS2-1 MS-ESS2-2 MS-ESS2-3	Major	
	M8.2.2	Recognize through visual comparison that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of	8.G.G.2	MS-PS4-2	Major	

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
		rotations; given two congruent figures, describe a sequence that exhibits the congruence between them.				
	M8.2.3	**Describe the effect of dilations, translations, rotations and reflections on two-dimensional figures using coordinates.**	8.G.G.3		Major	
	M8.2.4	**Recognize through visual comparison that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.**	8.G.G.4		Major	
	M8.2.5	**Use informal arguments to establish facts about the angle sum and exterior angles of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.**	8.G.G.5		Major	
Vocabulary		transformation, basic rigid motion, translation, rotation, reflection, image, sequence, vector, congruence, transversal				

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
M8.3		**Students will understand and apply the Pythagorean Theorem.**				
	M8.3.1	**Use models or diagrams to explain the Pythagorean Theorem and its converse.**	8.G.H.6		Major	
	M8.3.2	**Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems.**	8.G.H.7		Major	

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M8.3.3	**Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.**	8.G.H.8		Major	
	M8.3.4	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually into a rational number. Explore the real number system and its appropriate usage in real world situations.	8.NS.A.1	MS-PS4-3 L.8.5.b SS8.4.2		1c
	M8.3.5	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions.	8.NS.A.2			1c
	M8.3.6	Investigate concepts of square and cube roots.	8.EE.B.2	MS-PS3-1 MS-LS2-3,4,5 MS-ESS1-2,3		1c
Vocabulary		hypotenuse, leg, square, square root, cube root, rational, irrational				

M8.4		**Students will understand the connections between proportional relationships, lines, and linear equations.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M8.4.1	**Graph Proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.**	8.EE.C.5	MS-ESS3-4	Major	1c
	M8.4.2	**Explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through**	8.EE.C.6	MS-ESS2-6 MS-ESS1-2	Major	1c

		the origin and the equation y = mx + b for a line intercepting the vertical axis at (0,b).				
Vocabulary		slope, intercepts, variable, equation, rate of change				

M8.5		**Students will analyze and solve pairs of simultaneous linear equations.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M8.5.1	**Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.**	8.EE.D.8A	MS-LS1-2 MS-LS1-3 MS-LS1-4 MS-LS1-5 MS-ESS3-1	Major	1c, 1d 5a
	M8.5.2	**Solve systems of two linear equations in two variables with integer solutions by graphing the equations.**	8.EE.D.8B	MS-LS1-2 MS-LS1-3 MS-LS1-4 MS-LS1-5 MS-ESS3-1	Major	1c, 1d 5a
	M8.5.3	Solve simple real-world and mathematical problems leading to two linear equations in two variables given y = mx + b form with integer solutions.	8.EE.D.8C			
Vocabulary		slope, system of linear equations, solution to a system of linear equations				

M8.6		**Students will investigate patterns of association in bivariate data.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M8.6.1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe the association by form (linear/nonlinear), direction (positive/negative), strength (correlation) and unusual features.	8.SP.J.1	MS-LS1-4,5,8 MS-LS4-1,2,4,6 MS-ESS2-3,5 MS-ESS3-2,3 MS-ETS2-2 MS-ETS1-3,4	Minor	1c 3b, 3c, 3d 4a 6a, 6c, 6d
	M8.6.2	Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points on the line.	8.SP.J.2	MS-LS1-4,5,8 MS-LS4-1,2,4,6 MS-ESS2-3,5 MS-ESS3-2,3 MS-ETS2-2 MS-ETS1-3,4	Minor	1c 6a, 6c, 6d
	M8.6.3	Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects.	8.SP.J.3A	MS-LS1-4,5,8 MS-LS4-1,2,4,6 MS-ESS2-3,5 MS-ESS3-2,3 MS-ETS2-2 MS-ETS1-3,4	Minor	1c 3b, 3c, 3d 4a 5a
	M8.6.4	Use relative frequencies calculated for rows and columns to describe possible association between the two variables.	8.SP.J.4B	S-LS1-4,5,8 MS-LS4-1,2,4,6 MS-ESS2-3,5 MS-ESS3-2,3 MS-ETS2-2	Minor	1c 3b, 3c, 3d 4a 6a, 6c, 6d

					MS-ETS1-3,4		

Vocabulary	association, relative frequency, two-way table, correlation, strength, direction		

M8.7		**Students will define, evaluate, and compare functions.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M8.7.1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output (function notation not required in 8th grade).	8.F.E.1	CVE8.3.1	Major	1c
	M8.7.2	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	8.F.E.2	CVE8.3.1	Major	1c
	M8.7.3	Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.	8.F.E.3	MS-PS3-1,3 MS-PS4-1	Major	1c
	M8.7.4	Use functions to model relationships between quantities. Apply the concepts of linear functions to real-world and mathematical situations. a. Understand that the slopes the constant rate of change and the y- intercept is the point where x = 0. b. Determine the slope and the y-intercept of a linear function given multiple representations, including two points, tables, graphs, equations, and verbal descriptions.	8.F.F.4	MS-LS1-2 MS-LS2-3,4,5	Major	1c 5a

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
		c. Construct a function in slope-intercept form that models a linear relationship between two quantities. Interpret the meaning of the slope and the y-intercept of a linear function in the context of the situation.				
M8.7.5		Describe relationships between two quantities by analyzing a graph where the function is increasing, decreasing, constant, linear, or nonlinear. Sketch a graph that exhibits the qualitative features of a function that has been described verbally.	8.F.F.5	RI.8.1 W.8.2.b W.8.7 W.8.8	Major	1c
Vocabulary		function, input, output, increasing, decreasing, constant, linear, non-linear, rate of change, y-intercept, slope				

M8.8		Students will evaluate integer exponents; express very large and very small numbers in scientific notation.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Emphasis	ISTE Standard Reference
	M8.8.1	Understand and apply the laws of exponents (i.e. product rule, quotient rule, power to a power, product to a power, quotient to a power, zero power property, negative exponents) to generate equivalent numerical expressions limited to integer exponents.	8.EE.B.1	MS-PS3-1 MS-ESS1-3	Minor	

	M8.8.2	Explore the relationship between quantities in decimal and scientific notation.
		  a. Express very large and very small quantities, p, in scientific notation in the form of a x 10b= p where $1 \le a < 10$ and b is an integer.
		  b. Translate between decimal notation and scientific notation.
			8.EE.B.3	MS-PS1-1
				MS-LS1-3,8
				MS-ESS1-3,4
				MS-ESS2-2,3,4,5,6
				MS-ESS3-4
					Minor	1c

	M8.8.3	Apply the concepts of decimal and scientific notation to real-world and mathematical problems.
		   a. Select appropriate units of measure when representing answers in scientific notation.
		   b. Interpret scientific notation that has been generated by a variety of technologies.
			8.EE.B.4	MS-ESS1-3
				MS-ESS2-6
				MS-ESS3-1
				MS-ESS3-4
					Minor	1c

	M8.8.4	**Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.**	8.G.I.9		Major	1c
Vocabulary		scientific notation, order of magnitude, volume, surface area				

Math Standard Reference Codes									
Number & Quantity		**Algebra**		**Functions**		**Geometry**		**Statistics & Probability**	
N-RN	The Real Number System	A-SSE	Seeing Structure in Expressions	F-IF	Interpreting Functions	G-CO	Congruence	S-ID	Interpreting Categorical & Quantitative Data
N-Q	Quantities	A-APR	Arithmetic with Polynomials & Rational Expressions	F-BF	Building Functions	G-SRT	Similarity, Right Triangles & Trigonometry	S-IC	Making Inferences & Justifying Conclusions
N-CN	The Complex Number System	A-CED	Creating Equations	F-LE	Linear, Quadratic & Exponential Models	G-C	Circles	S-CP	Conditional Probability & Rules of Probability
N-VM	Vector & Matrix Quantities	A-REI	Reasoning with Equations & Inequalities	F-TF	Trigonometric Functions	G-GPE	Expressing Geometric Properties with Equations	S-MD	Using Probability to Make Decisions
						G-GMD	Geometric Measurement & Dimension		
						G-MG	Modeling with Geometry		
# District Standards									

Pre-Algebra

Purpose Statement:	Students will fluently add, subtract, multiply, and divide fractions, integers, and decimals. Students will analyze graphs and properties of geometric figures. Students will interpret data from graphs and tables. PALG.1

Vocabulary listed are essential for demonstration of benchmark mastery. Any additional words related to the benchmark may be used at the teacher's discretion.

Math practices are not explicitly listed as benchmarks or learning targets; however, all eight math practices should be incorporated into all benchmarks and learning targets (see Appendix A for Math Practices).

PALG.1		Students will solve examples involving exponents, number lines, and scientific notation in various scenarios.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	PALG.1.1	Arrange multiple values based on the number line.	6.NS.D.6		1c
	PALG.1.2	Multiply and divide values with common bases and non-negative exponents.	RN.A.1		

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
PALG.1.3	Multiply and divide values with common bases and integer exponents.	RN.A.1		
PALG.1.4	Calculate the square root or cube root of a value.	8.EE.B.2	MS-PS3-1 MS-LS2-3 MS-LS2-4 MS-LS2-5 MS-EES1-2 MS-EES1-3	1c
PALG.1.5	Convert between standard notation and scientific notation and perform operations with scientific notation.	8.EE.B.4	MS-ESS1-3 MS-ESS2-6 MS-ESS3-1 MS-ESS3-4	1c
Vocabulary	number line, base, exponent, integer, square root, cube root, standard notation, scientific notation			

PALG.2	Students will analyze rigid transformations and dilations with similar figures. Students will calculate angle measures with parallel lines and triangles.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
PALG.2.1	Interpret translations.	8.G.G.2 8.G.G.3	MS-PS4-2	1c, 1d
PALG.2.2	Interpret reflections and rotations.	8.G.G.2 8.G.G.3	MS-PS4-2	1c, 1d
PALG.2.3	Identify rigid translations of congruent figures.	8.G.G.2 8.G.G.3	MS-PS4-2	1c, 1d
PALG.2.4	Calculate scale factors for similar figures.	SRT.A.1		
PALG.2.5	Name angle pairs and calculate angle measures formed by parallel lines with transversals.	8.G.G.5		1c
PALG.2.6	Calculate missing angle measures for triangles both interior and exterior.	8.G.G.5		1c

Vocabulary	translation, reflection, rotation, congruent, scale factor, similar figures, corresponding, alternate exterior, consectutive interior, dilation

PALG.3		Students will use or rearrange formulas to calculate unknown values.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	PALG.3.1	Solve for an unknown side length of a right triangle with The Pythagorean Theorem.	8.G.H.7		1c
	PALG.3.2	Find distance on a coordinate plane with The Pythagorean Theorem	8.G.H.8		1c
	PALG.3.3	Calculate volumes of cylinders, cones, and spheres.	8.G.I.9		1c
	PALG.3.4	Find a missing dimension for a cylinder, cone, or sphere when given the volume.	8.G.I.9		1c
Vocabulary		right triangle, Pythagorean Theorem, volume, cylinder, cone, sphere			

PALG.4		Students will identify and interpret components of functions and their graphs.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	PALG.4.1	Identify functions using graphs, coordinate pairs, or data.	8.F.E.1	CVE.8.3.1	1c
	PALG.4.2	Interpret graphs of linear functions.	8.F.E.3	MS-PS3-1 MS-PS3-5 MS-PS4-1	1c
	PALG.4.3	Interpret graphs of non-linear functions.	8.F.F.5	R1.8.1 W.8.2.b W.8.8	1c
Vocabulary		input, output, independent variable, dependent variable, vertical line test, linear function, non-linear function			

PALG.5		Students will solve examples of linear and non-linear functions using graphs, data, and equations.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	PALG.5.1	Calculate unit rates and slopes.	8.EE.C.5	MS-ESS3-4	1c
	PALG.5.2	Identify slope or y-intercept from the slope-intercept form.	8.EE.C.6	MS-ESS2-6 MS-ESS1-3	1c
	PALG.5.3	Identify slope-intercept form when given initial value and rate of change.	8.EE.C.6	MS-ESS2-6 MS-ESS1-3	1c
	PALG.5.4	Find initial value or rate of change when given slope-intercept form.	8.EE.B.6	MS-ESS2-6 MS-ESS1-3	1c
	PALG.5.5	Analyze data from non-linear functions.	F.IF.A.1		
Vocabulary		unit rate, slope, y-intercept, slope-intercept form, initial value, rate of change, linear function, non-linear function			

PALG.6		Students will solve examples involving scatter plots with lines of best fit and frequency tables.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	PALG.6.1	Identify correlation on scatter plots.	8.SP.J.1	MS-LS1-4, 5, 8 MS-LS4-1, 2, 4, 6 MS-ESS2-3, 5 MS-ESS3-2 MS-ETS2-2 MS-ESS3-2, 3 MS-ETS1-3, 4 MS-ETS2-2	1c, 3b, 3c, 3d 4a, 6a, 6c, 6d
	PALG.6.2	Identify lines of best fit for scatter plots.	8.SP.J.2	MS-LS1-4, 5, 8	1c, 6a, 6c, 6d

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
				MS-LS4-1, 2, 4, 6 MS-ESS2-3, 5 MS-ESS3-2, 3 MS-ETS1-3, 4	
	PALG.6.3	Interpret lines of best fit.	8.SP.J.2	MS-LS1-4, 5, 8 MS-LS4-1, 2, 4, 6 MS-ESS2-3, 5 MS-ESS3-2, 3 MS-ETS1-3, 4	1c, 6a, 6c, 6d
	PALG.6.4	Calculate missing values on frequency tables.	S.ID.B.5	W.9-10.2d, e W.11-12.1.d W.11-12.2.d	1c, 5a, 5b, 5c
Vocabulary		correlation, scatter plots			

PALG.7		Students will solve equations that are one-step, multi-step, linear, and have variables on both sides.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	PALG.7.1	Solve one-step equations.	6.EE.F.7	MS-LS2-3, 4, 5 MS-ESS2-6	1c
	PALG.7.2	Solve multi-step equations.	7.EE.D.3	MS-PS2-1, 2 CV8.5.2 CV8.3.1	1c
	PALG.7.3	Solve linear equations.	8.EE.D.7	MS-PS3, 4 MS-PS4-1 MS-LS2-3, 4, 5 MS-ESS2-6 MS-ESS3-4	1c, 5a

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
PALG.7.4	Solve equations with variables on both sides.	8.EE.D.7	MS-PS3, 4 MS-PS4-1 MS-LS2-3, 4, 5 MS-ESS2-6 MS-ESS3-4	1c, 5a
PALG.7.5	Solve equations with rational coefficients.	8.EE.D.7	MS-Ps3, 4 PS-PS4-1 MS-LS2-3, 4, 5 MS-ESS2-6 MS-ESS3-4	1c, 5a
Vocabulary	variable, equation, coefficient				

PALG.8	Students will solve and create systems of equations utilizing various methods.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
PALG.8.1	Identify systems of equations.	8.EE.D.8	MS-LS1-2 MS-LS2-3, 4, 5 MS-ESS3-1	1c, 1d, 5a
PALG.8.2	Solve systems of equations by graphing.	A.REI.J.6		
PALG.8.3	Solve systems of equations by substitution.	A.REI.J.6		
PALG.8.4	Solve systems of equations by elimination.	A.REI.J.6		
PALG.8.5	Create systems of equations.	A.REI.J.6		
Vocabulary	system of equations, graphing, substitution, elimination			

Math Standard Reference Codes									
Number & Quantity		**Algebra**		**Functions**		**Geometry**		**Statistics & Probability**	
N-RN	The Real Number System	A-SSE	Seeing Structure in Expressions	F-IF	Interpreting Functions	G-CO	Congruence	S-ID	Interpreting Categorical & Quantitative Data
N-RN	Quantities	A-APR	Arithmetic with Polynomials & Rational Expressions	F-BF	Building Functions	G-SRT	Similarity, Right Triangles & Trigonometry	S-IC	Making Inferences & Justifying Conclusions
N-CN	The Complex Number System	A-CED	Creating Equations	F-LE	Linear, Quadratic & Exponential Models	G-C	Circles	S-CP	Conditional Probability & Rules of Probability
N-VM	Vector & Matrix Quantities	A-REI	Reasoning with Equations & Inequalities	F-TF	Trigonometric Functions	G-GPE	Expressing Geometric Properties with Equations	S-MD	Using Probability to Make Decisions
						G-GMD	Geometric Measurement & Dimension		
						G-MG	Modeling with Geometry		
# District Standards									

Resource Pre-Algebra

Purpose Statement:	Students will fluently add, subtract, multiply, and divide fractions, integers, and decimals. Students will analyze graphs and properties of geometric figures. Students will interpret data from graphs and tables. PALG.1

Vocabulary listed are essential for demonstration of benchmark mastery. Any additional words related to the benchmark may be used at the teacher's discretion.

Math practices are not explicitly listed as benchmarks or learning targets; however, all eight math practices should be incorporated into all benchmarks and learning targets (see Appendix A for Math Practices).

RPALG.1		Students will evaluate and operations of rational and irrational numbers, convert between fractions and decimals, and evaluate and simplify expressions.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	RPALG.1.1	Evaluate expressions using a calculator.	RN.A.1		
	RPALG.1.2	Convert between decimal and fraction form using a calculator.	RN.A.1		

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	RPALG.1.3	Calculate the square root or cube root of a value.	8.EE.B.2	MS-PS3-1 MS-LS2-3 MS-LS2-4 MS-LS2-5 MS-EES1-2 MS-EES1-3	1c
	RPALG.1.4	Convert between standard notation and scientific notation and perform operations with scientific notation using a calculator.	8.EE.B.4	MS-ESS1-3 MS-ESS2-6 MS-ESS3-1 MS-ESS3-4	1c
Vocabulary					

RPALG.2		Students will solve equations that are one-step, multi-step, linear, and have variables on both sides.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	RPALG.2.1	Solve one- and two-step equations.	6.EE.F.7	MS-LS2-3, 4, 5 MS-ESS2-6	1c
	RPALG.2.2	Solve multi-step equations.	7.EE.D.3	MS-PS2-1, 2 CV8.5.2 CV8.3.1	1c
	RPALG.2.3	Solve linear equations.	8.EE.D.7	MS-PS3, 4 MS-PS4-1 MS-LS2-3, 4, 5 MS-ESS2-6 MS-ESS3-4	1c, 5a
	RPALG.2.4	Solve equations with variables on both sides.	8.EE.D.7	MS-PS3, 4 MS-PS4-1 MS-LS2-3, 4, 5 MS-ESS2-6	1c, 5a

		MS-ESS3-4	
Vocabulary	variable, equation, coefficient		

RPALG.3	Students will be able to solve and graph single variable inequalities.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
RPALG.3.1	Graph single variable inequalities on a number line.	A.REI.12		
RPALG.3.2	Write single variable inequalities from a number line.	A.REI.12		
RPALG.3.3	Solve one- and two-step single variable inequalities.	A.REI.12		
Vocabulary				

RPALG.4	Students will be able to graph coordinate points, graph a line, and identify and interpret components of functions and their graphs.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
RPALG.4.1	Graph coordinate points using the coordinate plane.	A.REI.K.10 F.IF.B.4 F.IF.B.5 F.IF.C.7a F.IF.C.9	Science HS-ESS1-6 HS-PS2-1 HS-LS1-4 HS-LS1-5 HS-LS1-6	1c 3d 4a, d
RPALG.4.2	Identify slope and y-intercept from the slope-intercept form.	8.EE.C.6	MS-ESS2-6 MS-ESS1-3	1c
RPALG.4.3	Graph linear equations using slope intercept form.	A.REI.K.10 F.IF.B.4 F.IF.B.5 F.IF.C.7a	Science HS-ESS1-6 HS-PS2-1 HS-LS1-4	1c 3d 4a, d

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
			F.IF.C.9	HS-LS1-5 HS-LS1-6	
RPALG.4.4		Identify functions using graphs, coordinate pairs, or data.	8.F.E.1	CVE.8.3.1	1c
RPALG.4.5		Interpret graphs of linear functions.	8.F.E.3	MS-PS3-1 MS-PS3-5 MS-PS4-1	1c
RPALG.4.6		Determine if a graph is linear or non-linear.	8.F.F.5	R1.8.1 W.8.2.b W.8.8	1c
Vocabulary		input, output, independent variable, dependent variable, vertical line test, linear function, non-linear function			

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
RPALG.5		Students will write the equation of a line from a graph, a table, or two points.			
	RPALG.5.1	Calculate unit rates and slopes.	8.EE.C.5	MS-ESS3-4	1c
	RPALG.5.2	Identify slope and y-intercept from the slope-intercept form.	8.EE.C.6	MS-ESS2-6 MS-ESS1-3	1c
	RPALG.5.3	Identify slope-intercept form when given initial value and rate of change.	8.EE.C.6	MS-ESS2-6 MS-ESS1-3	1c
	RPALG.5.4	Find initial value or rate of change when given slope-intercept form.	8.EE.B.6	MS-ESS2-6 MS-ESS1-3	1c
	RPALG.5.5	Analyze data from non-linear functions.	F.IF.A.1		
Vocabulary		unit rate, slope, y-intercept, slope-intercept form, initial value, rate of change, linear function, non-linear function			

RPALG.6		Students will solve and create systems of equations utilizing various methods.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	RPALG.6.1	Identify systems of equations.	8.EE.D.8	MS-LS1-2 MS-LS2-3, 4, 5 MS-ESS3-1	1c, 1d, 5a
	RPALG.6.2	Solve systems of equations by graphing.	A.REI.J.6		
	RPALG.6.3	Solve systems of equations by substitution.	A.REI.J.6		
	RPALG.6.4	Solve systems of equations by elimination.	A.REI.J.6		
	RPALG.6.5	Create systems of equations.	A.REI.J.6		
Vocabulary		system of equations, graphing, substitution, elimination			

RPALG.7		Students will use the laws of exponents to simplify expressions. Students will be able to write and graph exponential functions and identify exponential decay and growth.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	RPALG.7.1	Evaluate expressions using the laws of exponents.	N.RN.A.1	none	none
	RPALG.7.2	Graph exponential equations	F.IF.B.4 F.IF.B.5 F.IF.C.7e F.LE.F.2	Science HS-ESS1-6 HS-PS2-1 HS-PS2-4 HS-PS4-1 HS-PS4-5	3d 4a, d 5c
	RPALG.7.3	Write exponential equations using starting value and growth factor.	A.REI.11		
	RPALG.7.4	Write exponential equations from word problems.	A.REI.11		
	RPALG.7.5	Identify exponential growth and decay.	F.LE.F.1.c	Science	4a,d

			F.LE.F.5 F.IF.C.8b F.BF.D.1b	HS-LS1-3 HS-LS1-4 ELA W.9-10.9.d W.9-10.2.e W.11-12.2.d W.9-10.2.e W.11-12.1.d	1c 3d 5a 6a,b,c,d
Vocabulary					

RPALG.8		Students will add, subtract, and multiply polynomials. Students will factor polynomials with a leading coefficient of 1.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	RPALG.8.1	Add and subtract polynomials.	N.RN.A.1 A.APR.C.1	None	None
	RPALG.8.2	Multiply polynomials.	N.RN.A.1	none	none
	RPALG.8.3	Factor polynomials.	A.SSE.A.1	Science HS-PS4-1 HS-ESS1-2 HS-PS2-4 HS-ESS1-1 HS-PS2-1 HS-ESS1-4 W.9-10.2.d W.11-12.2.d	1c Empowered Learner
Vocabulary					

Algebra I

			Common Assessment Period			
Pacing Guide						
Code	**Benchmark**	**Month(s) Taught**	**1**	**2**	**3**	**4**
ALG1.	Students will solve multistep equations; model and solve real life problems by creating equations and using appropriate units and formulas. Students will reason with and create equations to solve or argue problems and their solutions.	Aug – Sept	X			
ALG1.2	Students will solve inequalities in one variable and model real life problems by creating inequalities.	Sept	x			
ALG1.3	Students will determine the relationship between variables, whether a relationship is a function, create functions, graph and transform linear functions and graph absolute functions, and use function notation.	Oct - Nov		x		
ALG1.4	Students will write linear equations/functions, fit a function to a scatter plot and analyze the function.	Nov – Dec		x		
ALG1.5	Students will solve systems of two linear equations and inequalities and relate them to real world situations.	Jan – Feb				
ALG1.6	Students will add, subtract, and multiply polynomials; they will factor and solve quadratic equations	Feb – Mar				
ALG1.7	Students will use properties of exponents, including radicals, rational, exponential, growth and decay.	Mar – Apr				
ALG1.8	Students will graph quadratic functions	Apr - May				
ALG1.9	Students will organize data in tables, graphs, histograms and scatter plots. Students will also calculate the central tendencies and standard deviation of data	May				

Math Standard Reference Codes									
Number & Quantity		Algebra		Functions		Geometry		Statistics & Probability	
N-RN	The Real Number System	A-SSE	Seeing Structure in Expressions	F-IF	Interpreting Functions	G-CO	Congruence	S-ID	Interpreting Categorical & Quantitative Data
N-Q	Quantities	A-APR	Arithmetic with Polynomials & Rational Expressions	F-BF	Building Functions	G-SRT	Similarity, Right Triangles & Trigonometry	S-IC	Making Inferences & Justifying Conclusions
N-CN	The Complex Number System	A-CED	Creating Equations	F-LE	Linear, Quadratic & Exponential Models	G-C	Circles	S-CP	Conditional Probability & Rules of Probability
N-VM	Vector & Matrix Quantities	A-REI	Reasoning with Equations & Inequalities	F-TF	Trigonometric Functions	G-GPE	Expressing Geometric Properties with Equations	S-MD	Using Probability to Make Decisions
						G-GMD	Geometric Measurement & Dimension		
						G-MG	Modeling with Geometry		
# District Standards									

Algebra I

Purpose Statement:	Students will create and simplify algebraic expressions using laws of exponents and structures such as factored form; solve linear equations, inequalities, systems of linear equations, and factorable quadratic equations; write, graph and interpret linear and exponential functions; interpret, graph, and summarize one and two variable data.

Vocabulary listed are essential for demonstration of benchmark mastery. Any additional words related to the benchmark may be used at the teacher's discretion.

Math practices are not explicitly listed as benchmarks or learning targets; however, all eight math practices should be incorporated into all benchmarks and learning targets (see Appendix A for Math Practices).

Bolded items identify learning targets that are considered a priority. Please note, however, that all learning targets/standards in the curriculum map must still be taught, but those in bold should be taught to at least proficiency.

ALG1.1		Students will solve multistep equations; model and solve real life problems by creating equations and using appropriate units and formulas. Students will reason with and create equations to solve or argue problems and their solutions.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	ALG1.1.1	**Solve linear equations using multiple steps.**	A.REI.I.3	None	5a Computational Thinker
	ALG1.1.2	Solve linear equations with variables on both sides.	A.REI.I.3	None	5a Computational Thinker
	ALG1.1.3	Explain each step in solving a simple equation using properties of equality and inverse operations.	A.REI.H.1	CVE CV12.44	3d Knowledge Constructor 4d Innovative Designer 5c Computational Thinker 6a,b,c,d Creative Communicator
	ALG1.1.4	**Create equations with one variable and use them to solve problems.**	A.CED.G.1 N.Q.C.2	Science HS-PS2-1.	3d Knowledge Constructor 4d Innovative Designer 5a Computational Thinker 6b Creative Communicator
	ALG1.1.5	Rewrite equations and formulas to highlight a quantity of interest.	A.CED.G.4 N.Q.C.1	Science HS-PS2-1.	4d Innovative Designer

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
				HS-PS2-2 HS-ESS1-1 HS-ESS1-2 HS-ESS1-4 HS-PS4-1.	5c Computational Thinker
	ALG1.1.6	Use dimensional analysis to solve computational problems with formulas.	N.Q.C.1 N.Q.C.3		4d Innovative Designer 5c Computational Thinker 6b Creative Communicator
Vocabulary		equation, equality, solution, extraneous solution, variable, coefficient, inverse operation, formula, units of measurement and conversions.			

ALG1.2	**Students will solve inequalities in one variable and model real life problems by creating inequalities.**		Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
ALG1.2.1	**Represent solutions to inequalities verbally, algebraically, and graphically.**		A.REI.I.3	None	5a Computational Thinker
ALG1.2.2	Solve multistep inequalities and graph the solution set on a number line.		A.REI.I.3 A.REI.H.1	CVE CV12.44	3d Knowledge Constructor 4d Innovative Designer 5c Computational Thinker

					6a,b,c,d Creative Communicator
ALG1.2.3	**Solve multistep inequalities with variables on both sides, including those with empty sets or all real number solutions.**	A.REI.I.3 A.REI.H.1	CVE CV12.44	3d Knowledge Constructor 4d Innovative Designer 5c Computational Thinker 6a,b,c,d Creative Communicator
ALG1.2.4	**Create inequalities in one variable and use them to solve problems real-world problems.**	A.CED.G.1 N.Q.C.2	Science HS-PS2-1.	3d Knowledge Constructor 4d Innovative Designer 5a Computational Thinker 6b Creative Communicator
ALG1.2.5	Write and solve compound inequalities and graph the solutions set.	A.REI.I.3 A.REI.H.1		3d Knowledge Constructor 4d Innovative Designer 5a Computational Thinker 6b Creative Communicator
Vocabulary	inequality, solution set, equivalent inequalities, and all vocabulary from previous benchmark.			

ALG1.3		Students will determine the relationship between variables, whether a relationship is a function, create functions, graph and transform linear functions and graph absolute functions, and use function notation.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	ALG1.3.1	**Determine if a relation is a function and identify the domain, range, independent and dependent variables using a graph, table, equation, or application.**	F.IF.A.1 F.IF.A.3 A.REI.K.10	None	4a Innovative Designer
	ALG1.3.2	Identify and graph linear equations using discrete and continuous data.	A.REI.K.10 F.IF.B.4 F.IF.B.5 F.IF.C.7a F.IF.C.9	Science HS-ESS1-6 HS-PS2-1 HS-LS1-4 HS-LS1-5 HS-LS1-6	4a, d Innovative Designer 3d Knowledge Constructor 1c Empowered Learner
	ALG1.3.3	**Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.**	F.IF.A.2 A.CED.G.2	None	4a,d Innovative Designer 3d Knowledge Constructor 5c Computational Thinker
	ALG1.3.4	**Graph linear equations given in standard and slope-intercept forms.**	A.CED.G.2 F.IF.A.2 F.IF.B.4 F.IF.C.7a F.IF.C.9	HS-PS2-1 HS-LS1-4 HS-LS1-5 HS-LS1-6	1c Empowered Learner 4a,d Innovative Designer 3d Knowledge Constructor 5c Computational Thinker
	ALG1.3.5	**Calculate and interpret the average rate of change of a function.**	F.IF.B.6 N.Q.C.1	None	4a,d Innovative Designer

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
			N.Q.C.2		5c Computational Thinker 6b Creative Communicator
	ALG1.3.6	Graph absolute value function and apply transformations.	A.REI.K.10 F.IF.B.4 F.IF.C.7.b F.BF.E.3	HS-PS2-1 HS-LS1-4 HS-LS1-5 HS-LS1-6	1c Empowered Learner 4a,d Innovative Designer 3d Knowledge Constructor
Vocabulary		linear function, function notation, domain, range, continuous, discrete, independent and dependent variables, y-intercept, x-intercept, rate of change, slope, absolute value function, transformations in the coordinate plane			

ALG1.4	**Students will write linear equations/functions, fit a function to a scatter plot and analyze the function.**		Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
ALG1.4.1	**Write equations in two variables in slope-intercept form, given a graph, a table, slope and a point, or two points.**		A.REI.K.10 F.IF.B.4 F.IF.C.9 F.BF.D.1a F.LE.F.2	Science HS-PS2-1 HS-PS2-2 HS-ESS1-1 HS-ESS1-2 HS-ESS1-4 HS-LS1-3 HS-LS1-4 ELA W.9-10.2.d W.9-10.2.e W.11-12.1.d	4a,d Innovative Designer 5c Computational Thinker 3d Knowledge Constructor

				W.11-12.2.d	
ALG1.4.2	**Create an equation to model the relationship between two quantities and use the equation to solve real-world problems.**	A.CED.G.2 F.BF.D.1a	Science HS-PS2-1 HS-PS2-2 HS-ESS1-1 HS-ESS1-2 HS-ESS1-4 HS-LS1-3 HS-LS1-4 ELA W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	3d Knowledge Constructor 4d Innovative Designer 4a Innovative Designer 5a,c Computational Thinker	
ALG1.4.3	Write equations of parallel and perpendicular lines.	G.GPE.L.5 A.CED.G.2	ELA W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	6a,b,c,d Creative Communicator	
ALG1.4.4	Create a scatter plot to calculate a best-fit linear function; interpret the slope (rate of change) and the intercept (constant term) of this function in the context of the data.	S.ID.B.6.a S.ID.C.7 S.ID.C.9 F.BF.D.1 N.Q.C.1	Science HS-LS1-3 HS-LS1-4 HS-ESS1-6 ELA W.9-10.2.d, e W.9-10.8 W.11-12.1.d W.11-12.2.d	1c Empowered Learner 3d Knowledge Constructor 4a,d Innovative Designer 5a,b, c Computational Thinker 6a,b,c,d Creative Communicator	

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	ALG1.4.5	Use technology to calculate, then interpret the least-squares regression line and the correlation coefficient for a scatterplot.	S.ID.B.6.c	ELA W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	1c Empowered Learner 3d Knowledge Constructor 4a,d Innovative Designer 5a,b Computational Thinker
	ALG1.4.6	Distinguish between correlation and causation given real-life examples.	S.ID.B.6.c	ELA W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	1c Empowered Learner 3d Knowledge Constructor 4a,d Innovative Designer 5a,b Computational Thinker
Vocabulary		Linear function, slope-intercept form, point-slope form, standard form, parallel, perpendicular, arithmetic sequence, correlation, causation, least-squares regression, correlation coefficient			

ALG1.5		**Students will solve systems of two linear equations and inequalities and relate them to real world situations.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	ALG1.5.1	**Solve system of equations by graphing and relate them to real world situations, including those with no or infinite solutions.**	N.Q.C.1 A.REI.I.3 A.REI.J.6 A.REI.K.10 F.IF.C.7a	Science HS-PS2-1 HS-LS1-4 HS-LS1-5 HS-LS1-6	5a,c Computational Thinker 1c Empowered Learner

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
					4a,d Innovative Designer
	ALG1.5.2	**Solve systems of equations algebraically and relate them to real world situations, including those with no or infinite solutions.**	A.REI.K.10 A.REI.J.5 A.REI.J.6	ELA W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	6a,b,c,d Creative Communicator
	ALG1.5.3	Use graphs and tables from technology to find approximate solutions to equations in one variable by graphing each side as a separate function.	F.IF.C.7a A.REI.K.10 A.REI.K.11	Science HS-PS2-1 HS-LS1-4 HS-LS1-5 HS-LS1-6	1c Empowered Learner
	ALG1.5.4	**Graph the solutions to a linear inequality in two variables.**	A.REI.K.10 A.REI.K.12	None	1c Empowered Learner 4a,d Innovative Designer
	ALG1.5.5	**Graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes, and relate them to real-world situations.**	A.REI.K.12	None	1c Empowered Learner
Vocabulary		Solution for an equation in two variables, system of equations, half-plane, boundary line, solution to system of inequalities.			

ALG1.6	**Students will add, subtract, and multiply polynomials; they will factor and solve quadratic equations.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
ALG1.6.1	**Identify and interpret parts of a polynomial expression, such as terms, factors, and coefficients.**	A.SSE.A.1	Science HS-PS4-1 HS-ESS1-2 HS-PS2-4 HS-ESS1-1	1c Empowered Learner

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
				HS-PS2-1 HS-ESS1-4 W.9-10.2.d W.11-12.2.d	
	ALG1.6.2	**Add, subtract, and multiply polynomials.**	N.RN.A.1 A.APR.C.1	None	None
	ALG1.6.3	**Solve polynomial equations in factored form.**	A.SSE.B.3.a	Science HS-PS2-1 HS-PS2-4 HS-PS4-1 HS-PS4-5	5c Computational Thinker
	ALG1.6.4	**Rewrite quadratic expressions in factored form with a leading coefficient of 1.**	A.SSE.A.2 A.SSE.B.3.a F.IF.C.7a,c	Science HS-PS2-1 HS-PS2-4 HS-PS4-1 HS-PS4-5	4d Innovative Designer
	ALG1.6.5	Rewrite quadratic expressions in factored form with leading coefficient not equal to 1.	A.SSE.A.2 A.SSE.B.3.a F.IF.C.7a,c	Science HS-PS2-1 HS-PS2-4 HS-PS4-1 HS-PS4-5	4d Innovative Designer
Vocabulary		monomial, degree of monomial, polynomial, degree of polynomial, standard form of a polynomial, leading coefficient, quadratic, cubic, binomial, trinomial, perfect square trinomial, difference of two squares			

ALG1.7		**Students will use properties of exponents, including radicals, rational, exponential, growth and decay.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	ALG1.7.1	Distinguish between rational and irrational numbers; as well as identify which number set their sums or products belong in.	N.RN.B.3 N.RN.A.1		6a, b, c, d

					Creative Communicator
	ALG1.7.2	**Re-write expressions using properties of exponents.**	N.RN.A.1	none	none
	ALG1.7.3	**Rewrite expressions involving radicals and rational exponents using the properties of exponents.**	N.RN.A.1 N.RN.A.2	none	none
	ALG1.7.4	Determine whether a table, rule, or situation is linear or exponential.	F.LE.F.1.a F.LE.F.1.b F.LE.F.3 F.LE.F.5	ELA W.9-10.9 W.9-10.2.d W.11-12.2.d	1c Empowered Learner 3d Knowledge Constructor 5a Computational Thinker 6a,b,c,d Creative Communicator 4a,d Innovative Designer
	ALG1.7.5	**Construct exponential functions using a graph, a description of a relationship, or two or more input-output pairs.**	F.IF.B.4 F.IF.B.5 F.IF.C.7e F.LE.F.2	Science HS-ESS1-6 HS-PS2-1 HS-PS2-4 HS-PS4-1 HS-PS4-5	4a,d Innovative Designer 5c Computational Thinker 3d Knowledge Constructor
	ALG1.7.6	**Graph and interpret problems using exponential growth and decay.**	F.LE.F.1.c F.LE.F.5 F.IF.C.8b F.BF.D.1b	Science HS-LS1-3 HS-LS1-4 ELA W.9-10.9.d W.9-10.2.e W.11-12.2.d	4a,d Innovative Designer 1c Empowered Learner 3d Knowledge Constructor

				W.9-10.2.e W.11-12.1.d	5a Computational Thinker 6a,b,c,d Creative Communicator
	ALG1.7.7	Write the terms of an arithmetic sequence, and write the sequence as a linear function.	F.IF.A.3 F.BF.D.1a	Science HS-PS2-1 HS-PS2-2 HS-ESS1-1 HS-ESS1-2 HS-ESS1-4 HS-LS1-3 HS-LS1-4 ELA W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	4a Innovative Designer5a,c Computational Thinker
	ALG1.7.8	Identify and generate geometric sequences, and relate these sequences as exponential functions.	F.LE.F.1.a-c F.LE.F.2 F.LE.F.3 A.SSE.B.4	None	4a,d Innovative Designer 5c Computational Thinker 1c Empowered Learner
Vocabulary		exponent, base, nth root, radical, rational exponent, exponential function, exponential growth and decay, rate of growth and decay, compound interest, geometric sequence.			

ALG1.8		**Students will graph quadratic functions.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	ALG1.8.1	**Graph and interpret quadratic functions in the form $f(x)=ax^2$ and $f(x)=ax^2+k$ as they apply to real life problems.**	F.IF.C.7	HS-PS2-1 HS-LS1-4 HS-LS1-5 HS-LS1-6	1c Empowered Learner 4a,d Innovative Designer
	ALG1.8.2	**Graph quadratic functions using vertex form, and compare to $f(x)=x^2$, focusing on problems related to real life.**	F.IF.C.9 F.BF.E.3		4a Innovative Designer
Vocabulary		Quadratic function, vertex, transformation, intercepts, maximum and minimum values, axis of symmetry, parabola, vertical stretching and shrinking,			

ALG1.9		**Students will organize data in tables, graphs, histograms and scatter plots. Students will also calculate and interpret the central tendencies and standard deviation of data.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	ALG1.9.1	**Represent data with plots on the real number line (dot plots, histograms, and box plots) by hand or using technology.**	N.Q.C.1 S.ID.A.1	HS-PS2-1 HS-LS2-6 W.9-10.2.d W.11-12.2.d	1c Empowered Learner 4a,d Innovative Designer 5a,b Computational Thinker
	ALG1.9.2	**Calculate statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of one or more different data sets**	S.ID.A.2	W.9-10.2.d W.11-12.2.d	1c Empowered Learner 5a,b,c Computational Thinker

ALG1.9.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme values.	S.ID.A.3	W.9-10.2.d W.11-12.2.d	3d Knowledge Constructor 5b Computational Thinker 6a,b,c,d Creative Communicator
Vocabulary	mean, median, range, outlier, quartile, inner quartile range, box and whisker plots, histogram, skew, symmetric, percentile			

Math Standard Reference Codes

Number & Quantity		Algebra		Functions		Geometry		Statistics & Probability	
N-RN	The Real Number System	A-SSE	Seeing Structure in Expressions	F-IF	Interpreting Functions	G-CO	Congruence	S-ID	Interpreting Categorical & Quantitative Data
N-Q	Quantities	A-APR	Arithmetic with Polynomials & Rational Expressions	F-BF	Building Functions	G-SRT	Similarity, Right Triangles & Trigonometry	S-IC	Making Inferences & Justifying Conclusions
N-CN	The Complex Number System	A-CED	Creating Equations	F-LE	Linear, Quadratic & Exponential Models	G-C	Circles	S-CP	Conditional Probability & Rules of Probability
N-VM	Vector & Matrix Quantities	A-REI	Reasoning with Equations & Inequalities	F-TF	Trigonometric Functions	G-GPE	Expressing Geometric Properties with Equations	S-MD	Using Probability to Make Decisions
						G-GMD	Geometric Measurement & Dimension		
						G-MG	Modeling with Geometry		
# District Standards									

Geometry

Purpose Statement:	Students will apply inductive and deductive reasoning. Students will calculate lengths, areas, and volumes of plane and solid figures. Students will identify triangles and use their properties to solve equations, determine congruence, and determine similarity. Students will apply sine, cosine, and tangent ratios. Students will construct geometric shapes. Students will use all preceding skills to solve real life and mathematical problems.

Vocabulary listed are essential for demonstration of benchmark mastery. Any additional words related to the benchmark may be used at the teacher's discretion.

Math practices are not explicitly listed as benchmarks or learning targets; however, all eight math practices should be incorporated into all benchmarks and learning targets (see Appendix A for Math Practices).

Bolded items identify learning targets that are considered a priority. Please note, however, that all learning targets/standards in the curriculum map must still be taught, but those in bold should be taught to at least proficiency.

GEO.1		**Students will identify basic objects of geometry and the methods used to measure and compare these objects.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Reference	ISTE Standard Reference
	GEO.1.1	**Name, sketch, and define the basic elements of geometry** *(e.g., point, line, plane, angle, etc.)*.	G.CO.A.1	W.9-10.2.d W.11-12.2.d	WY-TOPP 10th	
	GEO.1.2	Define, measure, and classify angles and angle pair relationships.	G.CO.A.1 G.CO.C.9	W.9-10.2.d W.11-12.2.d	WY-TOPP 10th	
	GEO.1.3	**Use coordinate locations to find midpoints and calculate distances with the distance formula.**	G.CO.A.1 G.GPE.L.6 G.GPE.L.7	W.9-10.2.d W.11-12.2.d	WY-TOPP 10th	
Vocabulary		undefined terms, defined terms, **line segment**, **end-points, ray, opposite-rays**, postulate, **congruent segments, midpoint, segment bisector, acute, right, obtuse, straight angles, congruent angles, angle bisector, linear pair, vertical angles**, complementary, supplementary				

GEO.2		**Students will solve for areas, volumes, and density utilizing appropriate units of measurement and levels of accuracy as indicated and explore cross sections of solids.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Reference	ISTE Standard Reference
	GEO.2.1	**Calculate areas, volumes, and density using appropriate units of measurement and levels of accuracy.**	G.GMD.M.1 G.GMD.M.3 G.MG.O.2		WY-TOPP 10th (N.Q.C.1,2,3 not explicitly tested)	
	GEO.2.2	Apply geometric concepts in modeling situations.	G.MG.O.1 G.MG.O.2 G.MG.O.3	W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	WY-TOPP 10th	5a 6a, 6b, 6c, 6d

GEO.2.3	Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of a two-dimensional object	G.GMD.N.4		WY-TOPP 10th	
Vocabulary	polyhedron (face, edge, vertex), platonic solid, cross section, prism, surface area, lateral area, net, right prism, oblique prism, cylinder, right cylinder, pyramid, regular pyramid, cone, right cone, volume, sphere, great circle, hemisphere, similar solids.				

GEO.2	Students will analyze patterns of logic and support their reasoning in formal proofs.	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Reference	ISTE Standard Reference
GEO.2.1	Use inductive reasoning, deductive reasoning, and conditional statements to establish logical arguments.	G.CO.C.9	W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	WY-TOPP 10th	6a, 6b, 6c, 6d
GEO.2.2	Support an argument using logical reasoning (postulates, diagrams, proofs – segment, angle pairs, angles).	A.REI.H.1 G.CO.C.9	W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	WY-TOPP 10th (A.REI.H.1 not explicitly tested)	6a, 6b, 6c, 6d
Vocabulary	polyhedron (face, edge, vertex), platonic solid, cross section, prism, surface area, lateral area, net, right prism, oblique prism, cylinder, right cylinder, pyramid, regular pyramid, cone, right cone, volume, sphere, great circle, hemisphere, similar solids				

GEO.3		**Students will apply relationships of parallel and perpendicular lines.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Reference	ISTE Standard Reference
	GEO.3.1	**Classify angles (interior, exterior, and relationships) created when a transversal crosses lines and find angle measures when those lines are parallel.**	G.CO.A.1 G.CO.C.9	W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	WY-TOPP 10th	6a, 6b, 6c, 6d
	GEO.3.2	Determine and justify whether lines are parallel given angle relationships.	G.CO.A.1 G.CO.C.9 G.CO.C.10 G.CO.C.11	W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	WY-TOPP 10th	6a, 6b, 6c, 6d
	GEO.3.3	**Determine if two lines are parallel or perpendicular using their slopes and write linear equations given lines are parallel or perpendicular.**	G.GPE.L.5 G.CO.A.1	W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	WY-TOPP 10th	6a, 6b, 6c, 6d
Vocabulary		**parallel lines**, skew, parallel planes, **transversal, corresponding angles, alternate interior angles, alternate exterior angles, consecutive interior angles, slope, slope-intercept form of a linear equation**				

GEO.4		**Students will draw and describe transformations of geometric figures and use transformations to prove theorems.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Reference	ISTE Standard Reference
	GEO.4.1	**Draw and describe transformed figures using rotation, reflection, and translation, and dilation, and describe a series of transformations that will map a figure onto another.**	G.CO.A.2 G.CO.A.4 G.CO.A.5	W.9-10.2.d W.11-12.2.d	WY-TOPP 10th	1c, 4a, 5c
	GEO.4.2	Given a figure, describe lines of symmetry and rotational symmetry that will map the figure onto itself.	G.CO.A.9	W.9-10.2.d W.9-10.2.e W.11-12.1.d	WY-TOPP 10th	6a, 6b, 6c, 6d

			Math Standard Reference	W.11-12.2.d		
Vocabulary		congruent, rotation, transformation, reflection, translation, rigid motion, preimage, image, prime				

GEO.5		**Students will compare triangles and prove and apply relationships between and within triangles.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Reference	ISTE Standard Reference
	GEO.5.1	Apply theorems about triangles (triangle sum theorem and exterior angle theorem).	G.CO.C.9 G.CO.C.10 G.SRT.F.5	W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	WY-TOPP 10th	4a 6a, 6b, 6c, 6d
	GEO.5.2	Prove and apply theorems for isosceles and equilateral triangles.	G.CO.C.10 G.SRT.F.5	W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	WY-TOPP 10th	4a 6a, 6b, 6c, 6d
	GEO.5.3	**Show and prove that two triangles are congruent (SSS, SAS, HL, ASA, AAS) and use congruent triangles to prove theorems about parallelograms.**	G.CO.B.7 G.CO.B.8 G.CO.C.10 G.C.O.11 G.SRT.F.5	W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	WY-TOPP 10th	1c, 4a 6a, 6b, 6c, 6d
	GEO.5.4	Classify triangles in the coordinate plane using the distance formula and Pythagorean theorem.				
Vocabulary		ASA, SSS, SAS, AAS, HL, altitude, median				

GEO.6		**Students will solve for unknowns by: investigating how side lengths and angle measures relate within triangles; and simplifying radicals.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Reference	ISTE Standard Reference
	GEO.6.1	Write expressions in simplest radical form.	N.RN.A.2			
	GEO.6.2	**Solve right triangles through the use of Pythagorean Theorem, and use the Pythagorean converse to classify triangles as right, acute, or obtuse.**	G.SRT.G.8 A.APR.E.4		WY-TOPP 10th (A.APR.E.4 not explicitly tested)	4d
	GEO.6.3	Use patterns in special right triangles to solve for missing sides of those triangles.				
	GEO.6.4	**Solve right triangles through the use of trigonometric ratios (tangent, sine, and cosine) and their inverses.**	G.SRT.G.6 G.SRT.G.7 G.SRT.G.8	W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	WY-TOPP 10th (G.SRT.G.7 not explicitly tested)	4d 6a, 6b, 6c, 6d
Vocabulary		right triangle, converse, Pythagorean Theorem, radical, square root, factoring, sine, cosine, tangent, inverse sine, inverse cosine, inverse tangent				

GEO.7		**Students will investigate aspects of circles to calculate measures, describe relationships, prove that all circles are similar, and utilize appropriate tools to make formal constructions.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Reference	ISTE Standard Reference
	GEO.7.1	**Identify parts of circles including tangents, secants, chords, and radii.**	G.C.I.2 G.C.I.3	W.9-10.2.d W.11-12.2.d	WY-TOPP 10th (G.C.I.3 not explicitly tested)	6a, 6b, 6c, 6d

			Math Standard Reference	Cross-curricular Standard Reference	State Assessment Reference	ISTE Standard Reference
	GEO.7.2	Calculate arc length and area sectors of circles.				
	GEO.7.3	**Identify and describe relationships among chords, secants, inscribed angles, central angles, and circumscribed angles.**				
	GEO.7.4	Derive the equation of a circle given the center and radius.	G.GPE.K.1		WY-TOPP 10th	6a, 6b, 6c, 6d
	GEO.7.5	Make formal constructions with a variety of tools.	G.C.I.3 G.CO.D.12 G.CO.D.13		WY-TOPP 10th (G.C.I.3 not explicitly tested)	
Vocabulary		circle, center, radius, diameter, chord, secant, tangent, central angle, minor arc, major arc, semi-circle, congruent circles, congruent arcs, inscribed angle, intercepted arc, construction, inscribed				

GEO.8		**Students will determine if geometric figures are similar and apply properties of similar figures.**	Math Standard Reference	Cross-curricular Standard Reference	State Assessment Reference	ISTE Standard Reference
	GEO.6.1	**Build and solve proportions from similar figures to find unknown side lengths.**			WY-TOPP 10th	
	GEO.6.2	Decide if triangles are similar (AA, SSS, SAS).	G.SRT.E.2 G.SRT.E.3 G.SRT.F.5		WY-TOPP 10th	1c, 4a
Vocabulary		similar, ratio, proportion, scale factor of two similar polygons, dilation, center of dilation, scale factor of dilation, reduction, enlargement, AA, SSS, SAS				

Algebra II

	Pacing Guide					
Code	**Benchmark**	**Month(s) Taught**	**Common Assessment Period**			
			1	**2**	**3**	**4**
ALG2.1	Students will create linear equations using graphs, tables, and points in order to interpret data and make predictions.	Aug-Sept	X			
ALG2.2	Students will graph, write, and interpret quadratic functions and identify their essential characteristics.	Sept-Oct	X			
ALG2.3	Students will solve quadratic equations with real and complex solutions. Students will solve nonlinear systems of equations.	Oct-Nov		X		
ALG2.4	Students will identify, graph, and describe essential characteristics of polynomial functions. Students will perform mathematical operations with and solve polynomial equations.	Nov-Dec		X		
ALG2.5	Students will evaluate expressions using properties of rational exponents, graph radical functions, and solve equations containing radicals and rational exponents.	Jan-Feb			X	
ALG2.6	Students will perform function operations and inverses of functions.	Feb-Mar			X	
ALG2.7	Students will graph and analyze logarithmic functions. Students will use exponential functions to model and evaluate real-life problems.					
ALG2.8	Students will add, subtract, multiply, and divide rational expressions. Students will analyze and solve rational equations.					
ALG2.9	Students will calculate and interpret probabilities and apply the Fundamental Counting Principal.					

Math Standard Reference Codes									
Number & Quantity		**Algebra**		**Functions**		**Geometry**		**Statistics & Probability**	
N-RN	The Real Number System	A-SSE	Seeing Structure in Expressions	F-IF	Interpreting Functions	G-CO	Congruence	S-ID	Interpreting Categorical & Quantitative Data
N-Q	Quantities	A-APR	Arithmetic with Polynomials & Rational Expressions	F-BF	Building Functions	G-SRT	Similarity, Right Triangles & Trigonometry	S-IC	Making Inferences & Justifying Conclusions
N-CN	The Complex Number System	A-CED	Creating Equations	F-LE	Linear, Quadratic & Exponential Models	G-C	Circles	S-CP	Conditional Probability & Rules of Probability
N-VM	Vector & Matrix Quantities	A-REI	Reasoning with Equations & Inequalities	F-TF	Trigonometric Functions	G-GPE	Expressing Geometric Properties with Equations	S-MD	Using Probability to Make Decisions
						G-GMD	Geometric Measurement & Dimension		
						G-MG	Modeling with Geometry		
# District Standards									

Algebra II

Purpose Statement:	Students will create, make sense of problems and persevere in solving algebraic expressions pertaining to radical, rational, polynomial, logarithmic, and exponential functions. Students will reason abstractly, quantitatively, construct viable arguments and critique the reasoning behind the arguments. Students will model with mathematics, use appropriate tools strategically, and attend to precision. Students will look for and make use of structure, express regularity in repeated reasoning.

Vocabulary listed are essential for demonstration of benchmark mastery. Any additional words related to the benchmark may be used at the teacher's discretion.

Math practices are not explicitly listed as benchmarks or learning targets; however, all eight math practices should be incorporated into all benchmarks and learning targets (see Appendix A for Math Practices).

Bolded items identify learning targets that are considered a priority. Please note, however, that all learning targets/standards in the curriculum map must still be taught, but those in bold should be taught to at least proficiency.

ALG2.1	Create linear equations using graphs, tables, and points in order to interpret data and make predictions.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
ALG2.1.1	**Write equations of linear functions using points and slopes. Interpret slope and y-intercept in context.**	A.CED.G.2 F.BF.A.1 S.ID.C.7	HS-PS2-1 HS-ESS1-6 HS-LSI-3 HS-LSI-4 W.9-10.9 W.9-10.2.d,e W.11-12.1.d W.11-12.2.d	1c 3c, d 4a, d 5a, b, c 6a, b, c, d Computational Thinking Financial Literacy
ALG2.1.2	Calculate lines of best fit and use them to interpret data and make predictions.	S.ID.B.6 S.ID.C.7		
ALG2.1.3	**Compare properties of two linear functions, each represented in a different way. (i.e. equations, tables, data sets, etc.).**	F.IF.C.9		
ALG2.1.4	Use function notation, evaluate functions, and interpret statements that use function notation in context.	F.IF.A.2		
ALG2.1.5	Solve systems of linear equations graphically and algebraically.	A.REI.C.6		
Vocabulary	transformations, line of fit and line of best fit, correlation coefficient, and systems of equations			

ALG2.2		Students will graph, write, and interpret quadratic functions and identify their essential characteristics.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	ALG2.2.1	Describe transformations of quadratic equations.	F.BF.B.3	HS-PS2-1 HS-LS1-4 HS-LSI-5 HS-LS1-6	1c 4a, d
	ALG2.2.2	**Graph quadratic functions in multiple forms and identify key characteristics.**	F.IF.B.4 F.IF.B.5 F.IF.C.7.A F.IF.C.9	HS-PS2-1 HS-LS1-4 HS-LSI-5 HS-LS1-6 HS-PS2-1 HS-LSI-4, HS-LS1-5 HS-LS1-6	1c 3d 4a, d 5a, c 6b Computational Thinking Financial Literacy
	ALG2.2.3	Explore the focus and directrix of a parabola. Write equations of parabolas when solving real-life problems.	F.IF.B.4 F.IF.C.8.A	HS-PS2-1 HS-LS1-4 HS-LSI-5 HS-LS1-6 W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	1c 4a, d 5a, c 6b Computational Thinking Financial Literacy
	ALG2.2.4	**Write equations of quadratic functions using vertices, points, and *x*-intercepts. Create quadratic equations to model and interpret data sets.**	A.CED.A.2 F.IF.B.4 F.BF.A.1 S.ID.B.6	HS-PS2-1 HS-ESS1-6 W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	1c 3d 4a,d 5a, b, c 6b Computational

			Thinking Financial Literacy

Vocabulary	vertex, parabola, intercepts, intervals, axis of symmetry, minimum and maximum values, focus, and directrix

ALG2.3	**Students will solve quadratic equations for real and complex solutions. Students will solve nonlinear systems of equations.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
ALG2.3.1	Solve quadratic equations by graphing. *Note: Students can show proficiency by finding an approximate solution from a graph using their calculator.*	A.SSE.A.2 A.REI.B.4 F.IF.C.7.A	HS-PS2-1 HS-PS2-4 HS-PS4-1 HS-PS4-5 W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d CV12.44	3d 4a,d 5a, c 6a, b, c, d Computational Thinking Financial Literacy
ALG2.3.2	**Solve quadratic equations by factoring.**	A.REI.B.4 F.IF.C.8.A		
ALG2.3.3	Define and use the imaginary unit i. Apply operations to complex numbers.	N.CN.A.1 N.CN.A.2	W.9-10.2.d W.9-10.2. e W.11-12.1.d W.11-12.2.d	6a, b, d 5a,c 4d Computational Thinking Financial Literacy
ALG2.3.4	**Solve quadratic equations**, including complex solutions, **using square roots** and completing the square.	N.CN.C.7 A.REI.B.4	W.9-10.2.d W.9-10.2. e	5a, c 4d

		Note: • *students can show proficiency by approximating a solution using the calculator or an unsimplified exact solution.* • *these would be 3 out 4 on the proficiency scale*	F.IF.C.8.A	W.11-12.1.d W.11-12.2.d	6b Computational Thinking Financial Literacy
	ALG2.3.5	**Solve quadratic equations using the Quadratic Formula**. Analyze the discriminant to determine the number and type of solutions.	N.CN.F.7 A.REI.B.4	CV12.44 W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	3d 4d 5c 6a, b, c, d Computational Thinking Financial Literacy
	ALG2.3.6	Graph quadratic inequalities in two variables. Solve quadratic inequalities in one variable.	A.CED.A.1 A.CED.A.3	W.9-10.2.d W-9-10.2 e W.11-12.1.d W.11-12.2.d	5a, c 1c 3d 4d 6a, b, c, d Computational Thinking Financial Literacy
Vocabulary		root of a function, zero of a function, imaginary unit, complex number, completing the square, quadratic formula, discriminant, system of nonlinear equations, quadratic inequalities in one and two variables			

ALG2.4	**Students will identify, graph and describe essential characteristics of polynomials. Perform mathematical operations with and solve polynomial equations.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
ALG2.4.1	**Identify characteristics of and graph polynomial functions using tables and end behavior.**	F.IF.B.4 F.IF.C.7.C	HS-PS2-1 HS-LS1-4 HS-LS1-5 HS-LS1-6	3d 4a,d 1c 5a, c 6b Computational Thinking Financial Literacy
ALG2.4.2	**Add, subtract, and multiply polynomials.**	A.APR.A.1 A.APR.C.4 A.APR.C.5	HS-LS1-3 HS-LS1- 4 W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	4a 5a,c Computational Thinking Financial Literacy
ALG2.4.3	**Use long and synthetic division to divide polynomials.**	A.APR.D.6		
ALG2.4.4	Use the Remainder Theorem to evaluate polynomials.	A.APR.B.2		
ALG2.4.5	**Factor polynomials.**	A.APR.B.2 A.APR.B.3 A.SSE.A.2	W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	5a, c 1c 4d Computer

			Math	Cross-curricular	ISTE
				HS-PS4-1 HS-PS4-4 HS-ESS1-1 HS-ESS1-2 HS-PS2-1 HS-PS2-4 HS-PS4-5 HS-ESS1-4	Science 3A-DA-12 Computational Thinking
ALG2.4.6	**Find solutions of polynomial equations and zeros of polynomial functions.**	A.APR.B.3	W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	4d 6b, c 5a, c Computational Thinking Financial Literacy
ALG2.4.7	Utilize the Fundamental Theorem of Algebra to find all real and complex zeros of polynomial functions.	N.CN.C.8 N.CN.C.9 A.APR.B.3		6d
ALG2.4.8	Describe transformations of polynomial functions. Create transformations of polynomial functions.	F.BF.E.3 F.IF.C.7C		4a
Vocabulary	root of a function, zero of a function, imaginary unit, complex number, completing the square, quadratic formula, discriminant, system of nonlinear equations, quadratic inequalities in one and two variables			

ALG2.5	**Students will evaluate expressions using properties of rational exponents. Students will graph radical functions and solve equations containing radicals and rational exponents.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
ALG2.5.1	**Evaluate expressions with rational exponents and solve equations using roots.**	N.RN.A.1 N.RN.A.2		

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
ALG2.5.2	**Simplify expressions with rational exponents and write radical expressions in simplest form.**		N.RN.A.2	W.9-10.2.d W9-10.2.e W.11-12.1.d W.11-12.2.d CV12.44	4d
ALG2.5.3	Graph radical functions and circles.		F.IF.C.7.B	HS-PS2-1 HS-LS1-4 HS-LS1-5 HS-LS1-6	1c 4a, d
ALG2.5.4	**Solve equations containing radicals and rational exponents.**		A.REI.A.2	CV12.44 W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	3d 4d 6a, b, c, d 5a, c Computational Thinking Financial Literacy
Vocabulary	nth root of p, index of a radical, simplest form of a radical, like radicals, power function, composition, inverse relation, inverse function, radical function, radical equation, and extraneous solutions				

ALG2.6	**Students will perform functions and inverses of functions.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
ALG2.6.1	Add, subtract, multiply, and divide functions.	F.BF.A.1.B	HS-LS1-3 HS-LS1-4 W.9-10.2.d W.9-10-2.e	4a 5a, c Computational Thinking

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
				W.11-12.1.d W.11-12.2.d	Financial Literacy
	ALG2.6.2	Derive and verify inverses of functions and solve application problems.	F.BF.B.4.A A.CED.A.4		4d 5a, c 6b Computational Thinking Financial Literacy
Vocabulary					

ALG2.7		**Students will graph and analyze logarithmic functions. Students will use exponential functions to model and evaluate real-life problems.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	ALG2.7.1	**Graph exponential growth and decay functions. Utilize exponential models to solve real-life problems.**	F.IF.C.7.E F.IF.C.7.B A.SSE.B.3c SF.LE.B.5 F.LE.A2	HS-PS2-1 HS-LS1-4 HS-LS1-5 HS-LS1-6 W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d W.9-10.9	4a, d 5a, c 1c 3d 6a, b, c, d Computational Thinking Financial Literacy
	ALG2.6.2	**Define and evaluate logarithms.** Implement inverse properties of logarithmic and exponential functions.	F.IF.C.7.E F.BF.B.4A F.LE.A.4	W.9-10.9 HS-PS2-1 HS-LS1-4, 5, 6	1c 3d 4a, d 5a, c 6a, b, c, d

				Computational Thinking Financial Literacy
ALG2.6.3	Utilize the properties of logarithms to evaluate, expand and condense logarithmic expressions.	F.IF.C.7e F.BF.B.3	HS-PS4-1 HW-ESS1-2 HS-PS2-4 HS-ESS1-1 HS-PS2-1 HS-ESS1-4 W.9-10.2.d W.11-12.2.d Computer Science 3A-DA-12	1c Computational Thinking
ALG2.6.4	Solve exponential and logarithmic equations.	F.LE.A.4 A.SSE.A.2	W.9-10.9 W.9-10.2.e W.11-12.1.d HS-PS2-1, 4 HS-PS4-1, 5	1c 3d 4d 5a, c 6a, b, c, d Computational Thinking Financial Literacy
Vocabulary	exponential function, exponential growth function, growth factor, asymptote, exponential decay function, decay factor, natural base e, logarithm of y with base b, common logarithm, natural logarithm, exponential equation, logarithmic equation			

ALG2.8		Students will add, subtract, multiply, and divide rational expressions. Students will analyze and solve rational equations.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	ALG2.8.1	Model inverse and joint variation.	A.CED.A.1 A.CED.A.2 A.CED.A.3	HS-PS4-1 HS-ESS1-2 HS-PS2-4 HS-ESS1-1 HS-ESS1-4 HS-PS2-1 W.9-10.2.d W.11-12.2.d Computer Science 3A-DA-12	1c 4d 5a, c 6b Computational Thinking Financial Literacy
	ALG2.8.2	Multiply and divide rational expressions.	A.APR.F.6 A.APR.F.7		
	ALG2.8.3	Add and subtract rational expressions.	A.APR.F.6 A.APR.7		
	ALG2.8.4	Apply concepts to solve rational equations.	A.CED.A.4 A.REI.A.1 A.REI.A.2	W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d CV12.44 HS-PS2-1, 2 HS-ESS1-1, HS-ESS1-2 HS-ESS1- 4 HS-PS4-1	4d 5a, c 6b Computational Thinking Financial Literacy

Vocabulary	inverse variation, constant of variation, joint variation, rational function, simplified form of a rational expression, complex fraction, cross multiplying

ALG2.9		Students will calculate and interpret probabilities and apply the Fundamental Counting Principle.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	ALG2.8.1	**Determine whether events are independent; find probabilities of independent and dependent events.**	S.CP.A.1 S.CP.A.2 S.CPA.3 S.CP.A.5 S.CP.B.6 S.CP.B.8	ELA W.9-10.2.d W.11-12.2.d	1c Empowered Learner 3d Knowledge Constructor 5b Computational Thinker 6a,b,c,d Creative Communicator
	ALG2.8.2	Make and use two-way tables to find conditional probabilities.	S.CP.A.4 S.CP.A.5	ELA W.9-10.2.d W.11-12.2.d	1c Empowered Learner 3d Knowledge Constructor 5b,c Computational Thinker 6a,b,c,d Creative Communicator
	ALG2.8.3	Use the rules of probability to compute probabilities of compound events in a uniform probability model.	S.CP.A.1 S.CP.B.7		

	ALG2.8.4	Use permutations and combinations to compute probabilities of compound events and solve problems	S.CP.W.9		
Vocabulary		Sample space, outcome, event, counting principal, tree diagram, experimental and theoretical probability, independent and dependent events, two-way tables, conditional probability, compound events, mutually exclusive, disjoint, permutation, combination, factorial, Addition Rule, Multiplication Rule			

Algebra III Trigonometry

			Common Assessment Period			
Code	**Benchmark**	**Month(s) Taught**	**1**	**2**	**3**	**4**
ALG3.1	Students will be able to use the imaginary unit i to write complex numbers and their conjugates. Students will use operations with complex numbers and find complex solutions. Students will solve polynomial and rational equations and inequalities.					
ALG3.2	Students will analyze graphs to find the domain and range of various parent functions with emphasizes on one-to-one functions and their inverses. Students will perform operations on parent functions through translations, combinations, and compositions.					
ALG3.3	Students will utilize the Fundamental Theorem of Algebra, Remainder Theorem, and the Leading Coefficient Test to be able to analyze end behavior, and points of inflection in order to sketch Polynomial Functions.					
ALG3.4	Students will recognize, evaluate, and graph exponential and logarithmic functions.					
ALG3.5	Students will describe angles using degree and radian measures, and convert between degrees and radians. Students will develop and use the Unit Circle to define trigonometric coordinate points to further the use of trigonometric functions.					

Note: The "Pacing Guide" title spans the top of the table above the column headers.

Math Standard Reference Codes									
Number & Quantity		**Algebra**		**Functions**		**Geometry**		**Statistics & Probability**	
N-RN	The Real Number System	A-SSE	Seeing Structure in Expressions	F-IF	Interpreting Functions	G-CO	Congruence	S-ID	Interpreting Categorical & Quantitative Data
N-Q	Quantities	A-APR	Arithmetic with Polynomials & Rational Expressions	F-BF	Building Functions	G-SRT	Similarity, Right Triangles & Trigonometry	S-IC	Making Inferences & Justifying Conclusions
N-CN	The Complex Number System	A-CED	Creating Equations	F-LE	Linear, Quadratic & Exponential Models	G-C	Circles	S-CP	Conditional Probability & Rules of Probability
N-VM	Vector & Matrix Quantities	A-REI	Reasoning with Equations & Inequalities	F-TF	Trigonometric Functions	G-GPE	Expressing Geometric Properties with Equations	S-MD	Using Probability to Make Decisions
						G-GMD	Geometric Measurement & Dimension		
						G-MG	Modeling with Geometry		
# District Standards									

Algebra III Trigonometry

Purpose Statement:	Students will rewrite radical, rational, polynomial, logarithmic, and exponential expressions in equivalent forms. Additionally, students will create and solve linear, quadratic, radical, rational, logarithmic, and exponential equations that can model real-life problems. Students will also graph and analyze quadratic, exponential, and basic trigonometric functions, and utilize these graphs for problem solving. Finally, students will solve triangles using trigonometric ratios and the unit circle.

Vocabulary listed are essential for demonstration of benchmark mastery. Any additional words related to the benchmark may be used at the teacher's discretion.

Math practices are not explicitly listed as benchmarks or learning targets; however, all eight math practices should be incorporated into all benchmarks and learning targets (see Appendix A for Math Practices).

Bolded items identify learning targets that are considered a priority. Please note, however, that all learning targets/standards in the curriculum map must still be taught, but those in bold should be taught to at least proficiency.

ALG3.1		Students will be able to use the imaginary unit *i* to write complex numbers and their conjugates. Students will use operations with complex numbers and find complex solutions. Students will solve polynomial and rational equations and inequalities.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	ALG3.1.1	**Find the conjugate of a complex numbers and use conjugates with quotients of complex numbers.**	N.CN.D. *1-3 N.CN.F. *7-9 N.RN.A. *2 N.RN.B. *3 N.Q.C. *1, 2 A.SSE. *B.3A-.3C A.APR.C A.REI.I N.NR.A F.IF.C.7.*A-F *C.8A-B *C.9 F.BF.E.*3, 4A-4D, 5	HS-ESS1-6 HS-P52-1 HS-LS1-4 HS-LS1-5 HS-LS1-6	1c 4a, d 5a, c 6d Computational Thinking Financial Literacy
	ALG3.1.2	**Use operations with complex numbers.**		HS-PS2-1	6a, b, c, d 3d 4d 5a, c Computational Thinking Financial Literacy
	ALG3.1.3	**Use complex numbers in polynomial identities and equations.**		CV12.44 W.9-10.2.d W.9-10.2.e	3d 4d 5a, c 6a, b, c, d

					W.11-12.1.d W.11-12.2.d	Computational Thinking Financial Literacy
	ALG3.1.4	**Solve radical and rational equations.**			W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	5a, c 4d 6b Computational Thinking Financial Literacy
	ALG3.1.5	**Solve polynomial equations of higher degrees, including, radical, rational, and absolute value equations.**				6c
	ALG3.1.6	**Solve quadratic and higher degree equations using the methods of factoring, extracting roots, completing the square and using the quadratic formula.**				6a, b, c, d
	ALG3.1.7	Use properties of inequalities to solve equations using inequality notation and interval notation.				4d, 5c 5a Computational Thinking
Vocabulary		solution point, symmetry with respect to the *x- and y-* axes, and the origin, radical and rational equations, inequality and interval notation, "string method", complex number, conjugate,				

ALG3.2		**Students will analyze graphs to find the domain and range of various parent functions with emphasizes on one-to-one functions and their inverses. Students will perform operations on parent functions through translations, combinations, and compositions.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	ALG3.2.1	Implement different methods to determine if an equation is a function emphasizing one-to-one functions.	F.BF.D.1C (+) F.BF.E.*3 F.BF.E F.IF.B	W.9-10.9 W.9-10.2.d W.11-12.2.d	4a, d 1c 3d 5a

			F.IF.C. *7A-F F.IF.C. *8-9		6a, b, c, d Computational Thinking Financial Literacy
	ALG3.2.2	Graph functions expressed symbolically and show key features of the graph, by hand and using technology.		HS-ESS1-6	4a, d 3d 5a, c 6d Computational Thinking Financial Literacy
	ALG3.2.3	Use relative maximums and minimum values to identify intervals of increasing and decreasing.		HS-PS2-1 HS-LS1-4 HS-LS1-5 HS-LS1-6	3d 4a, d 1c 5a, c 6d Computational Thinking Financial Literacy
	ALG3.2.4	Identify and graph the eight basic parent functions.		HS-ESS1-6 HS-PS2-1 HS-LS1-4 HS-LS1-5 HS-LS1-6 W.9-10.2.d W.9-10.2.e W.11-12.1.d	4a, d 3d 1c 5a 6a, b, c, d Financial Literacy

				Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
					W.11-12-2.d W.9-10.9	
	ALG3.2.5	Perform operations on functions using combinations and compositions.			W.9-10.2.d W.11-12.2.d	4a, d 5c 1c Computational Thinking
	ALG3.2.6	Use parent functions to perform transformations on graphs. Use interval notation to describe specific parts of the graphs.			HS-LS1-3 HS-LS1-4 W.9-10.2d W.9-10.2.e W.11-12.1.d W.11-12.2.d	4a 5a, c Computational Thinking Financial Literacy
	ALG3.2.7	Identify and implement inverse functions informally, situationally, and graphically.				4d 5a, c 6b Computational Thinking Financial Literacy
Vocabulary		parent function, odd and even functions, step function, piecewise functions, position function, relative maximum and minimum, vertical and horizontal line tests, combination and composition of functions				

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
ALG3.3		**Students will utilize the Fundamental Theorem of Algebra, Remainder Theorem, and the Leading Coefficient Test to be able to analyze end behavior, and points of inflection in order to sketch Polynomial Functions.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	ALG3.3.1	Use the Fundamental Theorem of Algebra to determine numbers of zeros of polynomial functions.	A.APR.B F.IF.A F.IF.B F.IF.C	W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	4a, d 3d 5a, c 6b

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
			F.BF.D F.BF.E F.BF.F		Computational Thinking Financial Literacy
	ALG3.3.2	Use and apply the Remainder Theorem to find solutions.		W.9-10.2.d W.11-12.2.d HS-PS2-1 HS-LS1-4 HS-LS1-5 HS-LS1-6	1c 4a, d 5c Computational Thinking
	ALG3.3.3	Use the Leading Coefficient Test to determine how many points of inflections a graph has and to determine the end behavior.		W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	4a Financial Literacy
Vocabulary		Standard Form, maximum, minimum, leading coefficient, long division, synthetic division, synthetic substitution, regression feature, rational and complex zeros, and conjugate pairs			

ALG3.4		Students will recognize, evaluate, and graph exponential and logarithmic functions.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	ALG3.4.1	Recognize the graphs of exponential and logarithmic functions.	N.RN.A F.IF.C.7 F.IF.C.8 F.LE.F	HS-PS2-1 HS-PS2-4 HS-PS4-1 HS-PS4-5 HS-LS1-4 HS-LS1-5 HS-LS1-6 W.9-10.9 W.9-10.2.d W.9-10.2.e	5a, c 1c 4a, d 3d 6a, b, c, d 4d 5c Computer Science 3B-DA-05

				Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
					W.11-12.1.d W.11-12.2.d	Computational Thinking Financial Literacy
	ALG3.4.2	Graph exponential and logarithmic functions, showing intercepts and end behavior.			HS-PS2-1 HS-LS1-4 HS-LS1-5 HS-LS1-6	1c 4a,d
	ALG3.4.3	Recognize situations in which a quantity grows or decays by a constant percent rate.			W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	4a Financial Literacy
	ALG3.4.4	Utilize the change-of-base formula, and properties of logarithms to condense and expand expressions to manipulate and solve real-life problems.			HS-PS2-1 HS-PS2-4 HS-PS4-1 HS-PS4-5 HS-LS1-4 HS-LS1-5 HS-LS1-6 W.9-10.9	1c 4a, d 3d 5a, c 6a, b, c, d Computational Thinking Financial Literacy
Vocabulary		exponential functions with base "*a*" and "*e*", exponential growth/decay function, growth/decay factor, asymptote, natural base "*e*", common and natural logarithmic functions, exponential and logarithmic equations.				

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
ALG3.5		**Students will describe angles using degree and radian measures, and convert between degrees and radians. Students will develop and use the Unit Circle to define trigonometric coordinate points to further the use of trigonometric functions.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	ALG3.5.1	Explain and use the relationship between special right triangles to define the coordinate pairs (in radians) of the Unit Circle.	F.TF.H F.TF.I F.TF.J	W.9-10.2.d W.9-10.2.e W.11-12.1.d	6a, b, c, d 4d 5a, c

			G.SRT.G G.SRT.H	W.11-12.2.d	Computational Thinking Financial Literacy
ALG3.5.2	Use the definition of the sine, cosine, and tangent in order to sketch their graphs.			W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	6a, b, c, d 4d
Vocabulary	radian measure, initial and terminal side, coterminal angle, arc length, linear and angular speed, area of sector, cosecant, secant, cotangent, reference angle, periodic functions, even and odd functions, inverse trigonometric functions, amplitude and period of sine and cosine curves.				

Math Standard Reference Codes									
Number & Quantity		**Algebra**		**Functions**		**Geometry**		**Statistics & Probability**	
N-RN	The Real Number System	A-SSE	Seeing Structure in Expressions	F-IF	Interpreting Functions	G-CO	Congruence	S-ID	Interpreting Categorical & Quantitative Data
N-Q	Quantities	A-APR	Arithmetic with Polynomials & Rational Expressions	F-BF	Building Functions	G-SRT	Similarity, Right Triangles & Trigonometry	S-IC	Making Inferences & Justifying Conclusions
N-CN	The Complex Number System	A-CED	Creating Equations	F-LE	Linear, Quadratic & Exponential Models	G-C	Circles	S-CP	Conditional Probability & Rules of Probability
N-VM	Vector & Matrix Quantities	A-REI	Reasoning with Equations & Inequalities	F-TF	Trigonometric Functions	G-GPE	Expressing Geometric Properties with Equations	S-MD	Using Probability to Make Decisions
						G-GMD	Geometric Measurement & Dimension		
						G-MG	Modeling with Geometry		
# District Standards									

Integrated Math

Purpose Statement:	This class is designed to be a transition course between Geometry and Algebra II. Students will write and evaluate expressions; solve, write and graph linear equations and inequalities; and interpret patterns and functions. Students will interpret data, calculate central tendency and basic probability. Students will transform shapes on a coordinate plane and solve similarity problems including ones that involve right triangle trigonometry.

Vocabulary listed are essential for demonstration of benchmark mastery. Any additional words related to the benchmark may be used at the teacher's discretion.

Math practices are not explicitly listed as benchmarks or learning targets; however, all eight math practices should be incorporated into all benchmarks and learning targets (see Appendix A for Math Practices).

Bolded items identify learning targets that are considered a priority. Please note, however, that all learning targets/standards in the curriculum map must still be taught, but those in bold should be taught to at least proficiency.

INT.1		Students will interpret and create function rules from tables. Students will extend these rules to arithmetic sequences and patterns related to geometric shapes.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	INT.1.1	Use patterns in tables to create mathematical expressions.	A.SSE.1		
	INT.1.2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	F.IF.2		
	INT.1.3	Write conjectures and look for counterexamples in arithmetic sequences.	F.IF.3		
	INT.1.4	Relate the domain of a function, to the quantitative relationship it describes.	F.IF.5		
	INT.1.5	Write function rules related to geometric relationships. For example, sum of interior polygon angles.	G.CO.10		
Vocabulary		function, function notation, domain, range, conjecture, counterexample, arithmetic sequence			

INT.2		Students will write and solve 1 and 2 variable linear equations/inequalities that model real-life problems.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	INT.2.1	Rewrite algebraic expressions using the properties of real numbers.	A.SSE.2		
	INT.2.2	Create algebraic expressions to model real life problems.	A.SSE.2		
	INT.2.3	Solve linear equations in 1 variable, and explain the reasoning behind each step.	A.REI.1 A.REI.3		
	INT.2.4	Create linear equations in 1 variable to model real-life problems.	A.CED.1		
	INT.2.5	Solve linear inequalities in 1 variable.	A.REI.3		
	INT.2.6	Solve compound inequalities.	A.REI.3		
Vocabulary		expression, real numbers, equation, variable, inequality, compound inequality			

INT.3		Students will interpret and build linear functions that model a relationship between two quantities given a graph, a description of a relationship, or two input-output pairs. Students will compute and interpret rate of change.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	INT.3.1	Choose and interpret the scale and the origin in graphs.	N.Q.1		
	INT.3.2	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include intercepts and slope.	F.IF.4		
	INT.3.3	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes *(e.g., if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function)*.	F.IF.5		
	INT.3.4	Calculate and interpret average rate of change given tables, graphs, and ordered pairs.	F.IF.6		
	INT.3.5	Graph functions expressed symbolically and show key features of the graph (intercepts and slope).	F.IF.7a		
	INT.3.6	Write a function that describes a relationship between two quantities.	F.BF.1		
Vocabulary		scale, origin, y-intercept, x-intercept, rate of change, slope, ordered pairs			

INT.4		Students will interpret 2 or more linear functions, solve systems of equations graphically and algebraically, and graph linear inequalities and systems of linear inequalities.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	INT.4.1	Graph and interpret 2 or more linear functions.	REI.CI.6 REI.D.11		

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
INT.4.2		Solve systems of linear equations graphically and algebraically.	REI.CI.5 REI.CI.6		
INT.4.3		Graph linear inequalities.	REI.D.12		
INT.4.4		Graph systems of linear inequalities.	REI.D.12		
Vocabulary		linear function, system of linear equations, solution to a system of linear equations, system of linear inequalities			

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
INT.5		Students will calculate and interpret measures of central tendency, represent data with plots on the real number line, and display and interpret center and spread of data.			
	INT.5.1	Calculate and interpret in context measures of central tendency appropriate to the shape of the data distribution.	S.ID.2 S.ID.3		
	INT.5.2	Represent data with plots on the real number line (dot plots and histograms).	S.ID.1		
	INT.5.3	Display and interpret both center and spread of data in context using a box plot.	S.ID.1 S.ID.3		
Vocabulary		mean, median, mode, histogram, range, outlier, first quartile, third quartile, interquartile range, spread			

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
INT.6		Students will find probabilities of compound events using organized lists, tables, tree diagrams, and simulations. Students will differentiate and apply independent and dependent events to interpret data. Students will calculate expected value using an area model or tree diagram.			
	INT.6.1	Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative	7.SP.6		

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
		frequency, and predict the approximate relative frequency given the probability.			
	INT.6.2	Use tree diagrams and the counting principle to determine the sample space for events.	S.CP.1		
	INT.6.3	Find probabilities of simple events from a model and compare to experimental or observed probability.	7.SP.7		
	INT.6.4	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.	7.SP.8		
	INT.6.5	Design and use a simulation to generate frequencies for compound events. For example, use random digits from a table or a calculator as a simulation tool.	7.SP.8c		
	INT.6.6	Find the probability of independent and dependent events.	S.CP.2		
	INT.6.7	Calculate expected value for events based on chance using an area model or tree diagram, such as the expected win/loss of buying raffle tickets, or playing the lottery.	S.MD.2		
Vocabulary		relative frequency, sample space, counting principle, experimental probability, observed probability, compound events, independent events, dependent events, expected value			

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
INT.7		Students will apply concepts of similar figures, Pythagorean theorem, and right triangle trigonometry to solve real-world, indirect measurement problems.			
	INT.7.1	Solve real-world indirect measurement problems using similar figures.	G.SRT.2		
	INT.7.2	Use the Pythagorean Theorem to solve right triangles in applied problems.	G.SRT.8		
	INT.7.3	Develop definitions of trigonometric ratios for acute angles using the concept of similar triangles.	G.SRT.6		

	INT.7.4	Use trigonometric ratios to solve right triangles in applied problems.	G.SRT.8		
Vocabulary		indirect measurement, hypotenuse, Pythagorean Theorem, trigonometric ratios, similar triangles, right triangles, acute angles			

INT.8		Students will transform functions and shapes using translations, reflections, rotations, and dilations. Students will also describe the rotational and line symmetry of polygons.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	INT.8.1	Describe transformations as functions that take points in the plane as inputs and give other points as outputs.	G.CO.2		
	INT.8.2	Compare transformations that preserve distance and angle measurements to those that do not *(e.g. a translation vs. a horizontal stretch)*.	G.CO.2		
	INT.8.3	Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using graph paper, tracing paper, or geometry software.	G.CO.5		
	INT.8.4	Apply a function rule to perform a transformation without the coordinate plane.	G.CO.2		
	INT.8.5	Verify experimentally and apply the properties of dilations given by a center and a scale factor.	G.SRT.1		
	INT.8.6	Describe the rotational and line symmetry of polygons.	G.CO.3		
Vocabulary		transformation, translation, reflection, rotation, dilation, center of dilation, scale factor, center of rotation, rotational symmetry, line symmetry			

Math Standard Reference Codes									
Number & Quantity		**Algebra**		**Functions**		**Geometry**		**Statistics & Probability**	
N-RN	The Real Number System	A-SSE	Seeing Structure in Expressions	F-IF	Interpreting Functions	G-CO	Congruence	S-ID	Interpreting Categorical & Quantitative Data
N-Q	Quantities	A-APR	Arithmetic with Polynomials & Rational Expressions	F-BF	Building Functions	G-SRT	Similarity, Right Triangles & Trigonometry	S-IC	Making Inferences & Justifying Conclusions
N-CN	The Complex Number System	A-CED	Creating Equations	F-LE	Linear, Quadratic & Exponential Models	G-C	Circles	S-CP	Conditional Probability & Rules of Probability
N-VM	Vector & Matrix Quantities	A-REI	Reasoning with Equations & Inequalities	F-TF	Trigonometric Functions	G-GPE	Expressing Geometric Properties with Equations	S-MD	Using Probability to Make Decisions
						G-GMD	Geometric Measurement & Dimension		
						G-MG	Modeling with Geometry		
# District Standards									

Pre-Calculus
Pre-Calculus Trigonometry

Purpose Statement:	Pre-calculus is intended to provide the mathematical background needed for calculus. This course will provide a general introduction to functions, operations with function, inverse functions, and graphs of functions using standard graphs with transformations. It will include an extensive study of linear functions, polynomial functions (including new methods of solving polynomial equations), rational and radical functions, exponential and logarithmic functions, circular and trigonometric functions, sequences and series. The course will include extensive use of the graphing calculator.

Vocabulary listed are essential for demonstration of benchmark mastery. Any additional words related to the benchmark may be used at the teacher's discretion.

Math practices are not explicitly listed as benchmarks or learning targets; however, all eight math practices should be incorporated into all benchmarks and learning targets (see Appendix A for Math Practices).

Bolded items identify learning targets that are considered a priority. Please note, however, that all learning targets/standards in the curriculum map must still be taught, but those in bold should be taught to at least proficiency.

PCAL.1	Students will apply advanced quadratic strategies (completing the square, factoring $ax^2 + bx + c$, changing from standard to vertex form). Students will analyze properties of functions, including: compositions and inverses, using algebraic and graphing techniques and strategies, domain, range, function behavior.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
PCAL.1.1	Assess whether a given relation is a function through careful study of possible domains.	F.IF.A.1 F.IF.A.2 F.IF.A.3 F.IF.B.4 F.IF.B.5	HS-ESS1-6	4a, d 3d 5a, c 6d
PCAL.1.2	**Perform detailed algebraic and graphical analysis of functions to find zeros, relative minima and maxima, increasing or decreasing intervals, and average rate of change.** Students will also examine the properties of odd and even functions.	F.IF.B.4 F.IF.B.5 F.IF.B.6 F.IF.C.7.A F.IF.C.7.B F.IF.C.7.C F.IF.C.7.E F.IF.C.7.D (+) F.IF.C.7.F (+)	HS-PS2-1 HS-LS1-4 HS-LS1-5 HS-LS1-6	3d 4a, d 1c 5a, c 6d
PCAL.1.3	Recognize graphs of parent functions, and apply transformations to sketch a variety of functions.	F.IF.B.4 F.IF.B.5 F.BF.D.1.B F.BF.E.3 F.LE.F.4	HS-ESS1-6 HS-LSI-3 HS-LSI-4 W.9-10.2.d,e W.9-10.9 W.11-12.1.d W.11-12.2.d	3d 4a,d 5a,c 6d
PCAL.1.4	**Perform and apply operations of functions (addition, subtraction, multiplication, division, composition) in different situations and model scenarios with functions.**	F.BF.D.1 F.BF.D.1.A F.BF.D.1.B F.BF.D.1.C (+) F.BF.D	HS-LS1-3 HS-LS1-4 W.9-10.2d W.9-10.2.e	4a 5a, c

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
			F.BF.D.2 (+)	W.11-12.1.d	
			F.BF.E.3	W.11-12.2.d	
PCAL.1.5		**Graphically and algebraically determine if a function has an inverse or not, and find the equation of inverse functions where they exist.**	F.BF.E.4.A F.BF.E.4.B (+) F.BF.E.4.C (+) F.BF.E.4.D (+) F.BF.E.5 (+)		4d 5a, c 6b
Vocabulary		Cartesian plane, even and odd functions, inverse functions, composition of functions, rational functions			

PCAL.2		**Students will analyze polynomial and rational functions graphically and algebraically.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	PCAL.2.1	Analyze quadratic functions, write quadratic functions in standard form and use the results to sketch their graphs and find extrema of quadratic fundtions.	F.IF.A.2 F.IF.A.3 F.IF.B.4 F.IF.C.7.A F.IF.C.8 F.IF.C.9 A.APR.D.3	W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	4a, d 3d 5a, c 6b
	PCAL.2.2	**Find real zeros of polynomials, describe the end behavior of polynomials using the Leading Coefficient Test, sketch polynomial functions.**	A.APR.C.1 A.APR.D.3 G.CO.A.2 G.CO.A.4 G.CO.A.5 F.IF.C.7.C F.IF.C.7.E F.IF.C.7.D (+)	W.9-10.2.d W.11-12.2.d HS-PS2-1 HS-LS1-4 HS-LS1-5 HS-LS1-6	1c 4a, d 5c
	PCAL.2.3	Use long and synthetic division to divide polynomials and use the Remainder Theorem to evaluate polynomials at given points.	F.IF.C.8 F.IF.C.8.A	W.9-10.2.d W.9-10.2.e	4a

			Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
			A.APR.D.2 A.APR.D.3 A.APR.F.6	W.11-12.1.d W.11-12.2.d	
	PCAL.2.4	Add, subtract, multiply, and divide complex numbers, using complex conjugates to write in standard form when necessary, and find complex solutions of quadratic equations.	N.CN.D.1 N.CN.D.2 N.CN.D.3 (+)		6c
	PCAL.2.5	**Use the Fundamental Theorem of Algebra, factoring, graphing, and/or the Rational Zero Test (as needed) to find all zeros of polynomial functions (including irrational and/or complex zeros with complex pairs) and factor polynomials completely into only linear factors**	N.CN.D.2 N.CN.D.3 (+) N.CN.F.8 (+) N.CN.F.7 N.CN.F.8 (+) N.CN.F.9 (+)		6d
	PCAL.2.6	**Find and explain the domain of rational functions, find intercepts, find asymptotes (vertical, horizontal, and slant) and graph rational functions.**	F.IF.7d	HS-PS2-1 HS-LS1-4 HS-LS1-5 HS-LS1-6	1c, 4a, 4d
Vocabulary		remainder theorem, factor theorem, division algorithm, number of zeros, factors of polynomials, end behavior, local extrema, points of inflection, big-little concept, vertical asymptotes, holes, properties of complex number system, conjugate solutions, one-to-one functions, horizontal line test, composition of inverse functions, restricting domains, difference quotients and rates of change			

PCAL.3		**Students will analyze, evaluate and graph exponential and logarithmic functions and use the properties of exponents and logarithms to solve equations and model real-life problems.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	PCAL.3.1	Recognize, evaluate and graph exponential functions with base a and base e. Model and analyze real-life problems.	A.SSE.B.3.C F.IF.C.7.E F.IF.C.8.B F.LE.F.1.C F.LE.F.2	HS-PS2-1 HS-PS2-4 HS-PS4-1 HS-PS4-5 HS-LS1-4	5a, c 1c 4a, d 3d 6a, b, c, d

			F.LE.F.3 F.LE.F.4 F.LE.F.5	HS-LS1-5 HS-LS1-6 W.9-10.9 W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	Computer Science 3B-DA-05
	PCAL.3.2	Recognize, evaluate and graph logarithmic functions with base *a* and base *e* *(natural logarithm)*.	F.IF.C.7.E F.LE.F.4	HS-PS2-1 HS-LS1-4 HS-LS1-5 HS-LS1-6	1c 4a,d
	PCAL.3.3	**Use the properties of logarithms (change of base, product rule, quotient rule, power rule), to evaluate, rewrite, expand or condense logarithmic expressions.**	F.IF.C.8 F.LE.F.4	W.9-10.2.d W.9-10.2.e W.11-12.1.d W.11-12.2.d	4a
	PCAL.3.4	Solve simple and complex exponential and logarithmic equations.	A.SSE.B.3.A A.SSE.B.3.B A.SSE.B.3.C F.IF.C.7.E F.LE.F.1.A F.LE.F.1.B F.LE.F.1.C	HS-PS2-1 HS-PS2-4 HS-PS4-1 HS-PS4-5 HS-LS1-4 HS-LS1-5 HS-LS1-6 W.9-10.9	1c 4a, d 3d 5a, c 6a, b, c, d
	PCAL.3.5	**Use exponential and logarithmic functions to model and solve equations related to application problems.**	A.SSE.B.3.C F.IF.B.4 F.IF.C.7.E F.IF.C.8.B F.LE.F.1.C F.LE.F.2 F.LE.F.3	HS-PS2-1 HS-PS2-4 HS-PS4-1 HS-PS4-5 HS-LS1-4 HS-LS1-5 HS-LS1-6 W.9-10.9	5a, c 1c 4a, d 3d 6a, b, c, d Computer Science 3B-DA-05

			F.LE.F.4	W.9-10.2.d	
			F.LE.F.5	W.9-10.2.e	
				W.11-12.1.d	
				W.11-12.2.d	
Vocabulary	exponential growth/decay function, growth/decay factor, asymptote, natural base "e", common and natural logarithmic functions, exponential and logarithmic equations				

PCAL.4		**Students will analyze the six trigonometric ratios and inverses using the unit circle to solve right triangles and application problems. Students will apply transformations to graph the six trigonometric functions.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	PCAL.4.1	Extend the definition of angle measure to negative angles and angles greater than 180 degrees. Define radian measure and convert angle measures between radians and degrees. Calculate arc length and area of a sector.	F.TF.1 F.TF.2		
	PCAL.4.2	**Define the trigonometric ratios in terms of the coordinate plane and in terms of the Unit Circle.**	F.TF.2		
	PCAL.4.3	Define the six trigonometric ratios of an acute angle in terms of a right triangle. Solve right triangles and real-world problems using trigonometric ratios.	F.TF.1 F.TF.2 F.TF.3		
	PCAL.4.4	**Develop basic trigonometric identities and calculate the six trigonometric functions for any angle given a point, sign restrictions, or other given information.**	F.TF.8 F.TF.9		
	PCAL.4.5	**Graph the basic sine and cosine functions by analyzing amplitude, period changes, phase shifts, and vertical shifts.**	G.C.J.5		
	PCAL.4.6	**Graph tangent, cotangent, secant, and cosecant, functions and state the period, amplitude, vertical shift, and phase shift of these functions.**	F.TF.4 F.TF.5 F.TF.7e		

	PCAL.4.7	Find inverse trig functions (arcsin, arccos, arctan).	F.TF.7		
	PCAL.4.8	Apply trigonometric functions and inverse trigonometric functions to real-world applications.	F.TF.7		
Vocabulary		radian measure, initial and terminal side, coterminal angle, arc length, area of sector, cosecant, secant, cotangent, reference angle, periodic functions, even and odd functions, inverse trigonometric functions, amplitude and period of sine and cosine curves, periodic graphs, amplitude, phase shift			

		Students will prove trigonometric identities and solve equations using various properties. Students will solve oblique triangles using the Law of Sines and the Law of Cosines.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
PCAL.5					
	PCAL.5.1	Use the fundamental trigonometric identities to evaluate and simplify trigonometric expressions.	F.TF.8 F.TF.9		
	PCAL.5.2	**Prove trigonometric identities by applying strategies involving already proven identities.**	F.TF.8 F.TF.9		
	PCAL.5.3	**Solve trigonometric equations by combining terms, factoring quadratic types, and using inverse trigonometric functions, including multiple angles.**	F.TF.9		
	PCAL.5.4	**Use the sum and difference identities to solve trigonometric angles involving sine, cosine, and tangent.**			
	PCAL.5.5	**Use the double angle, half angle, sum-to-product, and product-to-sum identities to evaluate sine, cosine, and tangent equations and solve equations.**	F.TF.8		
	PCAL.5.6	**Solve oblique triangles using the Law of Sines. Find the area of a triangle using trigonometric formulas.**	G.SRT.11 (Modeling)		

	PCAL.5.7	Solve oblique triangles using the Law of Cosines.	G.SRT.9 G.SRT.10 (Modeling)		
Vocabulary		reciprocal identities, Pythagorean identities, double angle, half angle, power reducing, product to sum, sum to product identities, Law of Sine and Cosine formulas			

PCAL.6		Students will find the value of limits of functions (if possible) algebraically and graphically, including limits of functions at infinity.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	PCAL.6.1	Use the definition of a limit to estimate limits.			
	PCAL.6.2	Determine whether limits of functions exist, algebraically and graphically.			
	PCAL.6.3	Use properties of limits and various algebraic and graphical techniques (dividing out, rationalizing the numerator, sketching graphs, etc.) to evaluate limits of functions.			
	PCAL.6.4	Evaluate one-sided limits of functions.			
	PCAL.6.5	Evaluate limits of functions at infinity.			
Vocabulary		Definition of a limit			

Math Standard Reference Codes									
Number & Quantity		Algebra		Functions		Geometry		Statistics & Probability	
N-RN	The Real Number System	A-SSE	Seeing Structure in Expressions	F-IF	Interpreting Functions	G-CO	Congruence	S-ID	Interpreting Categorical & Quantitative Data
N-Q	Quantities	A-APR	Arithmetic with Polynomials & Rational Expressions	F-BF	Building Functions	G-SRT	Similarity, Right Triangles & Trigonometry	S-IC	Making Inferences & Justifying Conclusions
N-CN	The Complex Number System	A-CED	Creating Equations	F-LE	Linear, Quadratic & Exponential Models	G-C	Circles	S-CP	Conditional Probability & Rules of Probability
N-VM	Vector & Matrix Quantities	A-REI	Reasoning with Equations & Inequalities	F-TF	Trigonometric Functions	G-GPE	Expressing Geometric Properties with Equations	S-MD	Using Probability to Make Decisions
						G-GMD	Geometric Measurement & Dimension		
						G-MG	Modeling with Geometry		
# District Standards									

Consumer/Applied Math

Purpose Statement:	Students will apply basic computational skills and mathematical concepts to essential consumer topics such as income, banking, saving, budgeting, taking out various types of loans, and expenses incurred in owning a business. Students will analyze and compare accounting and macro-economic concepts.

Vocabulary listed are essential for demonstration of benchmark mastery. Any additional words related to the benchmark may be used at the teacher's discretion.

Math practices are not explicitly listed as benchmarks or learning targets; however, all eight math practices should be incorporated into all benchmarks and learning targets (see Appendix A for Math Practices).

Bolded items identify learning targets that are considered a priority. Please note, however, that all learning targets/standards in the curriculum map must still be taught, but those in bold should be taught to at least proficiency.

CM.1		**Students will calculate employee pay through hourly, yearly, individual production, and commission payroll scenarios. Scenarios include withholding taxes, insurance and voluntary deductions.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	CM.1.1	**Calculate fixed income.**	N.Q.C.1 N.Q.C.2 A.SSE.A.1.A	3A-DA-12	1c, 4d 5a, 5c 6b
	CM.1.2	**Calculate variable income**	N.Q.C.1 N.Q.C.2		4d 5a, 5c 6b
	CM.1.3	Calculate tax deductions.	A.SSE.A.1.A	3A-DA-12	1c
	CM.1.4	Calculate health insurance, social security and other deductions.	N.Q.C.1 N.Q.C.2		4d 5a, 5c 6b
Vocabulary		hourly rate, straight time pay, overtime pay, time and a half, double time, weekly time card, piecework, salary, commission, commission rate, straight commission, graduated commission, Federal income tax, personal exemptions, graduated income tax, social security, FICA, Medicare, group insurance, net pay			

CM.2		Students will computer average monthly expenditures and compare actual expenditure to those budgeted.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	CM.2.1	**Compute average monthly expenditure.**	A.SSE.A.1.A	3A-DA-12	1c
	CM.2.2	**Prepare a budget sheet.**	A.SSE.A.1.A	3A-DA-12	1c
	CM.2.3	**Compare a budgeted amount to actual expenditures.**	A.SSE.A.1.A	3A-DA-12	1c
Vocabulary		record keeping, expenditures, budget sheet, living expenses, fixed expenses, annual expenses, emergency fund, expense summary			

CM.3		Students will manage, balance, and compare checking and savings accounts, which include simple and compound interest.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	CM.3.1	Manage a checking account.	A.SSE.A.1.A	RST.9-10.7	1c
	CM.3.2	Balance a checking account with a monthly statement.	A.SSE.A.1.A	RST.9-10.7	1c
	CM.3.3	Utilize online banking for bill pay and accessing information of the account.	N.Q.C.1 N.Q.C.2	WHST.11-12.7	4d 5a, 5c 6b
	CM.3.4	Manage a savings account.	A.SSE.A.1.A	RST.9-10.7	1c
	CM.3.5	Calculate simple and compound interest.	N.RN.A.1		
	CM.3.6	Compare compound interest and continuous annuities.	N.Q.C.1 N.RN.A.1		4d, 5c
Vocabulary		deposit, automatic teller machine - ATM, personal identification number - PIN, checking account, check register, balance, bank statement, service account statement, interest, simple interest, annual interest rate, compound			

CM.4		Students will calculate and compare purchasing options including cost with sales tax, cost after discounts or rebates, and finance charges.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	CM.4.1	Calculate and compare total purchase price and unit price including sales tax.	A.CED.A.1		
	CM.4.2	Calculate sales prices using coupons, rebates and markdowns.	A.CED.A.1		
	CM.4.3	Calculate balance and finance charges on a charge account.	A.CED.A.2		
Vocabulary		sales tax, sales receipt, total purchase price, unit pricing, coupons, rebates, markdown, markdown rate, sale price, credit card, charge account, finance charge, unpaid-balance method, average daily balance method, account statement			

CM.5		**Students will calculate costs associated with student loans, personal loans, vehicle loans, and home loans.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	CM.5.1	**Calculate APR, length of loan, total interest, monthly payment and loan payoff for student and personal loans.**	N.RN.A.1		
	CM.5.2	**Calculate vehicle loans including licensing, taxes and insurance.**	N.Q.C.1 N.Q.C.2	RST.11-12.7	4d, 5a, 5c 6c
	CM.5.3	**Calculate home mortgages including closing costs, taxes and insurance.**	SSE.B.4	RST.11-12.7 RST.9-10.7	5c
Vocabulary		single payment loan, promissory note, maturity value, term, ordinary interest, exact interest, installment loan, down payment, amount financed, simple interest installment loan, annual percentage rate - APR, repayment schedule, final payment, down payment, mortgage loan, interest closing costs, principal, real estate taxes, assessed value, tax rate, market value, rate of assessment, home owner's insurance, loss-of-use coverage, personal liability, medical coverage, replacement value, premium, fire protection class, utility costs			

CM.6		**Students will calculate and compare costs associated with life and health insurance.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	CM.6.1	**Calculate health insurance premiums.**	N.Q.C.1 N.Q.C.2	RST.11-12.7	4d, 5a, 5c 6b
	CM.6.2	**Calculate the amount the patient pays for health care.**	N.Q.C.1 N.Q.C.2	RST.11-12.7	4d, 5a, 5c 6b
	CM.6.3	Utilize tables to compute annual premiums for term life insurance.	N.Q.C.1 N.Q.C.2	RST.9-10.7	4d, 5a, 5c 6b
	CM.6.4	Compare whole life insurance, universal life insurance, and limited payment policy.	N.Q.C.1 N.Q.C.2	RST.11-12.7	4d, 5a, 5c 6b

Vocabulary	health insurance, preferred provider organization - PPO, health maintenance organization - HMO, deductible, co-insurance, co-payment, life insurance, term life insurance beneficiary, whole life insurance, cash value, limited payment policy, universal life insurance			

CM.7		**Students will calculate gains and costs of investments including certificates of deposits, stocks, and bonds.**	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	CM.7.1	Compute interest and effective annual yield on a certificate of deposit	N.Q.C.1	RST.11-12.7	4d, 5c
	CM.7.2	**Calculate the cost, annual yield, annual dividend and profit or loss on stock and bond investments.**	N.Q.C.1		4d, 5c
Vocabulary		certificate of deposit, annual yield, stocks, stock certificate, dividend, profit, loss, bonds			

CM.8		Students will calculate the associated costs with owning a business including maintaining, training, and benefits of employees along with manufacturing and break-even values of products.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	CM.8.1	Calculate the cost of hiring, maintaining and training employees.	N.Q.C.1 N.Q.C.2	RST.11-12.9 RST.11-12.7	4d, 5a, 5c 6b
	CM.8.2	Calculate employee benefits including insurance, disability, workers compensation and unemployment insurance.	N.Q.C.1 N.Q.C.2	RST.11-12.9 RST.11-12.7	4d, 5a, 5c 6b
	CM.8.3	Calculate the cost of manufacturing a product and determine profit, loss and break-even values.	N.Q.C.1 N.Q.C.2	RST.9-10.7 RST.11-12.9	4d, 5a, 5c 6b
Vocabulary		recruiting, salary scale, cost of living adjustment - COLA, merit increase, employee benefits, disability insurance, workers compensation insurance, unemployment insurance, travel expenses, release time, manufacture, direct material costs, direct labor costs, prime costs, break-even analysis, break-even point, profit, fixed costs, variable costs, quality control, defective time study, packaging			

CM.9		Students will calculate selling price, net profit, and mark-downs associated with the purchasing and selling of products. The trade discounts, chain discounts, and the complement method will be used.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	CM.9.1	Calculate the selling price of products using trade discounts, chain discounts and the complement method.	N.Q.C.1 N.Q.C.2		4d, 5a, 5c 6b
	CM.9.2	Calculate the net profit as a percent of the selling price.	N.Q.C.1 N.Q.C.2		4d, 5a, 5c 6b
	CM.9.3	Calculate the mark-down of products as a percent of the selling price.	N.Q.C.1 N.Q.C.2		4d, 5a, 5c 6b
Vocabulary		list price, trade discount, trade discount rate, net price, compliment method, chain discounts, net price rate, single equivalent discount, invoice, cash discount, ordinary dating, end of month dating, costs, selling price, mark up, gross profit, net profit, mark up rate, operating expenses, net profit rate, mark down, mark down rate			

CM.10		Students will calculate costs associated with marketing including researching, advertising, storage, and distribution of the products.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	CM.10.1	Calculate the costs of advertising and the possible ways to advertise to increase projected sales.	N.Q.C.1 N.Q.C.2		4d, 5a, 5c 6b
	CM.10.2	Calculate the costs of warehouse storage and utilities.	N.Q.C.1 N.Q.C.2		4d, 5a, 5c 6b
	CM.10.3	Calculate the costs associated with inventory and shipping the products.	N.Q.C.1 N.Q.C.2		4d, 5a, 5c 6b
Vocabulary		product tests, opinion research firm, opinion survey, sales potential, sample, market share, sales projection, factor, factor method, warehouse, inventory, inventory card, average cost method, first in first out - FIFO, last in last out - LIFO, rent, lease, labor charge, utilities, monthly service charge, demand charge, energy charge, peak load, kilowatts, fuel adjustment charge, consultants, consultant fees			

CM.11		Students will create and analyze income statements and balance sheets along with calculating the total cost of expanding a business.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	CM.11.1	Calculate business expenses using income statements.	N.Q.C.1	RST.9-10.7	4d, 5c
	CM.11.2	Calculate assets, liabilities and owners' equity using a balance sheet and MACRS.	N.Q.C.1	RST.9-10.7	4d, 5c
	CM.11.3	Analyze and compare two or more income statements and balance sheets.	N.Q.C.1	RST.9-10.7	4d, 5c
	CM.11.4	Calculate the total cost of expanding a business.	N.Q.C.1	RST.9-10.7	4d, 5c
Vocabulary		payroll register, apportion, depreciation, straight line method, estimated life, salvage value, book value, accumulated depreciation, modified accelerated cost recovery system - MACRS, assets, liability, owner's equity, net worth, capital, balance sheet, cost of good sold, income statement, profit and loss statement, net income, net profit, current ratio, quick ratio, vertical and horizontal analysis, base figure, amount of change, growth expenses			

CM.12		Students will calculate and explain macro-economic concepts and analyze a budget with revenue and expenses.	Math Standard Reference	Cross-curricular Standard Reference	ISTE Standard Reference
	CM.12.1	Calculate the inflation rate, current price, and original price	N.Q.C.1	RST.9-10.7	4d, 5c
	CM.12.2	Explain and compute gross domestic product	N.Q.C.1	RST.9-10.7	4d, 5c
	CM.12.3	Calculate consumer price index, the current cost, and cost of commodity	N.Q.C.1	RST.9-10.7	4d, 5c
	CM.12.4	Allocate revenue and expenses and analyze a budget	N.Q.C.1	RST.9-10.7	4d, 5c
Vocabulary		inflation, gross domestic product - GDP, real GDP, per capita GDP, consumer price index - CPI, budget			

Appendix A

CCSS Math Practices

CCSS.MATH.PRACTICE.MP1 Make sense of problems and persevere in solving them.

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

CCSS.MATH.PRACTICE.MP2 Reason abstractly and quantitatively.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents— and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

CCSS.MATH.PRACTICE.MP3 Construct viable arguments and critique the reasoning of others.

Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

CCSS.MATH.PRACTICE.MP4 Model with mathematics.

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

CCSS.MATH.PRACTICE.MP5 Use appropriate tools strategically.

Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions

about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

CCSS.MATH.PRACTICE.MP6 Attend to precision.

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

CCSS.MATH.PRACTICE.MP7 Look for and make use of structure.

Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7×8 equals the well remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2×7 and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.

CCSS.MATH.PRACTICE.MP8 Look for and express regularity in repeated reasoning.

Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y - 2)/(x - 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x - 1)(x + 1)$, $(x - 1)(x^2 + x + 1)$, and $(x - 1)(x^3 + x2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

Appendix B

Sweetwater County School District #1
Pacing Guide

Grade/Course:		Teacher:	

Code	Outcomes	Time Frame*	Assessment Period **			
			1	**2**	**3**	**4**

Instructional Planning Resource

School:		Teacher:	
Subject/Course:		Time required:	

Benchmark:		
Learning Target:		Standard Reference:
		Tech Standard Reference:
		Cross-Curricular Standard Reference:

Formative Assessment: ☐ **Oral** ☐ **Written** ☐ **Product** ☐ **Performance**

Criterion:

Context (Relevancy) :

Teacher Methods	Student Activities	Resources
1.	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	4.
5.	5.	5.
6.	6.	6.
7.	7.	7.

Intervention	Enrichment