

By the time a student in Orange East Supervisory Union graduates, s/he will be able to.....

Represent and compare whole numbers and describe shapes in space			
Expectations for Prekindergarten <i>By the end of Prekindergarten, children will be able to.....</i>			
Number Sense, Quantity, and Counting	Number Relationships and Operations	Measurement, Classification and Data	Geometry and Spatial Reasoning
High Leverage Concepts and Strategies <ul style="list-style-type: none"> • Understanding number values and sequences to 10 (counting, cardinality, conservation and stable order) • 1:1 Correspondence • Strategies: Counting, Subitizing, Organizing, Tracking 			
<ul style="list-style-type: none"> • Recite numbers to 20 • Sequence numbers before and after up through 10 • Count a group of up to 10 • Subitize 1-5 objects • Read numerals up to 10 and connect them to the quantities they represent • Compare groups of up to 10 objects and identify which group has more or less, or if they are the same (equal) 	<ul style="list-style-type: none"> • Use simple strategies to solve mathematical problems and communicate how they solved the problems • Combine and separate small groups of objects to make new groupings, and identify the resulting number in the group • Compare quantity in two sets of objects and describe the relationship with comparative terms 	<ul style="list-style-type: none"> • Compare and group objects using attributes • Sort objects using two or more attributes and compare number of objects in each set • Classify familiar objects into categories • Order objects by size or length • Use terms such as before, after, now, later, tomorrow, and yesterday accurately 	<ul style="list-style-type: none"> • Name common two- and three-dimensional shapes, and their parts and attributes • Combine (i.e., compose) and separate (i.e., decompose) shapes to make other shapes. • Use terms to communicate relative position of objects • Follow simple directions related to relative position •

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Represent and compare whole numbers and describe shapes and space		
Expectations for Kindergarten <i>By the end of grade K...</i>		
Counting and Cardinality	Operations and Algebraic Thinking	Number and Operations in Base Ten
<p>Count to 100 by ones and tens</p> <p>Count forward beginning from a given number within the known sequence (instead of having to begin at 1)</p> <p>Write numbers from 0 to 20</p> <p>Represent a number of objects with a written numeral 0-20</p> <p>Count objects saying the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object</p> <p>Understand that the last number name said tells the number of objects counted</p> <p>Understand the number of objects is the same regardless of their arrangement or the order in which they were counted.</p> <p>Understand that each successive number name refers to a quantity that is one larger.</p> <p>Count to answer "how many?" questions about as many as 20 things and compare two quantities</p>	<p>Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations</p> <p>Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from</p> <p>Fluently add and subtract within 5.</p> <p>Solve addition and subtraction word problems, and add and subtract within 10</p> <p>Decompose numbers less than or equal to 10 into pairs in more than one way</p> <p>For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.</p>	<p>Work with numbers 11-19 to gain an understanding of place value</p> <p>Compose and decompose numbers from 11 to 19 into ten ones and some further ones using a variety of strategies and materials</p> <p>Understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones</p>

Measurement and Data	Geometry	
<p>Describe measurable attributes of objects, such as length or weight.</p> <p>Describe several measurable attributes of a single object.</p> <p>Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute</p> <p>Classify objects into given categories</p> <p>Count the numbers of objects in each category and sort the categories by count</p>	<p>Identify and describe shapes using the correct name of the shape</p> <p>Describe objects in relation to each other using terms such as <i>above</i>, <i>below</i>, <i>beside</i>, <i>in front of</i>, <i>behind</i>, and <i>next to</i>.</p> <p>Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").</p> <p>Analyze, compare, create, and compose shapes informally describing similarities and differences</p> <p>Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.</p> <p>Compose simple shapes to form larger shapes.</p>	

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Understand addition and subtraction, place value and linear measurement		
Expectations for First Grade <i>By the end of grade 1...</i>		
Operations and Algebraic Thinking	Number and Operations in Base Ten	Measurement and Data
<p>Use addition and subtraction within 20 to solve word problems that involve comparing, working with unknowns, composing and decomposing numbers</p> <p>Use different strategies to solve problems such as using objects, drawings, and equations</p> <p>Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20</p> <p>Fluently add & subtract within 20</p> <p>Understand the relationship between addition and subtraction.</p> <p>Understand and apply the commutative and associative properties of addition</p> <p>Understand symbols can stand for unknown quantities in word problems and equations</p> <p>Understand subtraction in terms of an unknown addend problem</p>	<p>Count to 120, starting at any number less than 120. (cross century & cross decade)</p> <p>In a given range up to 120, read and write numerals and represent a number of objects with a written numeral.</p> <p>Understand that the two digits of a two-digit number represent amounts of tens and ones.</p> <p>Know 10 can be thought of as a bundle of ten ones, called a "ten."</p> <p>Understand numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.</p> <p>Understand multiples of ten, such as 30, is 3 tens and zero ones.</p> <p>Compare two 2-digit numbers by analyzing the tens and ones</p> <p>Add one and two digit numbers within 100 using strategies based on concrete models and drawings, inverse operations, properties</p>	<p>Order three objects by length</p> <p>Compare the lengths of two objects indirectly by using a third object</p> <p>Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.</p> <p>Tell and write time in hours and half-hours using analog and digital clocks.</p> <p>Organize, represent, and interpret data with up to three categories</p> <p>Ask and answer questions about the total number of data points</p>

<p>Understand the meaning of the equal sign</p> <p>Determine if addition and subtraction equations are true or false; determine the number that would make the equation true</p>	<p>and place value (in context and in equations)</p> <p>Explain reasoning and methods for solving problems</p> <p>Given a two-digit number, mentally find 10 more or 10 less than the number</p>	
<p>Geometry</p>		
<p>Expectations for First Grade <i>By the end of grade 1...</i></p>		
<p>Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.</p> <p>Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape</p> <p>Partition circles and rectangles into two and four equal shares, describe the shares using the words <i>halves</i>, <i>fourths</i>, and <i>quarters</i>, and use the phrases <i>half of</i>, <i>fourth of</i>, and <i>quarter of</i>. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares</p>		

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Extend understanding of base-ten, addition and subtraction and measurement; describe and analyze shapes		
Expectations for Second Grade <i>By the end of grade 2...</i>		
Operations and Algebraic Thinking	Number and Operations in Base Ten	Measurement and Data
<p>Represent and solve problems using addition and subtraction</p> <p>Use addition and subtraction within 100 to solve word problems that involve comparing, working with unknowns, composing and decomposing numbers</p> <p>Use different strategies to solve problems such as using objects, drawings, and equations</p> <p>Fluently add and subtract within 20 using mental strategies</p> <p>By the end of Grade 2, know from memory all sums of two one-digit numbers.</p> <p>Work with equal groups of objects to gain an understanding of multiplication</p> <p>Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns</p> <p>Write an equation to express the total as a sum of equal addends</p>	<p>Understand the value of digits in 3 digit numbers</p> <p>Know and understand 100 can be thought of as a bundle of ten tens, called a "hundred"</p> <p>Understand multiples of 100, such as 400, is the value of 4 hundreds and zero ones</p> <p>Count within 1000</p> <p>Skip-count by 5s, 10s, and 100s</p> <p>Read and write numbers to 1000 using base-ten numerals, number names, and expanded form</p> <p>Analyze digits in ones, tens and hundreds to compare two three-digit numbers</p> <p>Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction</p> <p>Add up to four two-digit numbers</p> <p style="color: blue;">Add and subtract within 1000 using strategies based on concrete models and drawings, inverse operations, properties and place value</p>	<p>Select the best tool to measure an object with</p> <p>Measure the length of an object</p> <p>Estimate and compare lengths using units of inches, feet, centimeters, and meters</p> <p>Solve real world problems involving lengths with like units</p> <p>Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m</p> <p>Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and ¢ symbols appropriately</p> <p>Generate measurement data and represent measurements on a line plot, where the horizontal scale is marked off in whole-number units.</p> <p>Represent a data using a picture graph and a bar graph, with up to four categories and solve problems using information from graphs</p>

<p>Determine whether a group of objects up to 20 is odd or even</p>	<p><u>(in context and in equations)</u> <u>(NO standard algorithm)</u></p> <p>Mentally add and subtract 10 or 100 to a given number 100-900</p> <p>Explain why addition and subtraction strategies work, using place value and the properties of operations</p>	
<p>Geometry</p>		
<p>Expectations for Second Grade <i>By the end of grade 2...</i></p>		
<p>Recognize and draw shapes having specified attributes</p> <p>Partition a rectangle into rows and columns of same-size squares and count to find the total number of them</p> <p>Partition circles and rectangles into two, three, or four equal shares and describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths.</p> <p>Recognize that equal shares of identical wholes need not have the same shape.</p>		

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Develop understanding of multiplication, division, fractions, arrays, area and two-dimensional shapes		
Expectations for Third Grade <i>By the end of grade 3...</i>		
Operations and Algebraic Thinking	Number and Operations in Base Ten	Number and Operations in Fractions
<p>Represent and solve problems using multiplication and division</p> <p>Solve equations to find products quotients of whole numbers</p> <p>Interpret and use products and quotients to explain real world situations</p> <p>Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities</p> <p>Use different strategies to solve problems such as using obj</p> <p>Determine the unknown number that makes a division or multiplication sentence true</p> <p>Understand and apply commutative, associative and distributive property of multiplication</p> <p>Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division</p>	<p>Understand place value</p> <p>Round whole numbers to the nearest 10 or 100</p> <p>Fluently add and subtract within 1000</p> <p><i>Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9×80, 5×60) using strategies based on place value and properties of operations (in context and in equations)</i></p>	<p>Understand that a fraction is a quantity and can represent parts of a whole</p> <p>Know the parts of a fraction and what they represent</p> <p>Develop an understanding of unit fraction as $\frac{1}{b}$</p> <p>Draw 0-1 on a number line and represent fractional parts in between</p> <p>Explain equivalence of fractions in special cases</p> <p>Compare fractions by reasoning about their size</p> <p>Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line</p> <p>Recognize and generate simple equivalent fractions</p> <p>Explain why the fractions are equivalent</p>

<p>By the end of Grade 3, know from memory all products of two one-digit numbers.</p> <p>Solve two-step word problems using the four operations.</p> <p>Represent problems using equations with a letter standing for the unknown quantity.</p> <p>Assess the reasonableness of answers using mental computation and estimation strategies including rounding</p> <p>Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. <i>For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.</i></p>		<p>Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers</p> <p>Compare two fractions with the same numerator or the same denominator by reasoning about their size</p> <p>Recognize and understand that comparisons are valid only when the two fractions refer to the same whole</p> <p>Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions</p>
<p>Measurement and Data</p>	<p>Geometry</p>	
<p>Expectations for Third Grade <i>By the end of grade 3...</i></p>	<p>Expectations for Third Grade <i>By the end of grade 3...</i></p>	
<p>Tell and write time to the nearest minute and measure time intervals in minutes.</p> <p>Solve word problems involving time</p> <p>Measure and estimate liquid volumes and masses of objects using standard and metric units</p>	<p>Understand that shapes in different categories may share attributes, and that the shared attributes can define a larger categories</p> <p>Know properties of quadrilaterals</p> <p>Partition shapes into parts with equal areas and express the area of each part as a unit fraction of the whole</p>	

Solve word problems involving masses or volumes

Represent a data set using a scaled picture or bar graph with several categories.

Generate and represent measurement data on a line plot

Recognize area as an attribute of plane figures and understand concepts of area measurement.

A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.

Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).

Relate area to the operations of multiplication and addition.

Find the area of a rectangle

Solve problems involving area

Know and understand the distributive property

Use area models to represent the distributive property

Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts to solve real world problems

<p>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 areas or with the same area and different perimeters.</p>		
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Develop understanding of multi-digit multiplication and division; fraction equivalence, and two dimensional shapes		
Expectations for Fourth Grade <i>By the end of grade 4...</i>		
Operations and Algebraic Thinking	Number and Operations in Base Ten	Number and Operations in Fractions
<p>Use the four operations with whole numbers to solve problems</p> <p>Understand and represent multiplication equations as a multiplicative comparisons and comparisons as equations. e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5</p> <p>Understand the difference between multiplicative comparison from additive comparison</p> <p>Multiply or divide to solve word problems involving multiplicative comparison</p> <p>Solve multi-step word problems posed with whole numbers and having whole-number answers using the four operations</p> <p>Interpret remainders in word problems</p> <p>Represent these problems using equations with a letter standing for the unknown quantity.</p> <p>Assess the reasonableness of answers using mental computation and estimation strategies including rounding.</p> <p>Gain familiarity with factors and multiples.</p>	<p>Apply place value understanding for multi-digit whole numbers to recognize a digit in one place is 10x more than one place to the right</p> <p>Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form.</p> <p>Compare two multi-digit numbers using $>$, $=$, and $<$ symbols to record the results of comparisons</p> <p>Round multi-digit whole numbers to any place</p> <p>Fluently add and subtract multi-digit whole numbers</p> <p>Multiply a whole number of up to four digits by a one-digit whole number</p> <p>Multiply two two-digit numbers</p> <p style="color: blue;">Multiply and divide any two numbers within 1000 (in context and in equations)</p> <p>Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors using strategies based on place value, properties and relationships</p>	<p>Explain why a fraction is equivalent to another fraction</p> <p>Compare fractions with different numerators and denominators</p> <p>Use benchmark fractions to compare fractions</p> <p>Add and subtract fractions and understand addition and subtraction of fractions as joining and separating parts referring to the same whole</p> <p>Decompose fractions into a sum of fractions with the same denominator</p> <p>Add and subtract mixed numbers with like denominators</p> <p>Solve word problems involving addition and subtraction of fractions with like denominators and using the same whole</p> <p>Understand a fraction a/b as a multiple of $1/b$</p> <p>Multiply fractions by whole numbers and solve problems with fraction \times whole number</p> <p>Understand decimal notation of fractions</p>

<p>Find all factor pairs for a whole number in the range 1-100.</p> <p>Recognize that a whole number is a multiple of each of its factors.</p> <p>Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number.</p> <p>Determine whether a given whole number in the range 1-100 is prime or composite.</p> <p>Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.</p>		<p>Compare decimal fractions</p> <p>Express a fraction with denominator 10 as an equivalent fraction with denominator 100</p> <p>Use decimal notation for fractions with denominators 10 or 100. <i>For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram</i></p> <p>Compare two decimals to hundredths by reasoning about their size and record the results of comparisons with the symbols $>$, $=$, or $<$</p> <p>Recognize that comparisons are valid only when the two decimals refer to the same whole</p>
<p>Measurement and Data</p>	<p>Geometry</p>	
<p>Expectations for Fourth Grade <i>By the end of grade 4...</i></p>	<p>Expectations for Fourth Grade <i>By the end of grade 4...</i></p>	
<p>Know relative sizes of measurement units within one system including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec.</p> <p>Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit and record measurement equivalents in a two-column table</p> <p>Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require</p>	<p>Draw points, lines, line segments, rays, angles and perpendicular and parallel lines and identify these in two-dimensional figures.</p> <p>Classify two-dimensional figures based on parallel or perpendicular lines, and angles of a specified size</p> <p>Recognize right triangles as a category, and identify right triangles.</p> <p>Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along</p>	

<p>expressing measurements given in a larger unit in terms of a smaller unit.</p> <p>Apply the area and perimeter formulas for rectangles in real world and mathematical problems</p> <p>Display data sets on a line plot and solve problems involving addition and subtraction of fractions by using information in line plots</p> <p>Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale</p> <p>Measure and draw angles</p> <p>Recognize angle measurements as additive</p>	<p>the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.</p>	
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Operations with Fractions, decimals; division and volume		
Expectations for Fifth Grade <i>By the end of grade 5...</i>		
Operations and Algebraic Thinking	Number and Operations in Base Ten	Number and Operations in Fractions
<p>Write and Interpret numerical expressions</p> <p>Read, write, compare, show, multiple representations of a number</p> <p>Evaluate expressions using symbols</p> <p>Analyze patterns and expressions in numbers</p> <p>Write simple expressions</p> <p>Generate patterns using rules</p> <p>Determine, form and graph ordered pairs</p> <p>Understand the place value system and the value of digits is ten times the place before it</p> <p>Explain patterns when multiplying by ten in relation to the number of zeros represented</p> <p>Read, write, and compare decimals to the thousandths</p> <p>Fluently multiply multi-digit whole numbers using standard algorithm</p> <p>Add, subtract, multiply and divide multi-digit whole numbers fractions and decimals</p>	<p>Apply understanding of place value for multi-digit whole numbers to recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.</p> <p>Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10.</p> <p>Use whole-number exponents to denote powers of 10</p> <p>Read, write, and compare decimals to thousandths.</p> <p>Compare two decimals to thousandths using $>$, $=$, and $<$ symbols to record the results of comparisons</p> <p>Use place value understanding to round decimals to any place</p> <p>Fluently multiply multi-digit whole numbers using the standard algorithm.</p> <p>Find quotients of whole numbers with up to</p>	<p>Add and subtract fractions with unlike denominators to solve problems</p> <p>Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers</p> <p>Interpret a fraction as division of the numerator by the denominator</p> <p>Find the area of a rectangle with fractional side lengths</p> <p>Understand and interpret multiplication as scaling (resizing)</p> <p>Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number</p> <p>Solve real world problems involving multiplication of fractions and mixed numbers</p> <p>Divide unit fractions by whole numbers and whole numbers by unit fractions.1</p> <p>Solve real world problems involving division using unit fractions</p> <p>All four operations with fractions (in context)</p>

<p>Add and subtract fractions with unlike denominators to solve real-world problems</p> <p>Understand fractions as division</p> <p>Understand multiplication as scaling</p> <p>Divide whole numbers by unit fractions to solve real world problems</p> <p>Convert like measurement units</p> <p>Recognize and interpret data using line plots</p> <p>Understand concepts of volume</p> <p>Use operations and the formula for volume to solve real world problems involving volume</p> <p>Draw a four quadrant coordinate system and understand how it's design</p> <p>Graph coordinates and use to solve real world problems</p> <p>Classify two-dimensional figures in a hierarchy based on properties</p>	<p>four-digit dividends and two-digit divisors</p> <p>Add, subtract, multiply, and divide decimals to hundredths</p>	<p>and in equations) <u>(NO standard algorithms - students should be using modeling and/or decomposition approaches)</u></p>
<p>Measurement and Data</p>	<p>Geometry</p>	
<p>Expectations for Fifth Grade <i>By the end of grade 5...</i></p>	<p>Expectations for Fifth Grade <i>By the end of grade 5...</i></p>	

<p>Convert among different-sized standard measurement units within a given measurement system</p> <p>Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$)</p> <p>Use operations on fractions for this grade to solve problems involving information presented in line plots.</p> <p>Recognize volume as an attribute of solid figures and understand concepts of volume measurement</p>	<p>Construct a coordinate system using perpendicular lines</p> <p>Graphing points in the first quadrant of the coordinate plane to represent and solve real world problems</p> <p>Classify two-dimensional figures in a hierarchy based on properties</p>	
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Concepts of Ratios and Rates; Rational Numbers; Expressions and Equations, and Statistical Thinking		
Expectations for Sixth Grade <i>By the end of grade 6...</i>		
Ratios and Proportional Relationships	The Number System	Expressions and Equations
<p>Describe ratio relationships between two quantities using ratio language and terminology</p> <p>Solve problems using ratios and equivalent ratios</p> <p>Use models to compare ratios, and solve problems including those involving unit rates</p> <p>Understand a percent is a rate per 100</p> <p>Solve problems using unit rates and percents</p> <p>Convert and transform measurement units using ratio reasoning</p> <p>Fluently add, subtract, multiply, and divide multi-digit whole numbers and decimals using the standard algorithm for each operation</p> <p>Multiply and divide fractions by fractions</p> <p>Work with common multiples and factors to compute</p> <p>Find common factors and multiples</p> <p>Apply the distributive property</p>	<p>Solve word problems involving division of fractions by fractions</p> <p>Fluently divide multi-digit numbers using standard algorithm</p> <p>Fluently add, subtract, multiply, and divide multi-digit decimals using standard algorithms</p> <p>Find the greatest common factors and least common multiples of whole numbers</p> <p>Use the distributive property to express a sum of two whole numbers 1-100</p> <p>Apply understanding of positive and negative numbers to represent real world situations such as temperature, elevation, credits/debits</p> <p>Understand a rational number as a point on the number line with a location in relation to zero and with opposite signs of numbers (4 and -4)</p> <p>Extend understanding of number lines and coordinate systems to include negative numbers</p> <p>Know that the sign of a number in ordered pairs indicates which quadrant it is located in</p>	<p>Write and evaluate numerical expressions involving whole-number exponents.</p> <p>Write, read, and evaluate expressions in which letters stand for numbers</p> <p>Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient)</p> <p>Apply the properties of operations to generate equivalent expressions</p> <p>Solve one variable equations and inequalities</p> <p>Represent solutions of such inequalities on number line diagrams</p> <p>Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity</p>

<p>Perform operations on integers and rational numbers consistently, fluently, correctly, and with understanding Use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.</p> <p>Understand rational numbers are points on a number line</p> <p>Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane</p> <p>Find and position pairs of integers and other rational numbers on a coordinate plane</p> <p>Understand ordering and the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.</p> <p>Write, interpret, and explain statements of order for rational numbers in real-world contexts (such as comparing temperature)</p>	<p>Recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.</p> <p>Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.</p> <p>Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.</p> <p>Write, interpret, and explain statements of order for rational numbers in real-world contexts.</p> <p>Apply understanding of absolute value to real world situations</p> <p>Distinguish comparisons of absolute value from statements about order.</p> <p>Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane.</p> <p>Use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.</p>	
<p>Geometry</p>	<p>Statistics and Probabilities</p>	
<p>Expectations for Sixth Grade <i>By the end of grade 6...</i></p>	<p>Expectations for Sixth Grade <i>By the end of grade 6...</i></p>	

<p>Solve real world problems involving area, surface area, and volume</p> <p>Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes</p> <p>Find the volume of a right rectangular prism</p> <p>Draw polygons in the coordinate plane given coordinates for the vertices</p> <p>Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures.</p> <p>Apply techniques for solving nets and working with coordinate plane drawings to solve real world problems</p>	<p>Develop an understanding of statistical variability</p> <p>Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers</p> <p>Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape</p> <p>Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number</p> <p>Display numerical data in plots on a number line, including dot plots, histograms, and box plots</p> <p>Summarize numerical data sets in relation to their context</p>	
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By the time a student in the Orange East Supervisory Union graduates, he/she should be able to.....

Proportional Relationships, rational numbers, expressions and linear equations, geometric constructions and scale drawings

Expectations for Grade 7
By the end of grade 7...

Ratios and Proportional Relationships	The Number System	Expressions and Equations
<p>Understand and apply proportional relationships to solve problem</p> <p>Identify and compute unit rates</p> <p>Determine whether two quantities are in a proportional relationship</p> <p>Represent proportional relationships with equations</p> <p>Use proportional relationships to solve multistep ratio and percent problems</p> <p><i>Solves proportional reasoning problems using a model and relationship of multiplication and division (The cross products algorithm does not qualify as demonstrating understanding)</i></p>	<p>Add, subtract, multiply and divide rational numbers</p> <p><i>Apply properties of operations to add, subtract, multiply and divide integers</i></p> <p>Understand and apply additive inverse to solve problems</p> <p>Convert rational numbers to decimals using long division</p>	<p>Add, subtract, factor, and expand linear expressions with rational coefficients</p> <p>Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form</p> <p>Use variables to represent quantities and construct simple equations to solve real-world mathematical problems</p> <p>Solve word problems leading to inequalities</p>
Geometry	Statistics and Probability	
<p>Construct geometric figures and describe the relationships between them</p> <p>Compute actual length and area from scale drawings</p> <p>Know and use formulas for the area and circumference of a circle and use them to solve problems</p>	<p>Use random sampling to draw inferences about a population</p> <p>Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations</p> <p>Investigate chance processes</p>	

<p>Solve real world problems involving angles, area, surface area and volume</p>	<p>Develop, use and evaluate probability models</p> <p>Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation</p> <p>Design and use a simulation to generate frequencies for compound events</p>	

By the time a student in the Orange East Supervisory Union graduates, he/she should be able to.....

Expressions and equations, bivariate data, function, two-dimensional space and Pythagorean Theorem		
Expectations for Grade 8 <i>By the end of grade 8...</i>		
The Number System	Expressions and Equations	Functions
<p>Understand the difference between rational and irrational numbers</p> <p>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</p>	<p>Know and apply the properties of integer exponents to generate equivalent numerical expressions</p> <p>Evaluate square roots of small perfect squares and cube roots of small perfect cubes</p> <p>Use scientific notation and solve problems involving scientific notation</p> <p>Graph proportional relationships</p> <p>Interpret unit rate as slope</p> <p>Analyze and solve linear equations and systems of linear equations in two variables</p> <p style="color: blue;">Understand linear relationships using tables, and/or graphs, and/or equations. Make connections among representations of linear relationships.</p>	<p>Define, evaluate and compare functions</p> <p>Compare properties of two functions</p> <p>Interpret slope as an equation that defines a linear function whose graph is a straight line</p> <p>Use functions to model relationships between quantities</p>
Geometry	Statistics and Probability	
<p>Verify the properties of translations, rotations, and reflections through experiments</p> <p>Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using</p>	<p>Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities</p> <p>Investigate patterns of association in bivariate data</p> <p>Use the equation of a linear model to solve problems</p>	

<p>coordinates</p> <p>Know, understand and apply the Pythagorean Theorem</p> <p>Solve real-world problems using cylinders, cones and spheres</p>	<p>in the context of bivariate measurement data</p> <p>Interpret the slope and intercept of linear model in the context of bivariate data</p>	

By the time a student in the Orange East Supervisory Union graduates, he/she should be able to.....

Modeling, Reasoning and Sense Making		
High School Mathematics Proficiencies		
Number and Quantity	Algebra	Functions
Understand the real number system	Understand and interpret the structure of expressions	Understand the concept of function
Understand properties of exponents and functions of exponents	Write and use equivalent expressions to solve problems	Use function notation and find inverses of functions
Use properties of rational and irrational numbers to provide mathematical explanations	Solve and graph linear equations and inequalities	Evaluate functions
Reason quantitatively	Perform arithmetic operations on polynomials	Understand trigonometry of the unit circle and understand how trigonometry is used to model periodic phenomena
Use units to solve problems	Solve systems of equations and inequalities	Graph linear and absolute value functions and their transformations
	Understand quadratic equations and solve quadratic equations using a variety of methods	Write linear equations given a variety of information
	Solve, graph, and simplify square root functions, equations, and expressions including the Pythagorean Theorem	Understand the graph of an equation and the effect of transformations on the graph
	Understand the relationships between zeros, factors and graphs of polynomials	Graph quadratic functions and compare to other types of functions
	Solve and graph radical functions and their solutions	Understand exponents and logarithms as inverses
	Complete operation with rational functions and find solutions to rational equations and inequalities	
	Understand and discuss direct and inverse variation.	
	Simplify rational expressions	

	Complete operations with complex numbers and find solutions to quadratic equations that are complex	Solve exponential and logarithmic equations
Modeling	Geometry	Statistics and Probability
<p>Modeling is one of the mathematical practice skills and a focus for high school mathematics. Modeling provides tangible relevancy and links classroom mathematics and statistics to everyday life, work, and decision-making.</p> <p>Quantities and their relationships in everyday situations, including physical, economic, political, and social, can be modeled using mathematical and statistical methods.</p> <p>Technology is valuable when making mathematical models and can be used for varying assumptions, exploring consequences, and comparing predictions with data.</p> <p>The basic modeling cycle is summarized and involves: (1) identifying variables in the situation and selecting those that represent essential features, (2) formulating a model by creating and selecting geometric, graphical, tabular, algebraic, or statistical representations that describe relationships between the variables, (3) analyzing and performing operations on these relationships to draw conclusions, (4) interpreting the results of the mathematics in terms of the original situation,</p>	<p>Understand congruence in terms of rigid motion</p> <p>Understand and apply theorems about circles</p> <p>Experiment with transformations in the plane</p> <p>Make geometric constructions</p> <p>Explain volume formulas and use them to solve problems</p> <p>Translate between geometric description and the equation of a circle</p> <p>Understand similarity in terms of similarity transformations</p> <p>Define trigonometric ratios and solve problems involving right triangles</p> <p>Find arc lengths and areas of sectors of circles</p> <p>Translate between geometric description and the equation of a parabola</p> <p>Prove geometric theorems</p> <p>Use coordinates to prove simple geometric theorems algebraically</p>	<p>Summarize, represent, and interpret single variable sets of data</p> <p>Draw formal and informal comparative inferences about two populations</p> <p>Investigate patterns of association in bivariate data</p>

<p>(5) validating the conclusions by comparing them with the situation, and then either improving the model or, if it is acceptable, (6) reporting on the conclusions and the reasoning behind them.</p>		

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