Fourth Grade Math
Units of Instruction
2019-2020

BOONE COUNTY SCHOOLS

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Grade 4 Math

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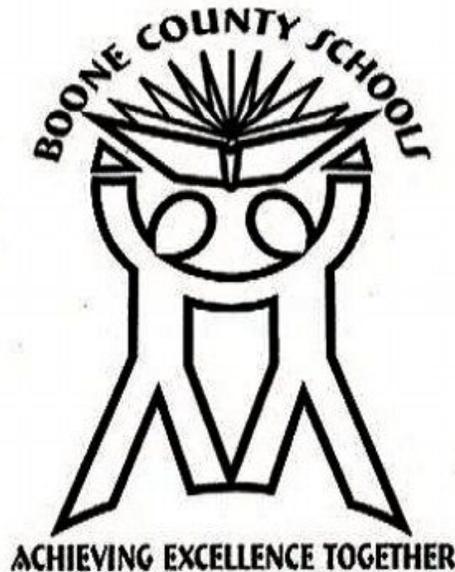
Priority Standards and Instructional Unit 1

4th Grade Math
Unit 1:

**This unit is designed to around these practice standards: Students use precise language, such as "ten times as much as" rather than "ten times more than" as they describe place value relationships (MP.6). Students make the conceptual connection between place value and multiplying and dividing by 10, noticing when any digit is multiplied by 10, the place of the digit moves one place to the left and when a digit is divided by 10, it moves to one place to the right. Beyond noticing this pattern, students understand this pattern exists because place value is structured this way (MP.7). For example, in solving 35 x 10 = ___, students might place 35 in a place value chart and explain 5 tens is 50, therefore, moving the 5 to the tens place and 30 tens equals 3 hundreds, therefore, moving the 3 to the hundreds place.

**Priority Standards will be summatively assessed throughout Quarter 1. All supporting standards are to be formatively assessed, driving reteaching and instructional adjustments to meet the needs of all students.

Number and Operation in Base Ten

4.NBT.1-Recognize in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.	Supporting Standard

4.NBT.2-Represent and compare multi-digit whole numbers.
  a. Read and write multi-digit whole numbers using base-ten numerals, number names and expanded form.
  b. Compare two multi-digit numbers based on the meanings of the digit in each place, using >, =, and < symbols to record the results of comparisons.
	Priority Standard

MP.2, MP.7	
4.NBT.3-Use place value understanding to round multi-digit whole numbers to any place. **MP.2, MP.6**	Priority Standard

Grade 4 Math

Priority Standards and Instructional Unit 2a

4th Grade Math
Unit 2a:

**This unit is designed to around these practice standards: Students select from their repertoire of strategies to solve multi-digit whole number addition or subtraction problems. For example, for the problem 345,402 – 67,087 =□, a student might choose to stack it and subtract using an algorithm. The same student seeing 56,708 – 9,998 = __, might notice how close the subtrahend (second value) is to 10,000 and decide to subtract 10,000 and add 2 onto the answer (MP.2). In general, students determine their approach based on the numbers in the problem seeking an efficient strategy. For multiplication and division, students recognize the relationship between area and multiplication and take advantage of rectangular arrays to model multiplication problems (MP.4). In creating such models and recording them as equations, students notice repetitive actions in computation and make generalizations to solve other similar problems (MP.8). Students explain how and why their selected models and/or algorithms work (MP.3).

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Number and Operation in Base Ten

4.NBT.4-Fluently add and subtract multi-digit whole numbers using an algorithm. **MP.2, MP.8**	Priority Standard

Operations and Algebraic Thinking

4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern not explicit in the rule itself. **MP.2, MP.3**	Support Standard

Grade 4 Math

Priority Standards and Instructional Unit 2b

4th Grade Math
Unit 2b:

**This unit is designed to around these practice standards: Students select from their repertoire of strategies to solve multi-digit whole number addition or subtraction problems. For example, for the problem 345,402 – 67,087 =□, a student might choose to stack it and subtract using an algorithm. The same student seeing 56,708 – 9,998 = __, might notice how close the subtrahend (second value) is to 10,000 and decide to subtract 10,000 and add 2 onto the answer (MP.2). In general, students determine their approach based on the numbers in the problem seeking an efficient strategy. For multiplication and division, students recognize the relationship between area and multiplication and take advantage of rectangular arrays to model multiplication problems (MP.4). In creating such models and recording them as equations, students notice repetitive actions in computation and make generalizations to solve other similar problems (MP.8). Students explain how and why their selected models and/or algorithms work (MP.3).

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Number and Operation in Base Ten

4.NBT.5-Multiply whole numbers
  ● Up to four digit number by a one-digit number
  ● Two-digit number by two-digit number
Multiplying using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays and/or are models. **MP.3, MP.4, MP.8**
	Priority Standard

Grade 4 Math

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Priority Standards and Instructional Unit 2c

4th Grade Math
Unit 2c:

**This unit is designed to around these practice standards: Students select from their repertoire of strategies to solve multi-digit whole number addition or subtraction problems. For example, for the problem 345,402 – 67,087 =▢, a student might choose to stack it and subtract using an algorithm. The same student seeing 56,708 – 9,998 = __, might notice how close the subtrahend (second value) is to 10,000 and decide to subtract 10,000 and add 2 onto the answer (MP.2). In general, students determine their approach based on the numbers in the problem seeking an efficient strategy. For multiplication and division, students recognize the relationship between area and multiplication and take advantage of rectangular arrays to model multiplication problems (MP.4). In creating such models and recording them as equations, students notice repetitive actions in computation and make generalizations to solve other similar problems (MP.8). Students explain how and why their selected models and/or algorithms work (MP.3).

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Number and Operation in Base Ten

4.NBT.6-Divide up to four-digit dividends by one-digit divisors. Find whole number quotients and remainders using • Strategies based on place value • The properties of operations • The relationship between multiplication and division Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. **MP.3, MP.7, MP.8**	Priority Standard

Grade 4 Math

Priority Standards and Instructional Unit 3

4th Grade Math
Unit: 3

**This unit is designed to around these practice standards: Students recognize a number represents a specific quantity and connects the quantity to written symbols and creates a logical representation of the problem considering both the appropriate units involved and the meaning of quantities (MP2). In an equation such as 35= 5 x 7, students identify and verbalize which quantity is being multiplied and which number tells how many times, saying, "Sally is five years old. Her mom is seven times older. How old is Sally's Mom?" Students discover a pattern or structure (MP.7). For example, a student distinguishes an additive comparison by identifying this type of question asks, " How many more?" and a multiplicative comparison focuses on comparing two quantities by asking," How many times as much?" or "How many times as many?" Students solve contextual problems using models and equations using a symbol to represent the unknown (MP.4).

Priority Standards will be summatively assessed throughout Quarter 2. All supporting standards are to be formatively assessed, driving reteaching and instructional adjustments to meet the needs of all students.

Operations and Algebraic Thinking

4.OA.1- Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations	Priority Standard
4.OA.2-Multiply or divide to solve word problems involving multiplicative comparisons by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison and additive comparisons.	Priority Standard

MP.1, MP.2, MP.3	

4.OA.3-Solve multistep problems.
   a. Perform operations in the conventional order when there are no parentheses to specify a particular order.
   b. Solve mulitstep word problems posed with whole numbers and having whole number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
MP.1, MP.4
	Priority Standard

Grade 4 Math

Priority Standards and Instructional Unit 4

4th Grade Math
Unit: 4

**This unit is designed to around these practice standards: Students use the structure and pattern of the counting numbers to find factor pairs, recognizing once they reach a certain point they don't have to keep looking for factors (MP.7). Students build arrays with a given area and look for patterns such as numbers of possible arrays to identify if the number is prime or composite. For example, noticing the number 7 has only two possible arrays, 1 x 7 and 7 x 1, therefore, it is prime. The number 4 has more than two rectangular arrays, 1 x 4, 4 x 1 and 2 x 2 and therefore, it is composite.

***Priority Standards will be summatively assessed throughout Quarter 2. All supporting standards are to be formatively assessed, driving reteaching and instructional adjustments to meet the needs of all students.*

Operations and Algebraic Thinking

|	
4.OA.1 Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations. **MP.2, MP.4**	Priority Standard

4.OA.4-Find factors and multiples of numbers in the range 1-100.
  a. Find all factor pairs for a given whole number.
  b. Recognize that a whole number is a multiple of each of its factors.
  c. Determine whether a given whole number is a multiple of a given one-digit number.
  d. Determine whether a given whole number is prime or composite.
MP.5, MP.7
	Support Standard

Grade 4 Math

Priority Standards and
Instructional Unit 5

4th Grade Math
Unit: 5

**This unit is designed to around these practice standards: Work in this standard extends the work in grade 3 by using additional denominators (5, 10, 12 and 100). Students use visual models such as area models, number lines, or sets of objects to illustrate how two fractions are equivalent (MP.4)
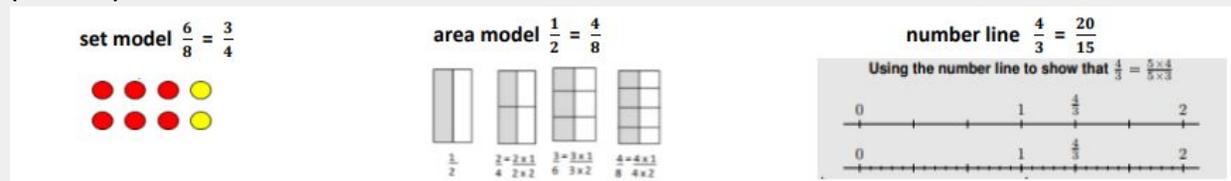
When students are asked to compare two fractions, they do not use a strategy they don't understand, such as the butterfly method, but rather employ reasoning strategies. They first consider whether they can decide which fraction is greater by observation (for example, the fractions have the same numerator or denominator or one fraction is greater than a benchmark and the other is less). If the fractions cannot be compared in this way, students decide whether to find a common denominator or a common numerator and then find the necessary fraction to compare. For example, to compare 3/8 and 5/12 , one can see 5/12 is closer to 1 2 (only 1/12 away, while 3/8 is 1/8 away) and therefore know that 5/12 is greater. Another student might not see this relationship, but decide that finding a common numerator is easier (being a basic fact) and multiply 3/8 by 5/5 to get 15/40 and 5/12 by 3/3 to get 15/36 . Then recognize and explain that 15/36 is greater (the pieces are larger) (MP.2, MP.3).

**Priority Standards will be summatively assessed throughout Quarter 2. All supporting standards are to be formatively assessed, driving reteaching and instructional adjustments to meet the needs of all students.

Number and Operations Fractions

4.NF.1-Understand and generate equivalent fractions.
   a. Use visual fraction models to recognize and generate equivalent fractions that have different numerators/denominators even though they are the same size.
   b. Explain why a fraction a/b is equivalent to a fraction (n x a)/(n x b)
MP.4, MP.7, MP.8
	Priority Standard

4.NF.2-Compare two fractions with different numerators and different denominators using the symbols <, =, or >. Recognize comparisons are valid only when the two fractions refer to the same whole. Justify the conclusions. **MP.2, MP.3**	Priority Standard

Grade 4 Math

Priority Standards and Instructional Unit 6

4th Grade Math
Unit: 6

**This unit is designed to around these practice standards: As students begin to work with fractions greater than unit fractions such as 2 3 + 2 3 = ___, they recognize, like whole numbers, they can decompose the non-unit fraction solve problems (Example: 2 3 + 2 3 = 2 3 + 1 3 + 1 3 = 11 3) (MP.7). Students apply this knowledge make sense of word problems and persevere in solving them (MP.1). By using tools and situations, students notice a pattern and generalize how to multiply a fraction by a whole number (for example, problems in the form n x $a \, b$). For example, they use pattern blocks or Cuisenaire Rods to determine the answer to a set of tasks: 4 x 1 2 , 5 x 1 3 , 6 x 1 3 , 5 x 2 3 , 6 x 2 3 and notice they multiply to find how many parts and thereby multiplying the whole number by the numerator (MP.5, MP.8). Note: Following a rote process of "putting a one under the whole number" or other rules not understood work against building understanding of 4.NF.4 and the development of mathematical practices.

**Priority Standards will be summatively assessed throughout Quarter 3. All supporting standards are to be formatively assessed, driving reteaching and instructional adjustments to meet the needs of all students.

Number and Operations Fractions

4.NF.3-Understand a fraction a/b with a > 1 as the sum of fractions 1/b.
   a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
   b. Decomposing a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions.
	Priority Standard

c. Add and subtract mixed numbers with like denominators. **d.** Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators. **MP.1, MP.5, MP.7**	

4.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
    a. Understand a fraction a/b as a multiple of $1/b$.
    b. Understand a multiple of a/b as a multiple of $1/b$ and use this understanding to multiply a fraction by a whole number.
    c. Solve word problems involving multiplication of a fraction by a whole number.
MP.5, MP.8
	Supporting Standard

Grade 4 Math

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Priority Standards and Instructional Unit 7

4th Grade Math
Unit: 7

**This unit is designed to around these practice standards: Students consider available tools and choose to use base ten blocks, graph paper, place value charts, number lines and other place value models to explore the relationships between fractions with denominators of 10 and denominators of 100 (MP.5). By using these tools, students begin to make abstract and quantitative connections to the relationship between fractions with denominators of 10 and 100 (MP.2). Through these experiences and work with fraction models, they build the understanding comparisons between fractions and decimals are only valid when the 91 whole is the same for both cases (hundredths or tenths) (MP.7). Students use base ten blocks, 10 by 10 geoboards and 10 by 10 grids to illustrate and compare decimal fractions and justify their conclusions (MP.3, MP.5).

Priority Standards will be summatively assessed throughout Quarter 4. All supporting standards are to be formatively assessed, driving reteaching and instructional adjustments to meet the needs of all students.

Number and Operations Fractions

4.NF.5- Convert and add fractions with denominators of 10 and 100. **a.** Convert a fraction with a denominator of 10 to an equivalent fraction with a denominator of 100. **b.** Add two fractions with respective denominators 10 and 100.	Supporting Standard
4.NF.6-Use decimal notation for fractions with denominators 10 or 100. **MP.4, MP.7**	Priority Standard
4.NF.7-Compare two decimals to hundredths.	Priority

a. Compare two decimals to hundredths by reasoning about their size. **b.** Recognize that comparisons are valid only when the two decimals refer to the same whole. **c.** Record the results of comparisons with the symbols >, =, or < and justify the conclusions. **MP.2, MP.3, MP.5**	Standard

Grade 4 Math

Priority Standards and Instructional Unit 8

4th Grade Math
Unit: 8

**This unit is designed to around these practice standards: Students explore angle measures using tools (MP.5). For example, the white rhombus in a pattern block set or a cardboard cut-out is used as a 'unit' angle (a non-standard unit). Students use this tool to measure the size of other angles, noticing that angle measures are additive (MP.1). Building on concrete experiences, students explain 1/360 of a circle, called a "one-degree angle," is the unit for measuring angles (MP.7). Students connect their concrete measuring experiences with a new tool, the protractor and use it to more precisely determine angle measures (MP.5, MP.6). When solving word problems involving angle measures, students use drawings and tools to make sense of the problem, recognizing non-overlapping angles can be added or subtracted to find missing angles (MP.1).

Priority Standards will be summatively assessed throughout Quarter 4. All supporting standards are to be formatively assessed, driving reteaching and instructional adjustments to meet the needs of all students.

Measurement and Data

4.MD.7-Recognize angle measure as additive. When an angle is into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems. **MP.1, MP.4**	Priority Standard
4.MD.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint and understand the	Supporting Standard

concepts of angle measurement.	
4.MD.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	Supporting Standard
Geometry	
4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse) and perpendicular and parallel lines. Identify these in two-dimensional figures. **MP.5, MP.6**	Supporting Standard
4.G.3 Identify lines of symmetry. a. Recognize a line of symmetry for a two-dimensional figure. b. Identify line-symmetric figures and draw lines of symmetry. **MP. 5, MP.7**	Supporting Standard

Grade 4 Math

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Priority Standards and Instructional Unit 9

4th Grade Math
Unit: 9

**This unit is designed to around these practice standards: Students recognize a statistical question is one that has variability in the answer and create such a question of interest to them and for which there are numerical responses (MP.1). After gathering data on a question of interest, students recognize they have many data points and therefore creating a graph helps to analyze the data. In creating the dot plot, students create a scale from 0 to 1 and label the scale to include intervals of 1/8 , 1/4 , 1/2 (MP.6). As they solve problems related to the graph, they stay focused on the reason they created the graph - to provide insights into the question they first posed, so responses focus on the statistical question posed (MP.1).

***Priority Standards will be summatively assessed throughout Quarter 4. All supporting standards are to be formatively assessed, driving reteaching and instructional adjustments to meet the needs of all students.*

Measurement and Data

4.MD.4-Use dot plots to analyze data to a statistical question.
  a. Identify a statistical question focused on numerical data.
  b. Make a dot plot to display a data set of measurements in fractions of a unit (1 2 , 1 4 , 1 8).
  c. Solve problems involving addition and subtraction of fractions by using information presented in dot plots.
MP.1, MP.6
	Priority Standard

Grade 4 Math

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Priority Standards and Instructional Unit 10

**This unit is designed to around these practice standards: Students know relative sizes of measurement units by actually measuring with the units and establishing a reference to an object. For example, recognizing a centimeter is about the width of their finger (MP.5). Students also measure objects using different units within the same system, such as meters and in centimeters (using a meter stick). Record the measurements in a table and notice relationships (MP.8). They explain why this pattern is true, arguing each meter has 100 centimeters, so 3 meters will have 300 centimeters and more generally explaining the smaller the unit the more units there will be when measuring the same object (MP.3). As students solve problems, they attend to and explain the attribute being measured (length or area), the unit being used to measure and make sense of the problem using drawings, tools, or strategies that make sense to them (MP.1, MP.3).

**Priority Standards will be summatively assessed throughout Quarter 3. All supporting standards are to be formatively assessed, driving reteaching and instructional adjustments to meet the needs of all students.

Measurement and Data

4.MD.1 Know relative size of measurement units (mass, weight, liquid volume, length, time) within one system of units (metric system, U.S. standard system and time).
  a. Understand the relationship of measurement units within any given measurement system.
  b. Within any given measurement system, express measurements in a larger unit in terms of a smaller unit.
	Supporting Standard

c. Record measurement equivalents in a two-column table.	

4.MD.2-Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects and money.
   a. Solve measurement problems involving whole number, simple fractions or decimals.
   b. Solve problems that require converting a given measurement from a larger unit to a smaller unit within a common measurement system, such as 2 km = 2,000m.
   c. Visually display measurement quantities using representations such as number lines that feature a measurement scale.
MP.1, MP.4
	Priority Standard

4.MD.3-Apply the area and perimeter formulas for rectangles in real world and mathematical problems.	Supporting Standard
Geometry	
4.G.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence of absence of angles of a specified size. Recognize right triangles as a category and identify right triangles. **MP.7**	Supporting Standard