Davison Community Schools
ADVISORY CURRICULUM COUNCIL
Phase II, April 20, 2015
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Math 3rd grade (2nd grade CAP)

Course Essential Questions:

- How are multiplication and division related?
- How is the unit fraction the foundation for developing an understanding of fractions?
- How are rectangular arrays, area, and multiplication related?
- What are some real-world application where shapes are composed and decomposed to create other shapes?
- How does mathematics help us in finding patterns and relationships in the real-world?
- How does the metric system compare to our place value system?

MAJOR CLUSTERS	- areas of intensive focus, where students need fluent understanding and application of the core concepts.	*approximately 70%*
SUPPORTING CLUSTERS	- rethinking and linking; areas where some material is being covered, but in a way that applies core understandings.	*approximately 20%*
ADDITIONAL CLUSTERS	- expose students to other subjects, though at a distinct, level of depth and intensity.	*approximately 10%*

Tier 3 Vocabulary Words are highlighted in yellow

Unit: 1 Numeration

Essential Questions:

- How and when can we use estimation, including rounding, strategies to solve real world problems?
- How can we use models (e.g., base ten blocks, number line, symbols, etc.) to reason about and show comparisons among numbers?
- How does using estimation and rounding strategies help students work with large numbers in real world context?
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Essential Understanding:

- Rounding is a method of approximating an answer.

Curriculum Standards- DOK noted where applicable with Standards

3.NBT.1 : Use place value understanding to round whole numbers to the nearest 10 or 100. **(DOK 1,2)**

MP-Make sense of problems and persevere in solving them
MP-Reason abstractly and quantitatively
MP-Construct viable arguments and critique the reasoning of others
MP-Model with mathematics
MP-Use appropriate tools strategically
MP-Attend to precision
MP-Look for and make use of structure

MP-Look for and express regularity in repeated reasoning
LEARNING TARGETS

Knowledge/Content **I Know …**	**Skills/Processes** **I Can …**
● how "round or rounding" relates to place value	● round a whole number to the nearest 10 ● round a whole number to the nearest 100 ● read and write numbers in the 100's. ● read and write numbers in the 1000's. ● read and write numbers in the ten and hundred thousands. ● name numbers in different ways. ● locate and compare whole numbers on a number line. ● identify the pattern on a number line and find the missing numbers. ● compare three-digit and four-digit numbers. ● order three-digit and four-digit numbers. ● make an organized list to represent information.

Phase II Curriculum

Unit: 2 Adding Whole Numbers

Essential Questions:	**Essential Understanding:**
● How does understanding place value help us make sense of procedures we use to add and subtract multi-digit numbers (within 1000)? ● Why might someone decompose a number when adding or subtracting? ● How does understanding the properties of operations help us make sense of and solve multi-digit addition and subtraction problems? ● How can one use arithmetic patterns and the properties of operations as strategies to solve multiplication and division problems?	● Rounding is a method of approximating an answer.

Curriculum Standards- DOK noted where applicable with Standards

3.NBT.1 : Use place value understanding to round whole numbers to the nearest 10 or 100. **(DOK 1,2)**

3.NBT.2 (required fluency) : Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. (A range of algorithms may be used.) **(DOK 1,2)**

3.OA.8 : Solve two-step word problems using the four operations. 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. **(DOK 1,2,3)**

***(This standard is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations).

3.OA.9 : Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. 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. **(DOK 1, 2, 3)**

MP-Make sense of problems and persevere in solving them
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MP-Look for and express regularity in repeated reasoning

LEARNING TARGETS

Knowledge/Content I Know …	Skills/Processes I Can …
• how "round or rounding" relates to place value • strategies and algorithms for adding within 1000 • the order of operations • strategies for estimating • arithmetic patterns such as even and odd numbers • patterns in an addition table • patterns in a multiplication table • patterns regarding multiples and sums • a variable is a letter or symbol that stands for the unknown quantity in an equation	• fluently add within 1000 • construct an equation with a letter standing for the unknown quantity • solve two-step word problems using the four operations • justify answers to problems using various estimation strategies • explain rules for a pattern using properties of operations • explain relationships between the numbers in a pattern • use counters to show the 3 properties of addition. • use a hundred chart to add 2-digit numbers. • solve problems by adding with mental math. • solve problems by estimating sums. • add 2-digit numbers. • solve 3-digit addition problems using an expanded algorithm. • use models to show regrouping when adding 3-digit numbers. • add 3-digit numbers on paper without using models. • add three or more addends without using models. • draw a picture to solve a problem.

Phase II Curriculum

Unit: 4: Subtracting Whole Numbers to Solve Problems

Essential Questions:	**Essential Understanding:**
● How does understanding place value help us make sense of procedures we use to add and subtract multi-digit numbers (within 1000)? ● Why might someone decompose a number when adding or subtracting? ● How does understanding the properties of operations help us make sense of and solve multi-digit addition and subtraction problems?	

Curriculum Standards- DOK noted where applicable with Standards

3.NBT.2 (required fluency) : Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. (A range of algorithms may be used.) **(DOK 1,2)**

3.OA.8 : Solve two-step word problems using the four operations. 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. **(DOK 1,2,3)**

*** (This standard is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations).

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LEARNING TARGETS

Knowledge/Content **I Know …**	**Skills/Processes** **I Can …**
● strategies and algorithms for subtracting within 1000 ● the order of operations ● strategies for estimating	● fluently subtract within 1000 ● construct an equation with a letter standing for the unknown quantity ● solve two-step word problems using the four operations ● justify answers to problems using various estimation strategies

	● find the value of an unknown number in an equation. ● subtract 2-digit numbers to solve problems. ● solve 3-digit subtraction problems. ● subtract 3-digit numbers using models. ● subtract 3-digit numbers to solve problems. ● subtract 3-digit numbers using models to solve problems. ● solve problems by drawing pictures to solve the number sentence. ● show my understanding of subtracting whole numbers. ● show my understanding of subtracting whole numbers.

Phase II Curriculum

Unit: Topic 5: Multiplication Meaning and Facts

Essential Questions:	**Essential Understanding:**
• How can knowing a multiplication fact help you solve a related division problem? • How can knowing a multiplication fact help you solve another multiplication fact? • How can we represent multiplication and division using a variety of models (e.g., array and number line)? • What does it mean when we say that multiplication and division are inverse operations and how does this connect to fact families? • How can we use what we know about addition and subtraction to help us make sense of multiplication and division? • How can one use a known multiplication or division fact to solve a related multiplication or division fact?	• Multiplication and division are related operations. • The operations of multiplication and division are related to Area. • Real world situations involving equal groups and area can be represented with multiplication and division equations and models.

Curriculum Standards- DOK noted where applicable with Standards

3.OA.1 : Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 × 7. **(DOK 1,2)**

3.OA.3 : Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.**(DOK 1,2)**

3.OA.4 : Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = __÷ 3, 6 × 6 = ?. **(DOK 1,2)**

3.OA.5: Apply properties of operations as strategies to multiply and divide. Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15 then 15 × 2 = 30, or by 5 × 2 = 10 then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. **(DOK 1,2)** (Distributive property.) (Students need not use formal terms for these properties.)

3.OA.7 (required fluency) : Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of one-digit numbers. **(DOK 1,2)**

3.OA.8 : Solve two-step word problems using the four operations. 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. (This standard is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations). **(DOK 1,2,3)**

Table 3: Multiplication and division situations

	$A \times B = \square$	$A \times \square = C$ and $C \div A = \square$	$\square \times B = C$ and $C \div B = \square$
Equal Groups of Objects	Unknown Product There are A bags with B plums in each bag. How many plums are there in all?	Group Size Unknown If C plums are shared equally into A bags, then how many plums will be in each bag?	Number of Groups Unknown If C plums are to be packed B to a bag, then how many bags are needed?
Arrays of Objects	*Equal groups language* Unknown Product There are A rows of apples with B apples in each row. How many apples are there?	Unknown Factor If C apples are arranged into A equal rows, how many apples will be in each row?	Unknown Factor If C apples are arranged into equal rows of B apples, how many rows will there be?
	Row and column language Unknown Product The apples in the grocery window are in A rows and B columns. How many apples are there?	Unknown Factor If C apples are arranged into an array with A rows, how many columns of apples are there?	Unknown Factor If C apples are arranged into an array with B columns, how many rows are there?
Compare	$A > 1$ Larger Unknown A blue hat costs \$$B$. A red hat costs A times as much as the blue hat. How much does the red hat cost?	Smaller Unknown A red hat costs \$$C$ and that is A times as much as a blue hat costs. How much does a blue hat cost?	Multiplier Unknown A red hat costs \$$C$ and a blue hat costs \$$B$. How many times as much does the red hat cost as the blue hat?
	$A < 1$ Smaller Unknown A blue hat costs \$$B$. A red hat costs A as much as the blue hat. How much does the red hat cost?	Larger Unknown A red hat costs \$$C$ and that is A of the cost of a blue hat. How much does a blue hat cost?	Multiplier Unknown A red hat costs \$$C$ and a blue hat costs \$$B$. What fraction of the cost of the blue hat is the cost of the red hat?

Adapted from box 2–4 of *Mathematics Learning in Early Childhood: Paths Toward Excellence and Equity*, National Research Council, 2009, pp. 32–33.

3.OA.9 : Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. 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. **(DOK 1,2,3)**

MP-Make sense of problems and persevere in solving them
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MP-Construct viable arguments and critique the reasoning of others
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LEARNING TARGETS

Knowledge/Content I Know …	Skills/Processes I Can …
• the product of multiple groups of objects • from memory all products of two one-digit numbers • the order of operations • strategies for estimating • arithmetic patterns such as even and odd numbers • patterns in an addition table • patterns in a multiplication table • patterns regarding multiples and sums	• interpret products of whole numbers as a total number of objects in a number of groups • multiply and divide within 1000 • solve word problems in situations involving equal groups arrays, and measurement quantities • represent word problems using a picture, an equation with a symbol for the unknown number, or in other ways • determine which operation (multiplication or division) is needed to determine the unknown whole number • solve to find the unknown whole number in a multiplication or division equation • explain how the properties of operations work • apply properties of operations as strategies to multiply and divide • fluently multiply and divide within 1000 • analyze multiplication or division problems in order to choose an appropriate strategy to fluently multiply or divide within 100 • construct an equation with a letter standing for the unknown quantity • solve two-step word problems using the four operations • justify answers to problems using various estimation strategies • explain rules for a pattern using properties of operations • explain relationships between the numbers in a pattern

Unit: 6/18 Multiplication Fact Strategies: Use Known Facts and Multiplying Greater Numbers

Essential Questions:	**Essential Understanding:**
• How can knowing a multiplication fact help you solve a related division problem? • How can knowing a multiplication fact help you solve another multiplication fact? • How can we represent multiplication and division using a variety of models (e.g., array and number line)? • What does it mean when we say that multiplication and division are inverse operations and how does this connect to fact families? • How can we use what we know about addition and subtraction to help us make sense of multiplication and division?	• Multiplication and division are related operations. • The operations of multiplication and division are related to Area. • Real world situations involving equal groups and area can be represented with multiplication and division equations and models.

Curriculum Standards- DOK noted where applicable with Standards

3.OA.1: Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 × 7. **(DOK 1,2)**

3.OA.3 : Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. **(DOK 1,2)**

3.OA.5: Apply properties of operations as strategies to multiply and divide. Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15 then 15 × 2 = 30, or by 5 × 2 = 10 then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.) (Students need not use formal terms for these properties.) **(DOK 1,2)**

3.OA.8 : Solve two-step word problems using the four operations. 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. (This standard is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations). **(DOK 1,2,3)**

3.NBT.3 : 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. (A range of algorithms may be used.) **(DOK 1,2)**

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MP-Look for and express regularity in repeated reasoning

LEARNING TARGETS

Knowledge/Content I Know …	Skills/Processes I Can …
• the product of multiple groups of objects • the order of operations • the strategies for estimating	• interpret products of whole numbers as a total number of objects in a number of groups • multiply and divide within 100 • solve word problems in situations involving equal groups, arrays, and measurement quantities • represent a word problem using a picture, an equation with a symbol for the unknown number, or in other ways • explain how the properties of operations work • apply properties of operations as strategies to multiply and divide • construct an equation with a letter standing for the unknown quantity • solve two-step word problems using the four operations • justify answers to problems using various estimation strategies

Phase II Curriculum

Unit: 7 Division Meanings

Essential Questions:	**Essential Understanding:**
• How can knowing a multiplication fact help you solve a related division problem? • How can knowing a multiplication fact help you solve another multiplication fact? • How can we represent multiplication and division using a variety of models (e.g., array and number line)? • What does it mean when we say that multiplication and division are inverse operations and how does this connect to fact families? • How can we use what we know about addition and subtraction to help us make sense of multiplication and division?	• Multiplication and division are related operations. • The operations of multiplication and division are related to Area. • Real world situations involving equal groups and area can be represented with multiplication and division equations and models.

Curriculum Standards- DOK noted where applicable with Standards

3.OA.2 : Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8. **(DOK 1,2)**

3.OA.3 : Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. **(DOK 1,2)**

3.OA.4 : Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = __ ÷ 3, 6 × 6 = ?.**(DOK 1,2)**

3.OA.6 : Understand division as an unknown-factor problem. For example, divide 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.**(DOK 1,2)**

MP-Make sense of problems and persevere in solving them

MP-Reason abstractly and quantitatively

MP-Construct viable arguments and critique the reasoning of others

MP-Model with mathematics

MP-Use appropriate tools strategically

MP-Attend to precision

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MP-Look for and express regularity in repeated reasoning

LEARNING TARGETS

Knowledge/Content I Know …	Skills/Processes I Can …
• what the numbers in a division problem represent • how to multiply and divide within 100 • that a multiplication problem is related to division problems • how to identify the unknown factor in the related multiplication problem • that when dividing the left overs are called remainders. • the relationship between equal groups and arrays • a quotient to be the number of objects in each equally partitioned share.	• explain what division means and how it relates to equal shares • interpret quotients as the number of shares or the number of groups when a set of objects is divided equally • solve word problems in situations involving equal groups, arrays, and measurement quantities • represent a word problem using a picture, an equation with a symbol for the unknown number, or in other ways • determine which operations (multiplication or division) is needed to determine the unknown whole number • solve to find the unknown whole number in a multiplication or division equation • recognize multiplication and division as related operations • explain how multiplication and division are related • use multiplication to solve division problems • use models to solve division problems. • find missing numbers in a multiplication chart. • use models to solve division using repeated subtraction. • solve word problems using problem solving strategies. • write and solve number stories involving division. • will solve problems by using objects or drawing pictures.

Phase II Curriculum

Unit: 8 Division Facts

Essential Questions:	**Essential Understanding:**
● How can knowing a multiplication fact help you solve a related division problem? ● How can knowing a multiplication fact help you solve another multiplication fact? ● How can we represent multiplication and division using a variety of models (e.g., array and number line)? ● What does it mean when we say that multiplication and division are inverse operations and how does this connect to fact families? ● How can we use what we know about addition and subtraction to help us make sense of multiplication and division?	● Multiplication and division are related operations. ● The operations of multiplication and division are related to Area. ● Real world situations involving equal groups and area can be represented with multiplication and division equations and models.

Curriculum Standards- DOK noted where applicable with Standards

3.OA.2 : Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8. **(DOK 1,2)**

3.OA.3 : Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. **(DOK 1,2)**

3.OA.4 : Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = __ ÷ 3, 6 × 6 = ?. **(DOK 1,2)**

3.OA.6 : Understand division as an unknown-factor problem. For example, divide 32 ÷ 8 by finding the number that makes 32 when multiplied by 8. **(DOK 1,2)**

3.OA.7 (Required Fluency): Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of one-digit numbers. **(DOK 1,2)**

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LEARNING TARGETS

Knowledge/Content I Know …	Skills/Processes I Can …
• what the numbers in a division problem represent • how to multiply and divide within 100 • that a multiplication problem is related to a division problems • how to identify the unknown factor in the related multiplication problem • that when dividing the left overs are called remainders. • the relationship between equal groups and arrays • from memory all products of two one-digit numbers • a quotient to be the number of objects in each equally partitioned share.	• explain what division means and how it relates to equal shares • interpret quotients as the number of shares or the number of groups when a set of objects is divided equally • solve word problems in situations involving equal groups, arrays, and measurement quantities • represent a word problem using a picture, an equation with a symbol for the unknown number, or in other ways • determine which operations (multiplication or division) is needed to determine the unknown whole number • solve to find the unknown whole number in a multiplication or division equation • recognize multiplication and division as related operations • explain how multiplication and division are related • I can relate multiplication and division problems. • fluently multiply and divide within 100 • analyze a multiplication or division problem in order to choose an appropriate strategy to fluently multiply or divide within 100 • I will find quotients for facts with divisors of 2, 3, 4, or 5. • I can give quotients for division facts with divisors of 6 and 7. • I can give quotients for division facts with divisors of 8 and 9. • I can use multiplication and division facts to find an unknown number in an equation. • I can use patterns to solve division problems with 0 and 1. • I can use problem solving strategies to solve problems using division.

Unit: 10/9 Solids, Shapes and Geometric Patterns

Essential Questions:	Essential Understanding:
● How can 2-dimensional shapes be described? ● How are geometric figures constructed? ● How does analyzing attributes of shapes assist in comparing and classifying two-dimensional shapes? ● How does recognizing characteristics of angles help in identifying specific quadrilaterals? ● How can pairs of sides (line segments) within a shape be described? ● What are some tools we can use to analyze attributes of two-dimensional figures? ● How does recognizing characteristics of angles help in classifying quadrilaterals?	● Objects can be described and compared using their geometric attributes. ● Figures are categorized according to their attributes.

Curriculum Standards- DOK noted where applicable with Standards

3.G.1 : Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories. **(DOK 1,2)**

3.G.2. : Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part is 1/4 of the area of the shape. **(DOK 1,2)**

3.OA.9 : Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. 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. **(DOK 1,2, 3)**

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LEARNING TARGETS

Knowledge/Content I Know …	Skills/Processes I Can …
● rhombuses, rectangles, and squares are examples of quadrilaterals based on their attributes	● describe, analyze, and compare properties of two-dimensional shapes ● compare and classify shapes by attributes to define a larger category (eg., quadrilaterals)

• that shapes can be partitioned into equal areas • the area of each part of a whole is called a fractional part. • the order of operations • strategies for estimating	• group shapes with shared attributes to define a larger category (eg., quadrilaterals) • draw examples of quadrilaterals that do and do not belong to any of the subcategories • relate fractions to geometry by expressing the area of part of a shape as a unit fraction of the whole • construct an equation with a letter standing for the unknown quantity • solve two-step word problems using the four operations • justify answers to problems using various estimation strategies • I can identify and extend patterns • I can identify and extend whole number patterns involving additions and subtractions • I can extend tables of ordered pairs for multiplication, addition and subtraction • I can extend patterns of cubes or tiles • I can identify solid figures by name and describe their attributes • I can identify shapes related to given solids • I can identify lines,line segments and explain their different relationships • I can identify and classify angles in relation to right angles • I can identify and classify polygons • I can identify and classify triangles • I can identify and classify quadrilaterals . • I can create new shapes by combining shapes or by separating shapes • I can make a new shape cutting apart a shape and rearranging the pieces • I can identify things in common among objects or situations to make or test generalizations.

Phase II Curriculum

Unit: 12 Understanding Fractions

Essential Questions:	**Essential Understanding:**
• How can fractions be represented visually and symbolically? • How can understanding unit fractions help us make sense of, build, and use other fractions? • How can we use the size of the unit to reason about fractions? • How can understanding equivalent fractions help us solve problems? • Are there fractions equal to and/or greater than one? If yes, why? If no, why not?	• The size of the fractional part is relative to the size of the whole. • Fractions represent quantities where a whole is divided into equal-sized parts using models, manipulatives, words, and/or number lines. • Fractions can be used as a tool to understand and model quantities and relationships. • Fractions are composed of unit fractions. • Fractions that represent equal-sized quantities are equivalent.

Curriculum Standards- DOK noted where applicable with Standards

3.G.2 : Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part is 1/4 of the area of the shape. **(DOK 1,2)**

3.NF.1 : Understand a fraction 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. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.) **(DOK 1,2)**

3.NF.2: Understand a fraction as a number on the number line; represent fractions on a number line diagram. **(DOK 1,2)**

3.NF.2A : Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line. **(DOK 1,2)**

3.NF.2B : Represent a fraction a/b on a number line diagram by 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. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.) **(DOK 1,2)**

3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.) **(DOK 1,2,3)**

3.NF.3A : A. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. **(DOK 1,2,3)**

3.NF.3B : Recognize and generate simple equivalent fractions (e.g., 1/2 = 2/4, 4/6 = 2/3), Explain why the fractions are equivalent, e.g., by using a visual fraction model.**(DOK 1,2,3)**

3.NF.3C: Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3=3/1; recognize that 6/1=6; locate 4/4 and 1 at the same point of a number line diagram. **(DOK 1,2,3)**

3.NF.3D : Compare two fractions with the same numerator or the same denominator by reasoning about their

sizes. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, < and justify the conclusions, e.g., by using a visual fraction model.

MP-Make sense of problems and persevere in solving them
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MP-Model with mathematics
MP-Use appropriate tools strategically
MP-Attend to precision
MP-Look for and make use of structure
MP-Look for and express regularity in repeated reasoning

LEARNING TARGETS

Knowledge/Content **I Know …**	**Skills/Processes** **I Can …**
• that shapes can be partitioned into equal areas • the area of each part of a whole is called a fractional part. • a unit fraction such as 1/b as the quantity formed when the whole is partitioned into b equal parts • a fraction such as a/b is a equal parts of the whole partitioned into b equal parts • the interval from 0 to 1 on the number line as the whole • how to divide a whole on a number line into equal parts • that the equal parts between 0 and 1 have a fractional representation • examples of equivalent fractions • how whole numbers can be written in fractional parts on a number line • the difference between a whole number and a fraction • what the numerator in a fraction represents and its location on a number line diagram • what the denominator in a fraction represents and its location on a number line diagram • the numerator is above the fraction bar and the denominator is below it • how to recognize whether or not different fractions refer to the same whole • how a fraction is equivalent to a whole number	• describe, analyze, and compare properties of two-dimensional shapes • compare and classify shapes by attributes to define a larger category (eg., quadrilaterals) • group shapes with shared attributes to define a larger category (eg., quadrilaterals) • draw examples of quadrilaterals that do and do not belong to any of the subcategories • express a fraction as the number of unit fractions • use accumulated unit fractions to represent numbers equal to, less than, and greater than, one • explain that the end of each equal part is represented by a fraction (1/the number of equal parts) • explain that the endpoint of each equal part represents the total number of equal parts • represent each equal part on a number line with a fraction • define the interval from 0 to 1 on a number line as the whole • divide a whole on a number line into equal parts • represent each equal part on a number line with a fraction • compare fractions by reasoning about their size to determine equivalence • determine if comparisons of fractions can be made (if the refer to the same whole) • compare two fractions with the same numerator by reasoning about their size • compare two fractions with the same denominator by reasoning about their size • record the results of comparisons using symbols >,=, or< • justify conclusions about the equivalence of fractions • use number lines, size, visual fraction models, etc. to find equivalent fractions

Unit:16 Perimeter, Area and Volume

Essential Questions:	Essential Understanding:
● How are area and perimeter similar? How are they different? ● What is the relationship between the size of measurement units and the number of units needed to measure perimeter or area? ● What does it mean to measure with precision? ● How can I figure out which tool is most appropriate to use to measure in a given situation? ● How is a square unit similar to and different from a linear unit? ● What strategies can help us solve measurement problems (e.g., composition/decomposition of shape and distributive property)?	● Everyday objects have a variety of attributes, each of which can be measured in many ways. ● Everyday objects have a variety of attributes, each of which can be measured in many ways. ● Area and addition are related. ● Perimeter and area are related.

Curriculum Standards- DOK noted where applicable with Standards

3.MD.5 : Recognize area as an attribute of plane figures and understand concepts of area measurement. **(DOK 1,2)**

3.MD.5A : A square with side length 1 unit, called "a unit square" is said to have "one square unit" of area and can be used to measure area. **(DOK 1,2)**

3.MD.5B :. 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.**(DOK 1,2)**

3.MD.6 : Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).**(DOK 1,2)**

3.MD.7 : Relate area to the operations of multiplication and addition. **(DOK 1,2)**

3.MD.7A: Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.**(DOK 1,2)**

3.MD.7B : 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.**(DOK 1,2)**

3.MD.7C : 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 × b and a × c. Use area models to represent the distributive property in mathematical reasoning.**(DOK 1,2)**

3.MD.7D : Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems. **(DOK 1,2)**

3.MD.8 : 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. **(DOK 1,2)**

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MP-Reason abstractly and quantitatively

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LEARNING TARGETS

Knowledge/Content **I Know …**	**Skills/Processes** **I Can …**
• what a "unit square" is • what area is • that area is measured by counting unit squares • that areas of each rectangle in a rectilinear (straight line) figure can be added together to find the area of the figure • the area of a rectangle relates to multiplication and addition and this can be modeled through the distribution property • what a polygon is • what perimeter is	• relate the number (n) of unit squares to the area of a plane figure • cover the area of a plane figure with unit squares without gaps or overlaps • use unit squares of cm, m, in, ft, and other sizes of unit squares to measure area • compare the area found by tiling a rectangle to the area found by multiplying the side lengths • multiply side lengths to find areas of rectangles • multiply using an area model (array) • find areas of rectangles • add areas of rectangles • solve real-world and mathematical area problems by multiplying side lengths of rectangles • use rectangular arrays to represent whole-number products in multiplication problems • use the technique of decomposing rectilinear figures to find the area of each rectangle to solve real world problems • find the area of a rectangle by tiling it in unit squares • find the side length of a rectangle in units • decompose rectilinear figures into non-overlapping rectangles • find the perimeter when given the length of sides • find the perimeter when there is an unknown side length • design, create, draw, model, etc. rectangles with the same perimeter and different areas • design, create, draw, model, etc. rectangles with the same area and different perimeters

Unit: 20 Data, Graphs and Probability

Essential Questions:	Essential Understanding:
• How do we use data represented in bar graphs and picture graphs to make sense of world around us? • How does one use multiplication when representing and interpreting data? • Where and how do we use number lines when we measure? • What does it mean to be precise when we measure? How are precision and estimation related when we measure? • How does representing data help us solve real-world and mathematical problems? • Why and how do we use tools to collect (e.g., rulers) and record (e.g., line plots) data? How do we know which tool is most appropriate to use to measure?	• Information can be represented in bar graph and picture graph form. • These graphs can be used to help us solve one and two- step math problems.

Curriculum Standards- DOK noted where applicable with Standards

3.MD.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 presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets. **(DOK 1,2)**

3.MD.4 : Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. **(DOK 1,2)**

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LEARNING TARGETS

Knowledge/Content I Know …	Skills/Processes I Can …
• how to explain what and identify the scale of a graph with a scale greater than one • what the horizontal axis is	• analyze a graph with a scale greater than one • choose a proper scale for a bar graph or picture graph • interpret a bar/picture graph to solve one- or

• each plot on the line as data or a number of objects	two-step problems asking “how many more” and “how many less” • create a scaled picture graph to show data • create a scaled bar graph to show data • analyze data from a line plot • determine an appropriate unit of measurement • determine an appropriate scale for a line plot • generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch • create a line plot where the horizontal scale is marked off in appropriate units - whole numbers, halves, or quarters

Phase II Curriculum

Unit: 15: Metric Measurement

Essential Questions:	**Essential Understanding:**
• How does metric measurement connect to multiples of 10? • What does it mean to be precise when we measure? • How are precision and estimation related when we measure? • How does representing data help us solve real-world and mathematical problems?	• Metric measurement units are related to place value concepts/multiples of 10.

Curriculum Standards- DOK noted where applicable with Standards

3.MD.2 : measure and estimate liquid volumes and masses of objects using standard units of grams(g), kilograms(kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.

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LEARNING TARGETS

Knowledge/Content **I Know …**	**Skills/Processes** **I Can …**
• how to measure liquid volume in liters • how to measure mass in grams and kilograms • various strategies to represent a word problem involving liquid volume or mass	• solve one-step word problems involving masses given in the same units • solve one-step word problems involving liquid volume given in the same units • measure liquid volumes using standard units of liters • measure mass of objects using standard units of grams (g) and kilograms (kg) • Add, subtract, multiply, and divide units of liters, grams, and kilograms • choose and identify an appropriate unit and tool to estimate and measure in milliliters and liters. • choose and identify an appropriate unit and tool to estimate and measure in grams and kilograms.

Phase II Curriculum

Unit: 17: Time and Temperature

Essential Questions:	**Essential Understanding:**
● How does elapsed time help us to plan and organize real life responsibilities? ● Where and how do we use number lines when we measure?	● Elapsed time is the interval of time, given a specific unit, from a starting time to an ending time.

Curriculum Standards- DOK noted where applicable with Standards

3.MD.1 : Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram. **(DOK 1,2)**

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LEARNING TARGETS

Knowledge/Content **I Know …**	**Skills/Processes** **I Can …**
● minute marks on an analog clock face and minute position on a digital clock face ● how to write time to the minute ● how to use an elapsed time line to add and subtract time intervals in minutes ● A.M. represents time from midnight to noon. ● P.M. represents time from noon to midnight. ● 60 min = 1 hour.	● compare an analog clock face with a number line diagram ● use a elapsed time number line diagram to add and subtract time intervals in minutes ● solve word problems involving addition and subtraction of time intervals in minutes ● tell time to the nearest minute.
