Title: Writing or selecting the expanded form for up to 3 digit number.

Grade: 3

PA Core Standard: CC.2.1.3.B.1 Apply place value understanding and properties of operations to perform multi-digit arithmetic.

PA Connector:		Write or select the expanded form for up to 3 digit number.

Strand: Number and Operations	**Family:** Understanding base Ten Number System

Progress Indicator: *E.NO.1j applying place value concepts to: read, write, and compare whole numbers up to 100,000; use expanded form; and round numbers to a given place*

Big Idea(s): Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.

Essential Question(s): What does it mean to estimate or analyze numerical quantities?

Foundational Knowledge:

- Identify digits in the ones, tens, or hundreds place
- Identify the value of each digit in a number
- Model a number using place value blocks
- Decompose a number based on its place value
- Compose a number if given the expanded form

Key Vocabulary, Concepts and Symbols:

- Understand the concepts, symbols, and vocabulary -Place value, ones, tens, hundreds

Suggested Instructional Strategies:

- Decompose the same number in various ways
  - 532 is "5 hundreds, 3 tens, 2 ones" or 500+30+2
  - 532 is "53 tens and 2 ones" or 530+2
  - 532 is "532 ones"
- Compose numbers given different representations
  - 4 hundreds, 2 tens, and 5 ones is $400 + 20 + 5$ is 425
  - 51 tens and 2 ones is $510 + 2$ is 512
- Use place value blocks to compose and decompose numbers

Supports, Scaffolds, and Considerations:

- Place value Mat
  - For an electronic copy: http://exchange.smarttech.com/details.html?id=7751cf63-0944-40d7-8007-531d51b4f18c
- Place value cards
- Start with color coded templates as it relates to tens and ones and remove for generalization
- Expanded form template (e.g., _____ + _____)
- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)

Key Word Search: place value, expanded form

Title: Identifying the number of highlighted parts (numerator) of a given representation (rectangles and circles).

Grade: 3

PA Core Standard: CC.2.1.3.C.1 Explore and develop an understanding of fractions as numbers.

PA Connector:		Identify the number of highlighted parts (numerator) of a given representation (rectangles and circles).

Strand: Numbers and Operations	**Family:** Representing

Progress Indicator: *E.NO.1l identifying and locating fractions on the number line or as regions, or parts of a set or unit, and recognizing that whole numbers are a subset of rational numbers*

Big Idea(s): Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations.

Essential Question(s): How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations?

Foundational Knowledge:

- Understands that fractions are equal parts of a whole (i.e., Describe that the denominator of a fraction represents the number of equal parts within a whole (length unit or region)
- Apply understanding that the numerator represents the parts of the whole (how many of the parts are being considered; should begin with unit fractions which have a numerator of 1)
- Count using one to one correspondence

Key Vocabulary, Concepts and Symbols:

- Understand concepts, symbols, and vocabulary: numerator, fraction, equal parts

Suggested Instructional Strategies:

- Use manipulatives such as paper folding as a way to break a rectangle into equal parts, starting with 2, 4 and 8 equal pieces. Then, 3 and 6 equal pieces
- Model-Lead-Test*
- Partitioning- breaking an object or set of objects into pieces
- Example-use cutout of pizza with fractions written on them that can be placed on a template (including circles and rectangles)
- Make connections between different representations of the fractions (for example: connection between 3 out of 8 pieces on a folded paper, 3 of 8 pieces of the apples, 3/8, the words 'three-eighths' and location of three-eighths (3/8) on a number line)
- In an array of 3 where at least two items in the array have the same denominator, when asked, locate (differentiate) the correct response. (for example, 3/8, 1/8, 2/8 or 1/8, 3/8, 3/4)

Supports and Scaffolds Considerations:

- Visual models with pre-marked and pre-divided regions
- Utilize the number line to support students with counting and one to one correspondence
- Graph paper
- Varied manipulatives
- Rectangles and circles with raised edges on highlighted section
- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)
- iPad applications
- Objects (e.g., apples) shared equally and matched with a fraction card

Key Word Search:

numerator, fraction

Title: Identifying the total number of parts (denominator) of a given representation (rectangles and circles).

Grade: 3

PA Core Standard: CC.2.1.3.C.1 Explore and develop an understanding of fractions as numbers.

PA Connector:		Identify the total number of parts (denominator) of a given representation (rectangles and circles).

Strand: Numbers and Operations	**Family:** Representing

Progress Indicator: *E.NO.1l identifying and locating fractions on the number line or as regions, or parts of a set or unit, and recognizing that whole numbers are a subset of rational numbers*

Big Idea(s): Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations.

Essential Question(s): How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations?

Foundational Knowledge:

- Understands that fractions are equal parts of a whole (i.e., Describe that the denominator of a fraction represents the number of equal parts within a whole (length unit or region)
- Understand that the denominator of the fraction indicates the total number of equal parts in one whole
- Count using one to one correspondence

Key Vocabulary, Concepts and Symbols:

- Understand concepts, symbols, and vocabulary: denominator, fraction, equal parts

Suggested Instructional Strategies:

- Use manipulatives such as paper folding as a way to break a rectangle into equal parts, starting with 2, 4 and 8 equal pieces. Then, 3 and 6 equal pieces
- Model-Lead-Test*
- Partitioning- breaking an object or set of objects into pieces
- Example-use cutout of pizza with fractions written on them that can be placed on a template (including circles and rectangles)
- Make connections between different representations of the fractions (for example: connection between 3 out of 8 pieces on a folded paper, 3 of 8 pieces of the apples, 3/8, the words 'three-eighths' and location of three-eighths (3/8) on a number line)
- In an array of 3 where at least two items in the array have the same numerator, when asked, locate (differentiate) the correct response. (for example, 3/8, 3/4, 3/5 or 3/8, 2/3, 3/4)

Supports and Scaffolds Considerations:

- Visual models with pre-marked and pre-divided regions
- Utilize the number line to support students with counting and one to one correspondence
- Graph paper
- Manipulatives
- Rectangles and circles with raised edges on highlighted section
- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)
- IPad applications
- Objects (e.g., apples) shared equally and matched with a fraction card

Key Word Search:

denominator, fraction

Title: Identifying the fraction that matches the representation for halves, fourths, or eighths		
Grade: 3		
PA Core Standard: CC.2.1.3.C.1 Explore and develop an understanding of fractions as numbers.		
PA Connector:		Identify the fraction that matches the representation for halves, fourths, or eighths (rectangles and circles).
Strand: Numbers and Operations	**Family:** Representing	
Progress Indicator: *E.NO.1l identifying and locating fractions on the number line or as regions, or parts of a set or unit, and recognizing that whole numbers are a subset of rational numbers*		
Big Idea(s): Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations.		
Essential Question(s): How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations?		
Foundational Knowledge: • Identify the parts and the whole when a region is partitioned or when item is divided • Count the number of the parts selected (e.g., 3 of the 4 parts; have fraction present but not required to read ¾) • Understand how parts of a whole can be expressed as fractions using numbers • Understand a fraction *1/b* as the quantity formed by 1 part when a whole is partitioned into b equal parts; • Ability to recognize that fraction bars of equal lengths can be divided into different numbers of equal parts/units • Understand a fraction *a/b* as the quantity formed by *a* parts of size *1/b* including times where *a* is greater than *b*		
Key Vocabulary, Concepts and Symbols: • Understand concepts, symbols, and vocabulary: numerator, denominator, _/_, halves, fourths, eighths		

Suggested Instructional Strategies:

- Before introducing fraction, use fraction bars:
  - Describe a fraction bar in multiple ways (e.g., present a fraction bar with four parts and two parts shaded red and describe the representation as the color and the number of parts shaded (a red bar with two parts shaded); four parts and two parts shaded (without using color); or two out of four parts are shaded
  - When explicitly teaching how to use the fraction bar, indicate that parts out of total parts shaded (e.g. two out of four parts shaded) is the language we use to name the fraction (2/4)
- Teach fractions explicitly as a way to indicate part of a whole including times when the number of parts will be greater than the whole.
- Teach explicitly that as the numerator increases, there will be more parts and sometimes there will be more parts than can fit in the whole (for ex. 3/2 is made of three ½)
- Task Analysis
  - Present a shaded fraction bar with the associated fraction.
  - State that the number is called a fraction.
  - State how to determine the fraction (e.g. I have a blue bar with 4 parts/units. Two of the parts are shaded. The fraction is two over four or two fourths.
  - State that for the fraction (e.g., 2/4), the denominator means to divide something into "four" equal parts and the numerator "2" indicates 2 of these parts.
  - Present the fraction and have the student create/select the associated representation of the fraction
- Have the student give fraction statements that are true for a provided group of objects. For example, 2 out of 3 or 2/3 of the pencils are yellow. Show the corresponding fraction.
  - Provide "hands on" opportunities to create fractions (e.g., salt dough, pies)

Supports and Scaffolds Considerations:

- Geoboards
- Dot-paper
- Cuisenaire rods
- Color tiles
- Pattern blocks or sets of objects
- Pie diagrams
- Fraction bars that are ruled into certain fixed partitions
- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)
- Objects (e.g., apples) shared equally and matched with a fraction card

Key Word Search:

numerator, denominator, fraction

Title: Representing a fraction 1/b by partitioning a rectangle or circle into b equal parts		
Grade: 3		
PA Core Standard: CC.2.1.3.C.1 Explore and develop an understanding of fractions as numbers.		
PA Connector:		Represent a fraction 1/b by partitioning a rectangle or circle into b equal parts (b=2, 4, or 8).
Strand: Numbers and Operations	**Family:** Representing	
Progress Indicator: *E.NO.1l identifying and locating fractions on the number line or as regions, or parts of a set or unit, and recognizing that whole numbers are a subset of rational numbers*		
Big Idea(s): Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations.		
Essential Question(s): How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations?		
Foundational Knowledge: • Understand how parts of a whole can be expressed as fractions using numbers • Understand a fraction *1/b* as the quantity formed by 1 part when a whole is partitioned into b equal parts; • Ability to recognize that fraction bars of equal lengths can be divided into different numbers of equal parts/units		
Key Vocabulary, Concepts and Symbols: • Understand concepts, symbols, and vocabulary: partition, divide, equal parts, fraction		
Suggested Instructional Strategies: • Use multiple exemplar to teach parts of a whole* • Teach across a variety of manipulatives such as paper folding as a way to break a rectangle into equal parts, starting with 2, 4 and 8 equal pieces. •		
Supports and Scaffolds Considerations: • Color tiles • Pattern blocks or sets of objects • Pie diagrams • Fraction bars that are ruled into certain fixed partitions • Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device) • Objects (e.g., apples) shared equally and matched with a fraction card		
Key Word Search: partition, divide, fraction		

Title: Selecting a model of a given fraction showing halves, fourths, or eighths

Grade: 3

PA Core Standard: CC.2.1.3.C.1 Explore and develop an understanding of fractions as numbers

PA Connector:		Select a model of a given fraction showing halves, fourths, or eighths (rectangles and circles)

Strand: Numbers and Operations	**Family:** Representing

Progress Indicator: *.NO.1n comparing and modeling fractions, including with different denominators*

Big Idea(s): Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations.

Essential Question(s): How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations?

Foundational Knowledge:

- Differentiate between parts and a whole and the whole itself
- Understand the structure of a fraction(i.e., Describe that the denominator of a fraction represents the number of equal parts within a whole (length unit or region)
-

Key Vocabulary, Concepts and Symbols:

- Understand the components of a fraction (numerator and denominator)
- Understand concept, symbols and vocabulary: fraction, numerator and denominator, vocabulary within the context of the problem

Suggested Instructional Strategies:

- Teach numerator = part and denominator = whole using a model. Types of models may include area or region models (e.g., pattern blocks, pie pieces, and grid or dot paper), length models (e.g., number lines, Cuisenaire rods, fraction rods, line segment drawings, etc.) and set models (e.g., drawings using X's and O's, two-color counters in loops on paper).
- Time Delay*
- Have students demonstrate a fraction by shading in the correct number of units given a fraction bar with 2, 4, or 8 units
- Use multiple exemplar training*
- Use Least to Most prompting*
    - Have the student give fraction statements that are true for a provided group of objects. For example, say, "2/6 of the pencils are yellow. Show the corresponding/matching fraction." Using a shaded fraction bar, say "This show 2 parts out of 6/6 parts with 2 shaded/2 parts shaded out of 6. Show the corresponding/matching fraction."

Supports and Scaffolds Considerations:

- Rectangle segmented into parts (vs. a pizza)
- Objects to model fractions
- Linear models (fraction bars, number lines)
- Software such as Smart boards to create and manipulate models of fractions
- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)

Key Word Search: numerator, denominator, fraction

Title: Using the relationships between addition and subtraction to solve problems		
Grade: 3		
PA Core Standard: CC.2.1.3.B.1 Apply place value understanding and properties of operations to perform multi-digit arithmetic		
PA Connector:		Use the relationships between addition and subtraction to solve problems
Strand: Numbers and Operations	**Family:** Perform Operations with Whole Numbers	
Progress Indicator *E.NO.2b explaining or modeling the relationship between addition and subtraction*		
Big Idea(s): Mathematical relationships among numbers can be represented, compared, and communicated.		
Essential Question(s): How is mathematics used to quantify, compare, represent, and model numbers?		
Foundational Knowledge: • Identify situations where you would add or subtract numbers • Model solving addition/subtraction problems using manipulatives • Use less complex addition problems, based upon the students' instructional level, to complete subtraction (e.g., $12 - 7 = ?$, "Seven plus what would give me 12?" or "Seven plus what would make ten… and two more would make twelve.") • Use less complex addition problems, based upon the students' instructional level, to complete subtraction (e.g., $6 + \square = 9?$, "Nine minus six would give me what number left over?" or "what is the difference between nine and six?"		
Key Vocabulary, Concepts and Symbols: • Understand the following concepts and vocabulary: add, subtract, sum, difference, total		
Suggested Instructional Strategies: • Use a problem solving template with base 10 blocks; have students build the start number in one of the spaces then either add another pile or subtract by removing base 10 blocks from the start pile. • Model decomposing numbers using number sentences paired with manipulatives o $3 + 4 = 7,\ 4 + 3 = 7,\ 7 - 4 = 3,\ 7 - 3 = 4$ o $1 + 6 = 7,\ 6 + 1 = 7,\ 7 - 6 = 1,\ 7 - 1 = 6$ o Extend to other addends of 7 o May connect to fact families & fact triangles		
Supports, Scaffolds, and Considerations: • Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device) • Manipulatives		
Key Word Search: addition, subtraction, fact families		

Title: Solving multiplication problems with neither number greater than 5		
Grade: 3		
PA Core Standard: CC.2.2.3.A.1 Represent and solve problems involving multiplication and division		
PA Connector:		Solve multiplication problems with neither number greater than 5
Strand: Numbers and Operations	**Family:** Perform Operations with Whole Numbers	
Progress Indicator: *E.NO.2d modeling multiplication (equal-sized groups, arrays, area models, equal-sized jumps on number lines, multiplicative comparisons) and division (successive subtraction, partitioning, sharing) of whole numbers*		
Big Idea(s): Mathematical relationships among numbers can be represented, compared, and communicated.		
Essential Question(s): How is mathematics used to quantify, compare, represent, and model numbers?		
Foundational Knowledge: • Create an array of sets (e.g., 3 rows of 2 objects) from a set of objects • Use graph paper or draw an array that has up to 5 columns and up to 5 rows • Count a set of objects within 25 • Use skip counting to model multiplication with repeated addition • Identify or draw pictorial representation of an array that matches the multiplication problem		
Key Vocabulary, Concepts and Symbols: • Understand the following concepts and vocabulary: multiply, factor, array		
Suggested Instructional Strategies: • Task analysis (e.g., state the problem (2 sets of 3), draw out the array for the problem, count the total, determine the product) • Counting strategies (i.e., repeated addition with whole numbers) • Model multiplication as repeated addition using a number line • Teach multiplication using concrete objects to build arrays and area models		
Supports, Scaffolds, and Considerations: • Raised grid (to keep structure of array) or graph paper • Manipulatives to build arrays • Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)		
Key Word Search: multiply, array, area model		

Title: Solving one and two step word problems

Grade: 3

PA Core Standard: CC.2.2.3.A.4 Solve problems involving the four operations, and identify and explain patterns in arithmetic

PA Connector:		Solve and determine the reasonableness of answers to one or two step word problems using whole numbers that require addition, subtraction or multiplication with answers up to 100

Strand: Numbers and Operations	**Family:** Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers

Progress Indicator: *E.NO.2e describing relationships between addition-multiplication; multiplication-division; addition-subtraction; why commutative property does not apply to subtraction or division*

Big Idea(s): Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations.

Essential Question(s): How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations?

Foundational Knowledge:

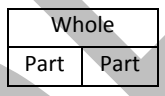
- Identify when situations are modeled using addition, subtraction, or multiplication
- Understanding the story behind the problem
- Justify the answer based upon the story in the problem
- Apply computation strategies to solve problems

Key Vocabulary, Concepts and Symbols:

- Understand the following concepts and vocabulary: add, subtract, multiply, sum, difference, product, vocabulary within the context of the problem

Suggested Instructional Strategies:

- Task analysis for each type of problem
- Use problem solving schemas



- Use counting strategies
- Use number patterns (i.e., skip counting)
- Explicitly teach checking the reasonableness of answers.
    - Does my solution answer the question?
    - Could I write another sentence to end the story using my answer that would make sense?

Supports and Scaffolds:

- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)
- Use template/graphic organizer to fill in steps of word problems
- Raised grid (to keep structure of array) or graph paper for multiplication or addition problems
- Provide manipulatives or picture representations with symbols included
- Highlight text that provides important information/vocabulary

Key Word Search: problem solving, addition, subtraction, multiplication

Title: Determining how many objects go into a group

Grade: 4

PA Core Standard: CC.2.2.4.A.1 Represent and solve problems involving the four operations

PA Connector:		Determine how many objects go into each group when given the total number of objects and the number of groups where the number in each group and the number of groups is between 6 and 10.

Strand: Numbers and Operations	**Family:** Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers

Progress Indicator: *E.NO.2d modeling multiplication (equal-sized groups, arrays, area models, equal-sized jumps on number lines, multiplicative comparisons) and division (successive subtraction, partitioning, sharing) of whole numbers*

Big Idea(s): Mathematical relationships among numbers can be represented, compared, and communicated.

Essential Question(s): How is mathematics used to quantify, compare, represent, and model numbers?

Foundational Knowledge:

- Create an array of objects given a specific number of rows and the total number, place one object in each group/row at a time
- Draw an array using the given information

Key Vocabulary, Concepts and Symbols:

- Understand the concepts, symbols, and vocabulary for: division, array, $\div, =$

Suggested Instructional Strategies:

- Teach division as the inverse of multiplication, continue using arrays but change the order in which the array is developed (e.g., Multiplication uses the number of rows and columns to find the total number of items in the array. Division uses the total number arranged into a specific number of columns to determine the number of rows.)
- Task analysis for division ($18 \div 3$)
    - identify the number of groups from the problem (3 groups)
    - put one object in each group
    - continue putting one object in each group until the total number of objects (18) is used
    - count one group of objects to determine the answer (6)
    - count second group to verify the answer (6)
    - an organizer will help with forming the groups and dividing the objects up

Supports, Scaffolds, and Considerations:

- Use a template/graphic organizer to create array
- Use manipulatives for context, may want to use cups or plates to help sort groups
- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)

Key Word Search: division, array

Title: Matching accurate addition or multiplication equation to a representation

Grade: 4

PA Core Standard: CC.2.2.3.A.1 Represent and solve problems involving multiplication and division

PA Connector:		Match an accurate addition or multiplication equation to a representation

Strand: Numbers and Operations	**Family:** Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers

Progress Indicator: *E.NO.2d modeling multiplication (equal-sized groups, arrays, area models, equal-sized jumps on number lines, multiplicative comparisons) and division (successive subtraction, partitioning, sharing) of whole numbers*

Big Idea(s): Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.

Essential Question(s): Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.

Foundational Knowledge:

- Select the representation of manipulatives on a graphic organizer to show addition/multiplication equation.
- Match different representations of the same equations (e.g., objects and arrangement may differ)
- Select a representation to place under each numeral in an addition equation
- State what the numbers represent in multiplication equation (e.g. first number is number of sets, second number is number within each set)
- Select a concrete or pictorial representation of an array that matches the multiplication problem

Key Vocabulary, Concepts and Symbols:

- Understand the concepts, symbols, and vocabulary for: +,×, =, factor, sum, total, product, representation

Suggested Instructional Strategies:

- Task analysis
  - Are the representations using equal sized groups
    - Yes - multiplication
      - Do the number of groups (rows), the number in each group (columns), and the total number of objects match the equation?
    - No – Addition
      - Do the parts and the whole match the number of objects in the equation?
- Counting strategies to select the correct answer or eliminate incorrect answers

Supports, Scaffolds, and Considerations:

- Visual representations that can be manipulated
- Graphic organizer or template
- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)

Key Word Search: addition, multiplication

Title: Using a visual model, compare 2 fractions with the same denominator to determine if the fractions are equal or which fraction is greater

Grade: 4

PA Core Standard: CC.2.1.4.C.1 Extend the understanding of fractions to show equivalence and ordering

PA Connector:		**Using a visual model, compare 2 fractions with the same denominator to determine if the fractions are equal or which fraction is greater**

Strand: Number and Operations	**Family:** Determine Equivalency (Number Operations-Fractions/ratios/Proportions)

Progress Indicator: *E.SE.1g using symbols (=, >, <) to compare whole numbers, fractions, or decimals; write equations; and express inverse or related operations*

Big Idea(s): Mathematical relationships among numbers can be represented, compared, and communicated.

Essential Question(s): How is mathematics used to quantify, compare, represent, and model numbers?

Foundational Knowledge:

- Understand the concept of a fraction
- Understand the concept of comparison (greater than, less than, equal)
- Identify a concrete representation of a fraction as greater than, less than, or equal to another (divide a rectangle into fourths and compare ¼ to ¾)
- Label pictorial representations of fractions

Key Vocabulary, Concepts and Symbols:

- Understand the following concepts and vocabulary: fraction, denominator, numerator, <, >, and =

Suggested Instructional Strategies:

- Model comparisons using manipulatives and drawings by showing parts of the whole (e.g., to compare $\frac{1}{4}$ and $\frac{3}{4}$ break object into 4 equal parts…which is more the 3 parts out of the 4 or the 1 part out of the 4?)
- Multiple exemplars for equal, greater than, less than.
- Explicit teaching of modeling fractions with a rectangle
  - the denominator is the number of equal sections
  - the numerator is the number of shaded sections
  - the fractional value is the amount of shaded area out of the total area
  - use different sizes rectangles to model the same fraction to illustrate proportionality
- Explicit teaching of comparisons (more of the same size parts, same number of parts but different sizes, more and less than ½ or 1 whole, connect to the location on the number line)
  - Choose your answer, explain why you chose the answer, test your answer

Supports and Scaffolds Considerations:

- Number line with fractions (e.g. could include simplified "rulers", one ruler that indicates fourths, a second ruler that indicates sixths, and compare the location of the fractions based on their placement on the ruler)
- Illustrations: Area models that represent fractional values
- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)

Key Word Search: fraction, area model, compare, inequality, numerator, denominator

Title: Using symbols to compare 2 fractions (with different denominators of 10 or less)

Grade: 4

PA Core Standard: CC.2.1.4.C.1 Extend the understanding of fractions to show equivalence and ordering

PA Connector:		Use =, <, or > to compare 2 fractions (with different denominators of 10 or less)

Strand: Numbers and Operations	**Family:** Determine Equivalency (Number Operations-Fractions/ratios/Proportions)

Progress Indicator *E.SE.1g using symbols (=, >, <) to compare whole numbers, fractions, or decimals; write equations; and express inverse or related operations*

Big Idea(s): Mathematical relationships among numbers can be represented, compared, and communicated.

Essential Question(s): How is mathematics used to quantify, compare, represent, and model numbers?

Foundational Knowledge:

- Understand the concept of a fraction
- Understand the concept of comparison (greater than, less than, equal)
- Identify a concrete representation of a fraction as greater than, less than, or equal to another (divide and shade one rectangle to represent $\frac{3}{4}$ and another rectangle to represent $\frac{3}{5}$, making su)
-

Key Vocabulary, Concepts and Symbols:

- Understand the following concepts and vocabulary: fraction, denominator, numerator, <, >, and =

Suggested Instructional Strategies:

- Multiple exemplars for equal, greater than, less than.
- Explicit teaching of using area models to compare fractions
  - An example of the problem $\frac{3}{4} \square \frac{3}{5}$
  - Begin with two rectangles with equal areas
  - Divide the first rectangle into 4 sections and shade 3 of the section to model $\frac{3}{4}$
  - Divide the second rectangle into 5 sections and shade 3 of the section to model $\frac{3}{5}$
  - Determine the appropriate symbol to use based on the area that represents each fractional value
- Explicit teaching of comparisons (more of the same size parts, same number of parts but different sizes, more and less than ½ or 1 whole, distance from ½ or 1 whole, connect to the location on the number line)
  - Choose your answer, explain why you chose the answer, test your answer

Supports and Scaffolds Considerations:

- Number line with fractions (e.g. could include simplified "rulers", one ruler that indicates fourths, a second ruler that indicates sixths, and compare the location of the fractions based on their placement on the ruler)
- Illustrations: Area models that represent fractional values
- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)

Key Word Search: fraction, area model, compare, inequality, numerator, denominator

Title: Comparing 2 fractions with the same denominators to determine if the fractions are equal or which fraction is greater.		
Grade: 4		
PA Core Standard: CC.2.1.4.C.1 Extend the understanding of fractions to show equivalence and ordering.		
PA Connector:		Using a visual model, compare 2 fractions with the same denominator to determine if the fractions are equal or which fraction is greater.
Strand: Numbers and Operations	**Family:** Determining Equivalency	
Progress Indicator *E.SE.1g using symbols (=, >, <) to compare whole numbers, fractions, or decimals; write equations; and express inverse or related operations*		
Big Idea(s): Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations.		
Essential Question(s): How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations?		
Foundational Knowledge: • Understand the concept of a fraction • Understand the concept of comparison (greater than, less than, equal) • Apply understanding of the symbols of <, >, and = with whole numbers • Use concrete representation to determine if a fraction is equal, greater than, less than, another fraction with either the same numerator or denominator (e.g., divide a rectangle into fourths and compare ¼ to ¾, break into 4 equal parts…which is more the 3 parts or the 1 part?)		
Key Vocabulary, Concepts and Symbols: • Identify symbols of <, >, and =, compare		
Suggested Instructional Strategies: • Label pictorial representations of fractions, numerator, denominator • Multiple exemplars for equal, greater than, less than* • Through the use of various models, explicitly teach comparing two fractions with the same denominator • Choose your answer, explain why you chose the answer, test your answer		
Supports and Scaffolds Considerations: • Number line with fractions • Illustrations • Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device) • Computer software • Examples of illustrations to show greater than less than, or equal • Manipulatives		
Key Word Search: numerator, denominator, fraction		

Title: Use =, <, or > to compare 2 fractions		
Grade: 4		
PA Core Standard: CC.2.1.4.C.1 Extend the understanding of fractions to show equivalence and ordering.		
PA Connector:		Use =, <, or > to compare 2 fractions (with different denominators of 10 or less).
Strand: Numbers and Operations	**Family:** Determining Equivalency	
Progress Indicator: *E.SE.1g using symbols (=, >, <) to compare whole numbers, fractions, or decimals; write equations; and express inverse or related operations*		
Big Idea(s): Mathematical relationships among numbers can be represented, compared, and communicated.		
Essential Question(s): How is mathematics used to quantify, compare, represent, and model numbers?		
Foundational Knowledge: • Understand the concept of a fraction (i.e., Describe that the denominator of a fraction represents the number of equal parts within a whole (length or region) • Understand the concept of comparison (greater than, less than, equal) • Create equivalent forms of a fraction. • Identify concrete/pictorial representations of fractions to determine if one is greater than, less than, equal to the other (e.g., to compare $\frac{1}{2}$ and $\frac{1}{3}$ a rectangle can be divided into 6 parts with 3 and 2 sections shaded to represent each of the fractions, respectively)		
Key Vocabulary, Concepts and Symbols: • Understand concept, symbols and vocabulary: fraction, numerator, denominator, <, >, =		
Suggested Instructional Strategies: • Multiple exemplars for equal, greater than, less than* • Explicit teaching of comparisons (more of the same size parts vs. same number of parts but different sizes, placement on a number line, estimating the decimal equivalent) ○ Choose your answer, explain why you chose the answer, test your answer		
Supports and Scaffolds Considerations: • Number line with fractions • Fraction strips • Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device) • Manipulatives than can be used to model creating equivalent fractions		
Key Word Search: fraction, greater than, less than, compare		

Title: Order fractions on a number line		
Grade: 4		
PA Core Standard: CC.2.1.4.C.1 Extend the understanding of fractions to show equivalence and ordering.		
PA Connector:		Order fractions on a number line.
Strand: Numbers and Operations	**Family:** Determining Equivalency	
Progress Indicator: *E.NO.1l identifying and locating fractions on the number line or as regions, or parts of a set or unit, and recognizing that whole numbers are a subset of rational numbers*		
Big Idea(s): Mathematical relationships among numbers can be represented, compared, and communicated.		
Essential Question(s): How is mathematics used to quantify, compare, represent, and model numbers?		

Foundational Knowledge:

- Show understanding of how parts of a whole can be expressed as fractions using numbers
- 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*.
- Locate fractions on a number line
- Demonstrate understanding of how the numerator and denominator each influence the placement of a fraction on a number line

Key Vocabulary, Concepts and Symbols:

- Understand concepts, symbols and vocabulary: “greatest to least” and “least to greatest”

Suggested Instructional Strategies:

- Use fraction cards to place and order on a number line
- Explicitly teach that the denominator is the number of equal sections between 0 and 1
- Folding sentence strips to determine the size of the sections between 0 and 1 on a number line (assuming the length of the strip is equal to 1)
- Explicitly teach that the numerator is the number of equal sections from 0
  - 3/5 means the space between 0 and 1 has 5 equal sections and 3/5 is at the end of the 3rd section from zero
  - 7/3 means the space between 0 and 1 has 3 equal sections and 7/3 is at the end of the 7th sections from zero.

Supports and Scaffolds Considerations:

- Use the same denominators before moving to different denominators.
- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)
- Number line with raised markers

Key Word Search: fraction, ordering, number line

Title: Determining equivalent fractions		
Grade: 4		
PA Core Standard: CC.2.1.4.C.1 Extend the understanding of fractions to show equivalence and ordering.		
PA Connector:		Determine equivalent fractions.
Strand: Numbers and Operations	**Family:** Determining Equivalency	
Progress Indicator: *E.NO.1m composing and representing equivalent fractions in the form a/b*		
Big Idea(s): Mathematical relationships among numbers can be represented, compared, and communicated.		
Essential Question(s): How is mathematics used to quantify, compare, represent, and model numbers?		
Foundational Knowledge: • Describe equivalency with whole numbers (what is and what is not equivalent; this may begin with numbers or sets of objects) • Describe models as "part of a whole" to represent a fraction • Identify two equivalent fractions, both represented either numerically or as a model (e.g., rectangles cut in halves and in fourths with ½ and 2/4 shaded in). • Represent fractions using shaded grids by generating pictorial representations (shading circles, or rectangles; drawing on graph paper, etc.)		
Key Vocabulary, Concepts and Symbols: • Understand concepts, symbols and vocabulary: fraction, equivalent fractions , numerator, denominator		

Suggested Instructional Strategies:

- Teach equivalency explicitly using bars of equal length with the same shaded amount
    - 1 part out of 2, two parts out of 4, and 3 parts out of six, are equal (the same amount of the bar is shaded broken into 1, 2 or 3 parts)
    - fold 2 pieces of paper the same length, fold one in half, one in fourths. Examine that ½ and 2/4 are the same distance from 0.
- Teach equivalency explicitly by using bars (visual) to show that when both the numerator and the denominator are multiplied by the same "non-zero" number, the fractions remain equivalent.
- Task Analysis: Comparing fractions equal to 1/2
    - Present fraction bars of equal lengths that are divided into different numbers of parts with half of the parts shaded.
    - Write a fraction for each fraction bar.
    - Write a chain of equivalent fractions: ½ = 2/4 = 3/6 = 4/8)
    - Then, complete a similar activity using two bars with same amount shaded (more or less than **half** of the parts)
    - Write a fraction for each fraction bar (2/3, 4/6, 8/12)
    - Write a chain of equivalent fractions (2/3 = 4/6 = 8/12)
- Task Analysis: Splitting bars to create equivalent fractions
    - Present a shaded fraction bar (e.g., 4 parts with 2 parts shaded (2/4)
    - Write/build the numeric fraction (e.g., 2/4)
    - Split each part in half – doubling the 4 parts to 8 parts doubles the shaded parts from 2 to 4)
    - Write/build the numeric new fraction (e.g. 4/8)
    - Write/build a numeric chain of equivalent fractions 2/4 = 6/8)
    - Explicitly state that when the numerator is doubled, by doubling the denominator, the fractions are equal
    - Provide additional examples to show that by splitting the bar, increasing all parts of the bars increases the number of shaded parts
- Use Model-Lead-Test*
    - Multiple exemplars (e.g., "These fractions are equivalent. These fractions are equivalent. These fractions are not equivalent.")*

Supports and Scaffolds Considerations:

- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)
- Various pictures that model fractions
- Geoboards
- Dot-paper
- Cuisenaire rods
- Color tiles
- Pattern blocks or sets of objects
- Fraction bars that are ruled into certain fixed partitions and lined up for comparisons

Key Word Search: fraction, equivalent

Title: Using a representation, decompose a fraction into multiple copies of a unit fraction		
Grade: 4		
PA Core Standard: CC.2.1.4.C.1 Extend the understanding of fractions to show equivalence and ordering. **CC.2.1.4.C.2 Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.**		
PA Connector:		Using a representation, decompose a fraction into multiple copies of a unit fraction (e.g., ¾ = ¼ + ¼ + ¼).
Strand: Numbers and Operations	**Family:** Determining Equivalency	
Progress Indicator: *E.NO.2g recognizing fractions as one number/one quantity, rather than two numbers (numerator and denominator) and using number lines to represent magnitude of fractions*		
Big Idea(s): Mathematical relationships among numbers can be represented, compared, and communicated.		
Essential Question(s): How is mathematics used to quantify, compare, represent, and model numbers?		
Foundational Knowledge: • Identify models showing halves, thirds, or fourths • Given a visual fraction model (region or number line), write the fraction with the correct numerator and denominator • 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*. • Locate fractions on a number line		
Key Vocabulary, Concepts and Symbols: • Understand concepts, symbols and vocabulary: fraction, unit fraction , numerator, denominator		
Suggested Instructional Strategies: • Teach explicitly using manipulatives that can be partitioned into equal sections • Use a number line to model decomposing fractions • Use graph paper or rectangles/circles for pictorial representations • Task Analysis: Splitting bars to create equivalent fractions o Present a shaded fraction bar (e.g., 4 parts with 2 parts shaded (2/4) o Write/build the numeric fraction (e.g., 2/4) o Split each part in half – doubling the 4 parts to 8 parts doubles the shaded parts from 2 to 4) o Write/build the numeric new fraction (e.g. 4/8) o Write/build a numeric chain of equivalent fractions 2/4 = 6/8) o Explicitly state that when the numerator is doubled, by doubling the denominator, the fractions are equal o Provide additional examples to show that by splitting the bar, increasing all parts of the bars increases the number of shaded parts • Use Model-Lead-Test* o Multiple exemplars (e.g., "These fractions are equivalent. These fractions are equivalent. These fractions are not equivalent.")*		

Supports and Scaffolds Considerations:

- Assistive Technology (e.g., interactive whiteboard or other software, calculator, communication device)
- Manipulatives
- Graph paper, dot paper
- Color tiles
- Number line with raised edges

Key Word Search: fraction, unit fraction, numerator, denominator

Title: Rewriting a decimal as a fraction.

Grade: 4

PA Core Standard: CC.2.1.4.C.3 Connect decimal notation to fractions, and compare decimal fractions (base 10 denominator, e.g. ,19/100).

PA Connector:		Rewrite a decimal as a fraction.

Strand: Numbers and Operations	**Family:** Determining Equivalency

Progress Indicator: *M.NO.1c using a variety of fractional and decimal representations and locating them on a number line*

Big Idea(s): Mathematical relationships among numbers can be represented, compared, and communicated.

Essential Question(s): How is mathematics used to quantify, compare, represent, and model numbers?

Foundational Knowledge:

- Demonstrate an understanding of place value by identifying digits in the tenths and hundredths place
- Understand the concept of equivalency (what is and what is not equivalent; this may begin with numbers/sets of objects: e.g., $3 \neq 2, 1 \neq 2;\ 5 + 10 = 15$)
- Read and write a number using fractions/decimals/words (e.g. 0.2 is *two tenths* is $\frac{2}{10}$; 0.51 is *fifty one hundredths* is$\frac{51}{100}$)
- Write a decimal as a fraction with base 10 or base 100

Key Vocabulary, Concepts and Symbols:

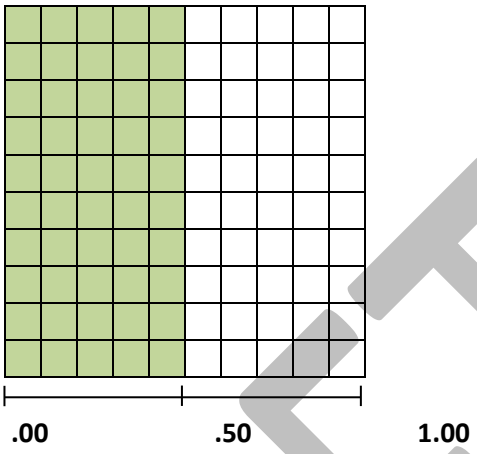
- Understand concepts, symbols and vocabulary: equal (=), not equal (≠)fraction, decimal, tenths, hundredths, numerator, denominator

Suggested Instructional Strategies:

- Explicitly teach using a task analysis (*0.73*)
  - Write/read/select the number ("*seventy three hundredths*")
  - Determine whether to use a denominator of 10 or 100 based on how the decimal is read (*The denominator will be 100 since we read "hundredths."*)
  - Determine the number of tenths or hundredths from the decimal. (*73*)
  - Write the number of tenths or hundredths as the numerator divided by the proper denominator. ($\frac{73}{100}$)
- Model fractions/decimals using a 10x10 grid and shading
- Self-checking strategies using a calculator to compute the division
- Teach using least to most prompting*

Supports and Scaffolds:

- Place value chart
- Place value blocks
- Grids (with or without raised lines)
- Grids with corresponding decimal number lines



- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)

Key Word Search: fraction, decimal

Title: Rewriting a fraction as a decimal

Grade: 4

PA Core Standard: CC.2.1.4.C.3 Connect decimal notation to fractions, and compare decimal fractions (base 10 denominator, e.g. ,19/100).

PA Connector:		Rewrite a fraction as a decimal

Strand: Numbers and Operations	**Family:** Determining Equivalency

Progress Indicator: *M.NO.1c using a variety of fractional and decimal representations and locating them on a number line*

Big Idea(s): Mathematical relationships among numbers can be represented, compared, and communicated.

Essential Question(s): How is mathematics used to quantify, compare, represent, and model numbers?

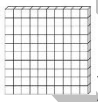
Foundational Knowledge:

- Identify numbers that are fractions or decimals
- Identify digits in the tenths place or the hundredths place
- Read and write a number using fractions/decimals/words (e.g. $\frac{3}{10}$ is *three tenths* is 0.3; $\frac{73}{100}$ is *seventy three hundredths* is 0.73)
- Write a fraction, with base 10, as a decimal
- Write a fraction, with base 100, as a decimal

Key Vocabulary, Concepts and Symbols:

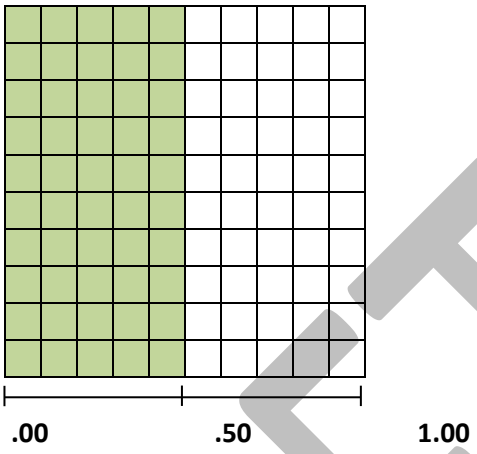
- Understand concepts, symbols and vocabulary: equal, decimal, tenths, hundredths, fraction, numerator, denominator

Suggested Instructional Strategies:

- Given a set of 10 or 100 items/pictures, select the subset of items that represents a given fraction/decimal
- Use place value blocks to model numbers and practice identifying digits and their place value
  - the flat () represents a value of 1
  - one rod () represents one tenth
  - one unit ()represents one hundredth
- Model fractions/decimals using a 10x10 grid and shading
- Self-checking strategies using a calculator to compute the division
- Connect fractions to decimals as it relates to a dollar bill (e.g., ½ of a dollar is .50).
  - Reinforce how a decimal amount and the equivalent fraction can be described in different ways of dividing a dollar. Use plastic coins to demonstrate the decimal amounts each person would receive in different situations and tell the equivalent fractional part of the dollar each person could receive.
  - Begin with most common fractions (e.g., ½ = .5, ¼ = .25, ¾ = .75)

Supports and Scaffolds:

- Place value chart
- Place value blocks
- Grids (with or without raised lines)
- Grids with corresponding decimal number lines



- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)

Key Word Search: fraction, decimal

Title: Adding and subtracting fractions with like denominators using representations

Grade: 4

PA Core Standard: CC.2.1.4.C.1 Extend the understanding of fractions to show equivalence and ordering

PA Connector:		Add and subtract fractions with like denominators (2,3,4, or 8) using representations

Strand: Numbers and Operations	**Family:** Performing Operations

Progress Indicator: *E.NO.2h adding, subtracting, and multiplying fractions, including mixed numbers*

Big Idea(s): Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations.

Essential Question(s): How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations?

Foundational Knowledge:

- Differentiate between parts of a fraction and the whole
- Count the parts represented by the numerator
- Recognize like denominators (e.g., recognize that the '4' in 2/4 is the same as the '4' in ¼)
- Create a pictorial or concrete representation (using fraction strips or tiles) of fractions.
- Determine whether to use addition and subtraction strategies based on the context of the problem
- Understand the components of a fraction (numerator and denominator)
- Find the sum of two numbers

Key Vocabulary, Concepts and Symbols:

- Understand concepts, symbols and vocabulary: +, – fraction, numerator, denominator

Suggested Instructional Strategies:

- Model-Lead-Test using representations*
- Model addition and subtraction using the number line
- Teach explicit rules for adding and subtracting fractions
  - Pizza Fractions: Cut 'pizza' circles the same size then cut them into a variety of fractions and use them to add/subtract mixed numbered fractions (e.g. add one half pizza to two ¼ pieces to make a whole or subtract 1/3 pizza from 6/6)

Supports and Scaffolds Considerations:

- Fraction strips
- Fraction tiles
- Pictorial representations where the wholes are the same size
- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)
- Raised number line
- Pattern blocks or sets of objects
- Representations of fractions with raised sections

Key Word Search: fraction, addition, subtraction

Title: Rounding to any place value		
Grade: 4		
PA Core Standard: CC.2.1.4.B.1 Apply place value concepts to show an understanding of multi-digit whole numbers		
PA Connector:		Round to any place (e.g., ones, tens, hundreds, thousands)
Strand: Numbers and Operations	**Family:** Understanding Base Ten Number System	
Progress Indicator: *E.NO.1j applying place value concepts to: read, write, and compare whole numbers up to 100,000; use expanded form; and round numbers to a given place*		
Big Idea(s): Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.		
Essential Question(s): What does it mean to estimate or analyze numerical quantities?		
Foundational Knowledge: • Identify digits in the ones, tens, and hundreds place • Make comparisons between similar/different with concrete representations (i.e., is this set of manipulatives (8 ones) closer to this set (a ten) or this set (a zero)? • Recognize that numbers 1-4 are closer to 0 and numbers 6 through 9 are closer to 10. • Identify 5 as a number in the middle but that we round up • Identify concrete and pictorial representations of numbers use place value manipulatives • Match vocabulary of ones, tens, hundreds, thousands to digits in a number		
Key Vocabulary, Concepts and Symbols: • Understand the following concepts and vocabulary: ones, tens, hundreds, round		

Suggested Instructional Strategies:
• Explicit instruction on rules for rounding using a number line
• Task analysis for rounding
  ○ e.g., circle place value, arrow next number, arrow number tells circle number what to do, make decision, determine the rounded number
• Model-Lead-Test*
• Connect to relevant contextual situations
  ○ e.g., 28¢ rounds up to 30¢		

Supports, Scaffolds, and Considerations: • Number line or number chart • Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device) • Graphic organizer or place value template		
Key Word Search: place value, round, rounding		

Title: Writing or selecting the expanded form for a multi-digit number

Grade: 4

PA Core Standard: CC.2.1.4.B.1 Apply place value concepts to show an understanding of multi-digit whole numbers

PA Connector:		Write or select the expanded form for a multi-digit number up to 1 million

Strand: Numbers and Operations	**Family:** Understanding base Ten Number System

Progress Indicator: *E.NO.1j applying place value concepts to: read, write, and compare whole numbers up to 100,000; use expanded form; and round numbers to a given place*

Big Idea(s): Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.

Essential Question(s): What does it mean to estimate or analyze numerical quantities?

Foundational Knowledge:

- Identify bundles as a 1, 10, or 100
- Identify the appropriate number of bundles for each digit in the multi-digit number within 999
- Understand that the position of a digit determines its value
- Identify the place value of each number in a multi-digit number
- Recognize that a number can decomposed by place value and represented as an addition equation (e.g., $569 = 500 + 60 + 9$)
- Select the expanded form of a number
- Write expanded form of number

Key Vocabulary, Concepts and Symbols:

- Understand the following concepts and vocabulary: ones, tens, hundreds, place value

Suggested Instructional Strategies:

- Place value cards

- Place value Mat
  - Visit this site for an example: http://exchange.smarttech.com/details.html?id=7751cf63-0944-40d7-8007-531d51b4f18c
- Base ten place value kit

Supports, Scaffolds, and Considerations:

- Start with color coded templates as it relates to tens and ones and remove for generalization
- Expanded form template (e.g., $128 =$ ____ $+$ ____ $+$ ____ or $67 =$ ____ $+$ ____)
- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)

Key Word Search: ones, tens, hundreds, place value

Title: Identifying multiples for a whole number		
Grade: 4		
PA Core Standard: CC.2.2.4.A.2 Develop and/or apply number theory concepts to find factors and multiples		
PA Connector:		Identify multiples for a whole number
Strand: Numbers and Operations	**Family:** Perform Operations with Whole Numbers	
Progress Indicator: *E.NO.2f identifying factors and multiples of numbers*		
Big Idea(s): Mathematical relationships among numbers can be represented, compared, and communicated.		
Essential Question(s): How is mathematics used to quantify, compare, represent, and model numbers?		
Foundational Knowledge: • Use skip counting to find multiples • Locate multiples on a number line • Use arrays to find multiples, by adding columns and determining the next multiple		
Key Vocabulary, Concepts and Symbols: • Understand the following concepts and vocabulary: multiple		

Suggested Instructional Strategies:
• Use calculators to explore the patterns of multiples when skip counting by a given number
• Counting strategies (i.e., repeated addition with whole numbers)
• Connect repeated addition and the number line to multiples
• Model finding multiples by building arrays
  ○ Start with a 6x1 array
  ○ Add a column and count the total, 12
  ○ Add a column and count to the next multiple, 18
  ○ Generalize to repeated addition
  ○ Connect to the number line		

Supports and Scaffolds: • 100s chart with markers or counters to mark multiples • Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device) • Raised number line • Manipulatives to build arrays		
Key Word Search: multiply, multiple, array		

Title: Reading, writing, or selecting a decimal to the hundredths place		
Grade: 5		
PA Core Standard: CC.2.1.5.B.1 Apply place value concepts to show an understanding of operations and rounding as they pertain to whole numbers and decimals.		
PA Connector:		Read, write, or select a decimal to the hundredths place.
Strand: Numbers and Operations	**Family:** Representing	
Progress Indicator: *M.NO.1b extending place value understanding to reading (e.g., naming the values with number words, rather than "point four"), writing, comparing, and rounding decimals*		
Big Idea(s): Mathematical relationships among numbers can be represented, compared, and communicated.		
Essential Question(s): How is mathematics used to quantify, compare, represent, and model numbers?		
Foundational Knowledge: • Recognize part/whole when materials are divided into tenths or hundredths • Place the decimal in the correct position of a given sequence of digits to form the desired number • Identify digits in the tenths place or the hundredths place		
Key Vocabulary, Concepts and Symbols: • Understand concepts, symbols and vocabulary: decimal, tenths, hundredths		

Suggested Instructional Strategies:

- Give students a sequence of digits and have them put in a decimal that will result in a specified number
    - Given 648, where would the decimal be placed for the number "six and forty eight hundredths?
    - Given 648, where would the decimal be placed for the number "sixty four and eight tenths?"
    - After the student practices placing a decimal within a sequence of digits, extend the concepts of place value by allowing the student to arrange both the digits and the decimal to build a number. For example: *How would you arrange the digits 4, 6, 8 and a decimal to represent the mixed number* $4\frac{86}{100}$*?*
- Teach explicitly how to read and write decimals to the tenths (.1) and hundredths (.01)
- Teach explicitly the relative position of a number to the decimal point and its place value
- Task Analysis for decimals (tenths)
    - Present a 1x10 grid and ask the student how many boxes make up the grid.
    - Shade a tenth and ask how may boxes are shaded (i.e., 1 out of 10)
    - Ask the student to write or select a written form for the decimal for 1 out of 10
    - Ask the student to read or select a recording of the decimal
    - Complete for multiple decimals (.1 - .9)
- Task Analysis for decimals (hundredth)
    - Present a 10x10 grid and ask the student how many boxes make up the grid
    - Shade one hundredth and ask how many boxes are shaded (i.e., 1 out of 100)
    - Ask the student to write or select a written form for the decimal for 1 out of 100
    - Ask the student to read or select a recording of the decimal
    - Complete for multiple decimals (.01 - .99)
- Use Model-Lead-Test*
- Match, write or say decimals that correspond to combinations of dollars and cents
    - Student will read a money amount card. (The amount could be written as a decimal, with words, or using a cent sign.)
    - Ask student to describe the money amount in another form (e.g., as a decimal).
    - Use number cards to organize a stated number with a decimal.

Supports and Scaffolds Considerations:

- 10x10 Grids (with or without raised lines)
- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)
- Manipulatives that reinforce context: money, place value blocks, etc.
- Visual representations: pictures, cards, number line
- Place value charts
- Word cards, number cards, and grid cards for the same decimals (e.g., one tenth, .1, and a model)

Key Word Search: decimal

Title: Solving word problems involving the addition or subtraction of fractions with unlike denominators

Grade: 5

PA Core Standard: CC.2.1.5.C.1 Use the understanding of equivalency to add and subtract fractions.

PA Connector:		Solve word problems involving the addition or subtraction of fractions with unlike denominators.

Strand: Numbers and Operations	**Family:** Problem Solving

Progress Indicator: *NO.1c using a variety of fractional and decimal representations and locating them on a number line*

Big Idea(s): Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations.

Essential Question(s): How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations?

Foundational Knowledge:

- Understand that the numerator tell the number of parts and the denominator tells the size of the parts
- Recognize the need for addition or subtraction with the context of the problem.
- Build models to match fractions in a given equation (e.g., 1/3 + 2/3 =, student will build model of each fraction and demonstrate addition as the "putting together" of the two models)
- Identify key information in a word problem to represent the sum/difference and the fraction
- Solve fraction problems using:
  - Pictures
  - Models
  - Representation cards
  - Number sentences
  - Mathematical word problems
  - Number line

Key Vocabulary, Concepts and Symbols:

- Understand concepts, symbols and vocabulary: $+, -, \times, \div$, fraction, numerator, denominator, vocabulary within the context of the problem

Suggested Instructional Strategies:

- Teach explicitly how to express a verbal description of a fraction ("one-fourth" as 1/4)
- Task analysis:
  - Highlight/circle important facts
  - Identify the question
  - Choose the correct operation ($+, -$)
  - Set up the problem (template may be provided)
  - Compute the answer
  - State the answer
  - Assess the reasonableness of the answer.
- Teach explicitly how to use a number line/conversion tables to solve a word problem
- Use Model-Lead-Test*
  - Give students problems to model such as these: Charlene ate 1/4 of the sandwich at breakfast and 2/4 of the sandwich at lunch. How much of the sandwich did she eat?

Supports and Scaffolds Considerations:

- Number line with raised edges
- Rectangular blocks engraved with dots (can be used to teach students who have visual impairment)
- Fraction strips
- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)
- Use adapted text for word problems

Key Word Search: fraction, addition, subtraction

Title: Solving 1 step problems using decimals		
Grade: 5		
PA Core Standard: CC.2.1.5.B.2 Extend an understanding of operations with whole numbers to perform operations including decimals		
PA Connector:		Solve 1 step problems using decimals
Strand: Numbers and Operations	**Family:** Performing Operations	
Progress Indicator: *M.NO.2c using operations and standard algorithms with whole numbers, fractions (unlike denominators), and decimals (to hundredths)*		
Big Idea(s): Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations.		
Essential Question(s): How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations?		
Foundational Knowledge: • Given a real world context determine when to add, subtract, multiply, and divide • Understand that numbers to the right of the decimal represent a value less than one • Follow rules for decimal point placement when adding, subtracting, multiplying or dividing • Use the number line to represent operations with decimals.		
Key Vocabulary, Concepts and Symbols: • Understand concepts, symbols and vocabulary: $+, -, \times, \div$ decimal point, decimal, vocabulary within the context of the problem		
Suggested Instructional Strategies: • Use task analytic instruction to teach steps to solve word problems • Teach using Least to Most prompts* • Use Model-Lead-Test* • Have students self-check their answers. Start by modeling this process. • To demonstrate addition, gather several representations labeled with the decimal (circles, squares, pattern blocks, Cuisenaire rods) and identify how many of the pieces make one whole (e.g., .5 + .5).		
Supports and Scaffolds Considerations: • 10×10 hundreds grids • Place value chart • Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device) •		
Key Word Search: decimal		

Title: Solving problems or word problems using up to three digit numbers and addition or subtraction		
Grade: 5		
PA Core Standard: CC.2.2.4.A.1 Represent and solve problems involving the four operations		
PA Connector:		Solve problems or word problems using up to three digit numbers and addition or subtraction
Strand: Numbers and Operations	**Family:** Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers	
Progress Indicator: *M.NO.2a working flexibility with common addition, subtraction, multiplication, and division situations*		
Big Idea(s): Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations.		
Essential Question(s): How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations?		
Foundational Knowledge: • Combine (+) or decompose (-) with concrete objects; use counting to get the answers • Identify when situations are modeled using addition or subtraction • Use computation strategies efficiently (e.g., add on, count back, make-a-ten, friendly numbers, doubles/near-doubles) based upon the given problem • Translate wording from problem into a number sentence		
Key Vocabulary, Concepts and Symbols: • Understand symbols +, =, −, addition, subtraction, equals, vocabulary within the context of the problem		
Suggested Instructional Strategies: • Task analysis for each type of problem • Use counting/computation strategies • Use number patterns (e.g., skip counting) • Use concrete and pictorial representations to model the processes associated with the addition and subtraction algorithms		
Supports, Scaffolds, and Considerations: • Addition and subtraction template to fill in the steps of the word problem (____ + ____ = ____; a vertical structure with boxes above the first number for regrouping) • Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device) • Provide meaningful manipulatives or picture representations with symbols included • Highlight text that provides important information/vocabulary		
Key Word Search: addition, subtraction, word problem		

Title: Solving word problems that require multiplication or division, including numbers with decimals

Grade: 5

PA Core Standard: CC.2.1.5.B.2 Extend an understanding of operations with whole numbers to perform operations including decimals

PA Connector:		Solve word problems that require multiplication or division, including numbers with decimals

Strand: Numbers and Operations	**Family:** Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers

Progress Indicator: *M.NO.2a working flexibility with common addition, subtraction, multiplication, and division situations*

Big Idea(s): Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations.

Essential Question(s): How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations?

Foundational Knowledge:

- Understand concept of division: Sharing or grouping numbers into equal sets
- Understand concept of multiplication: the result of making some number of copies of the original group
- Model multiplication and division with arrays of objects
- Model multiplication and division using the number line
- Identify when situations are modeled using multiplication or division
- Create/select/use a representation of the word problem
- Translate wording from problem into a number sentence

Key Vocabulary, Concepts and Symbols:

- Understand the concepts, symbols, and vocabulary for: array, ÷, =, x, vocabulary within the context of the problem

Suggested Instructional Strategies:

- Task analysis for each type of problem
- Problem-based schema

Product	
Factor	Factor

- Use counting/computation strategies
- Use number patterns (i.e., skip counting)
- Use concrete and pictorial representations to model the processes associated with the multiplication and division algorithms

Supports and Scaffolds:

- Multiplication or division template to fill in the steps of the word problem (___ x ____ = ____)
- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)
- Provide meaningful manipulatives or pictorial representations with symbols included
- Highlight text that provides important information/vocabulary
- Multiplication and division tables

Key Word Search: multiplication, division, word problem