

Preschool 1

Number	
Conceptual Understandings	Begin to understand that numbers are a naming system Numbers are connected to each other through a variety of relationships
Constructing meaning	Connect differences observed between collections of 1, 2, and 3 with the number string “One, two, three” String number names from 1-5 together but not necessarily in the right order Count a collection of one to four items Identify numbers in the environment
Transferring meaning into symbols	Identify and describe objects that are the <i>same</i> or <i>different</i> Use <i>bigger</i> , <i>smaller</i> and <i>the same</i> to describe differences between objects and between small groups of easily compared quantities Count with a sequence of numbers but without quantity (like reciting <i>ABCs</i>).
Applying with understanding	Put together simple puzzles, and understand that a whole object can be separated into parts
Shape and space	
Conceptual understandings	Shapes can be described and organized according to their properties Related concepts: dimension, orientation
Constructing meaning	Explore 2D and 3D shapes Identify basic shapes in the environment Sort real 3D objects according to attributes Sort 3D shapes according to attributes Match 3D objects to 3D shapes Explore and observe the silhouettes or printing that 3D shapes and objects can create. Explore the boundaries of the immediate environment (<i>inside</i> , <i>outside</i> , <i>above</i> , <i>below</i>) and relative position (<i>next to</i> , <i>behind</i> , <i>in front of</i> , <i>up</i> , <i>down</i>).
Transferring meaning into symbols	Find connections between 2D and 3D shapes in real world objects using visual symbols Use shapes and lines when making drawings and pictures
Applying with understanding	Show how real and geometric shapes are related Recognize and match shapes Sort and group objects by shape Match real objects to 2D and 3D shapes Perform simple transformations (turn puzzle pieces to fit)
Measurement	

TIS Elementary Math Scope and Sequence

Conceptual understandings	Measurement involves comparing objects and events
Constructing meaning	Understand that real objects can be compared and described (<i>longer, bigger, smaller</i>) Begin to use the days of the week to build a picture of our daily routines and keep track of time
Transferring meaning into symbols	identify attributes of real objects, for example, longer, shorter, bigger, smaller (side by side)
Applying with understanding	Begin to use non-standard units of measurement to solve problems in real-life situations involving length. Begin to identify the sequence of events in their daily routine
Pattern and function	
Conceptual understandings	Patterns and sequences occur in everyday situations Related concepts: repetition & sequencing
Constructing meaning	Understand that sets can be organized by different attributes Visualize & repeat patterns
Transferring meaning into symbols	Repeat rhymes and songs with number patterns Describe patterns in various ways using drawings, words, symbols, materials, actions, numbers
Applying with understanding	Extend and create patterns Translate a pattern into a different mode, e.g. pictorial
Data Handling	
Conceptual understandings	We collect information to make sense of the world around us Related concepts: classification
Constructing meaning	Understand that sets can be organized by different attributes Discuss chance in daily events (impossible, maybe, certain) Use pictures to display data Play games with a single dice or spinner, which matches colors or objects
Transferring meaning into symbols	Represent information through pictographs Sort, describe, and label real objects by attributes Describe data in words and pictures
Applying with understanding	Create pictographs and tally marks Create living graphs using real people

TIS Elementary Math Scope and Sequence

	Create graphs using real objects Contribute to a collection of objects and collation of information
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Preschool 2

Number	
Conceptual Understandings	Numbers are a naming system Numbers are connected to each other through a variety of relationships Number sense develops from connections with personal experiences
Constructing meaning	Visualize number dot patterns Pair and match games of real objects to pictures Use <i>bigger</i> , <i>smaller</i> and <i>the same</i> to describe differences between objects and small groups of easily compared quantities and anticipating what a change will do to the group Add one or two to a set of objects Begin to understand one-to-one correspondence Use words like <i>more</i> , <i>less</i> , <i>first</i> , and <i>second</i> to compare quantities or position Compare amounts by imagining or role playing the situation and counting the resulting quantity Engage in partitioning and combining games
Transferring meaning into symbols	Talk about, recognize, and recreate simple patterns. String number names together orally in the right order from 1-6 Try to “count” to determine the number of objects in a set (up to 6) The number sequence Know some numbers Know the order of the number names Know what number comes next Know ordinal numbers Counting Synchronize number words and point Count each item one Recognizing personally significant numbers Link numerals to amounts Record numerals for a purpose Represent numbers with pictures Tallies or numerals Form numerals Internalize the shape of numerals
Applying with understanding	Understand that the last number named tells <i>how many</i> , even if counting lacks numerical understanding. Non-verbally and mentally determine that one item added to another makes two; and that one item taken away or subtracted from two makes one. Put together simple puzzles, and understand that a whole object can be separated into parts Distinguish spoken numbers from other spoken words Recognize that numbers may be used to signify quantity

TIS Elementary Math Scope and Sequence

	<p>Estimate quantities in sets by comparing</p> <p>Understanding counting</p> <p>Understand why we need to count</p> <p>Say how many there are</p> <p>Count a number of things</p> <p>Understand a request to share in a social sense and distribute items or portions</p> <p>Solve hidden number problems</p>
Shape and space	
Conceptual understandings	<p>Objects in our environment have a position in space that can be describe according to a point of reference</p> <p>Related concepts: dimension, orientation</p>
Constructing meaning	<p>Sort, describe, and compare 3D shapes according to their attributes</p> <p>Explore and observe the 2D shapes that 3D shapes and objects create in silhouette or printing</p> <p>Relate 2D shapes to real-world objects</p> <p>Explore manipulation of 2D and 3D shapes in creating pictures</p> <p>Analyze visual images of 2D and 3D shapes</p> <p>Explore and describe the paths, regions, and boundaries of the immediate environment (<i>inside, outside, above, below</i>) and position (<i>next to, behind, in front of, up, down</i>).</p>
Transferring meaning into symbols	<p>Sort, match, describe, and compare 3D shapes using labels and picture symbols</p> <p>Describe position and direction using <i>inside, outside, above, below, next to, behind, in front of, up, down</i></p> <p>Identify the essential spatial features of the common mathematical shapes (circle, triangle, square, rectangle)</p>
Measurement	
Conceptual understandings	<p>Measurement involves comparing objects and events</p> <p>Events can be ordered and sequenced</p>
Constructing meaning	<p>Understand that events in daily routines can be described and sequenced (<i>before, after, bedtime, story time, today, tomorrow</i>)</p> <p>Understand the sequence of days of the week and our daily routines</p> <p>Use calendar as a tool for keeping track of time – to count days</p> <p>explore and understand length as an attribute of an object</p> <p>Compare the length of objects using non-standard units</p>
Transferring meaning into symbols	<p>Identify and sequence events in daily routines (<i>before, after, bedtime, story time, today, tomorrow</i>).</p> <p>Identify, compare and describe attributes of real objects (<i>longer, shorter, heavier, empty, full, hotter, colder</i>)</p> <p>Identify the longest dimension of an object</p>

TIS Elementary Math Scope and Sequence

	Show measuring results in drawings
Applying with understanding	Find objects that share one attribute Describe and sequence observations about events and objects in real-life situations Use non-standard units of measurement to solve problems in real-life situations involving length and time of day/night Compare lengths of different objects
Pattern and function	
Conceptual understandings	Patterns and sequences occur in everyday situations Patterns repeat and grow Related concepts: repetition & sequencing
Constructing meaning	Visualize and repeat patterns Understand that patterns can be found in everyday situations like sounds, actions, objects, nature, seasons Demonstrate simple patterns in oral language Interpret and translate a pattern into a different mode e.g., pictorial representation into a bead string
Transferring meaning into symbols	Describe patterns in various ways, including through words, drawings, symbols, and actions Use number patterns to represent and understand real life situations
Applying with understanding	Reproduce and describe repeating and sequential patterns Extend and create patterns in dance or movement
Data Handling	
Conceptual understandings	Organizing objects and events helps us to solve problems Events in daily life involve chance Related concepts: classification
Constructing meaning	Understand that sets can be organized by one or more attributes Begin to understand that information about themselves and their surroundings can be obtained in different ways Use counting to collect data Compare sizes of different groups Discuss chance in daily events (<i>impossible, maybe, certain</i>) Observe and describe different representations of the same data Display objects or pictures in one-to-one correspondence Create situations and discuss which are not sure to happen and which we can't be sure about
Transferring	Observe data or information through pictographs, tally marks, or bar graphs

TIS Elementary Math Scope and Sequence

meaning into symbols	Sort real objects by attributes Represent data using concrete materials, pictures, labels and/or words, and/or numbers Display objects or pictures in one-to-one correspondence then record the results, comparing and summarizing information by counting Begin to represent relationships between objects using tree, Venn and Carroll diagrams Create a graph of real objects and compare quantities using number words
Applying with understanding	Use tree, Venn, and Carroll diagrams to explore relationships between data Identify and describe chance in daily events (<i>impossible, less likely, maybe, most likely, certain</i>) Talk about display of data collection Interpret block graphs Place objects into sequences

Kindergarten

Number	
Conceptual Understandings	Numbers can be used in many ways for different purposes in the real world Making connections between our experiences with number can help us develop number sense
Constructing meaning	Visualize number stories Understand one-to-one correspondence Understand conservation of number Recall the sequence of number names at least into double digits Order quantities from least to most Understand that for a set of objects the number name of the last object counted describes the quantity of the whole set Create a set of a given size, using 5 to 12 objects Recognize that some problems have more than one solution Connect number names and numerals to describe quantities Count forward by 1's and tens to 100 and backward from 100 with and without objects Use languages to describe and compare amounts (less, least, more, most, same, equal) Distribute items or portions in order to share but may not be concerned about whether everyone gets some, the portions are equal, or the whole amount is used up Explore +, - and = in both oral and written forms using concrete materials Use fraction names to describe a half and a whole Identify and sort decimal coins
Transferring meaning into symbols	Recognizes numeral and names (0 -10) Connects numerals to the quantities they represent (0-10) Record and represent quantities using objects, pictures, numbers, and/or words Order quantities from least to most and most to least Find the total of two single digit numbers Find and record different ways to arrange a set of 6 objects Have a strategy for accurately counting up to 20 objects Recognize one-to-one and two-to-one correspondence Count a set up to 20 objects Compare two quantities up to 20 objects and can identify which quantity is more and which is less Use numbers to describe arrangements of objects and to record how many in all Finds the total of two quantities up to 12 Distinguish numerals from other written symbols Order numerals in correct sequence from 0- 10 Find different ways to arrange up to 10 objects or to arrive at 10 (number bonds) Record and represents quantities using objects, pictures, numbers, and/or words Track the size of a growing collection of up to 15 objects

TIS Elementary Math Scope and Sequence

	<p>Have a strategy for accurately counting up to 20 objects</p> <p>Recognize personally significant numbers</p> <p>Link numerals to amounts</p> <p>Record numerals for a purpose</p> <p>Represent numbers with pictures, Tallies or numerals</p> <p>Form numerals</p> <p>Internalize the shape of numerals</p>
Applying with understanding	<p>Count forward by 1,s and tens to 100 and backward from 100 with and without objects</p> <p>Count how many objects are in a set of up to 20 objects and count out a specific number of objects (up to 20) from a larger set</p> <p>Identify, write and read aloud numbers from 0- at least 31</p> <p>Compare 2 sets of up to 20 objects each and explain why the number of objects in one set is equal to, greater than or less than the number of the objects in the other set</p> <p>Use a number line or chart to locate and identify the numbers from 1 - 100 coming before/after/between given numbers</p> <p>Identify place value of each digit utilizing standard and expanded form through 20</p> <p>Use the ordinal numbers 1st - 10th to discuss positions in ordered lists</p> <p>Identify and name halves and whole using concrete items</p> <p>Use concrete objects to model addition and subtraction of whole numbers related to sums of 10 or less and write corresponding number sentence</p> <p>Model meanings of operations and the relationship between addition and subtraction using manipulatives</p> <p>Estimate the number of objects in a group of 20 or less and count to evaluate reasonableness of estimating</p> <p>Create grade appropriate story picture and story problems, solve using a variety of strategies, present and justify results</p>
Shape and space	
Conceptual understandings	<p>Shapes are classified an named according to their properties</p> <p>Some shapes are made up of parts that repeat in some way</p> <p>Specific vocabulary can be used to describe an object’s position in space</p> <p>Related concepts: dimension, orientation</p>
Constructing meaning	<p>Observe and describe 2-D and 3-D shapes and objects</p> <p>Relate 2-D shapes to real-world objects</p> <p>Put 3-D shapes together to make other shapes</p> <p>Explore relationships among pattern blocks</p> <p>Analyze visual images observing 2-D and 3-D shapes</p> <p>Observe similarities and differences between the faces of 3-D shapes</p> <p>Explore the positions of objects and the spatial relationships among objects in an arrangement</p> <p>Explore 2-D symmetry</p>

TIS Elementary Math Scope and Sequence

	<p>Explore what happens to shapes when they are rotated, and flipped</p> <p>Explore and describe the paths, regions and boundaries of their immediate environment (inside, outside, above, below) and their position (next to, behind, in front of, up, down).</p> <p>Understand that although a shape’s attributes change, its properties remain the same (Triangles are triangles even “Upside down” or “Stretched thin”)</p>
Transferring meaning into symbols	<p>Describe and label 2-D and 3-D shapes and objects</p> <p>Visualize and select combinations of shapes to fill an area or design</p> <p>Reproduce the essential spatial features of the common mathematical shapes (circle, triangle, square, rectangle, rhombus, trapezoid)</p> <p>Visualize turning and moving a shape to get a given space</p> <p>Relate a 3-D shape to a 2-D representation of that shape</p> <p>Match a 3-D block to a 2-D outline of one of its faces</p>
Applying with understanding	<p>Identify two dimensional shapes i.e. circle, triangle, rectangles, and squares regardless of size or orientation’</p> <p>Identify three-dimensional figures in the environment</p> <p>Use relative position words including before/after far/near and over/under to place objects</p> <p>Describe the location of one object relative to another object using words such as <i>in, out, over, under above, below etc.</i></p> <p>Represent two-dimensional geometric shapes</p> <p>Use the positional words to describe the location of an object</p>
Measurement	
Conceptual understandings	<p>Measurement involves comparing objects and events</p> <p>Objects have attributes that can be measured using non-standard units</p> <p>We use tools to measure the attributes of objects and events</p> <p>Events can be ordered and sequenced</p>
Constructing meaning	<p>Understand that tools can be used to measure</p> <p>Understand that calendars can be used to determine the date, and to identify and sequence days of the week and months of the year</p> <p>Recognize length as an attribute of an object</p> <p>Develop strategies for measuring the length of an object</p> <p>Repeat multiple nonstandard units to quantify length</p> <p>Become familiar with units of time on a calendar</p> <p>Use the calendar to count days</p> <p>Compare the length, mass and capacity of objects using non-standard units</p>
Transferring meaning into symbols	<p>Record and represent measurement using pictures, numbers, and/or words</p> <p>Repeat a non-standard unit to measure a length up to 3 units long</p> <p>Identify and sequence events in their daily routine, for example, before, after, bedtime, story time, today, tomorrow.</p> <p>Identify, compare and describe attributes of real objects, for example, longer, shorter, heavier, empty, full, hotter, colder</p>

TIS Elementary Math Scope and Sequence

Applying with understanding	<p>Name in order the days of the week</p> <p>Sequence events;and identify calendars and clocks as objects that measure time</p> <p>Tell time to the hour</p> <p>Use comparative vocabulary in measurement settings (e.g. long/longer, short/shorter)</p> <p>Identify and describe measurable attributes such as length, weight and capacity and use these attributes to make direct comparisons</p> <p>Measure length with non-standard units (e.g. paper clips, cubes)</p> <p>Determine and describe comparisons of length, mass, capacity (e.g. longer, heavier, holds more than) using different shaped containers</p>
Pattern and function	
Conceptual understandings	<p>Patterns can be represented using numbers and other symbols</p> <p>Whole numbers exhibit patterns and relationships that can be observed and described</p> <p>Related concepts: repetition and sequencing</p>
Constructing meaning	<p>Recognize patterns in the environment and in daily life e.g. the pattern of school events, family celebrations, seasons</p> <p>Make, extend and orally describe repeating patterns with materials</p> <p>Decides which attribute to focus on when constructing a pattern</p> <p>Add units to continue a pattern</p> <p>Copies, construct, extend, and record patterns</p> <p>Predict and verify what comes next in a pattern</p> <p>Begin to decompose patterns into their units</p>
Transferring meaning into symbols	<p>Recognize and continue sequential patterns with 1,2, or 3 elements</p> <p>Record simple patterns using different notation</p> <p>Create simple patterns with single digits</p> <p>Define a “rule” for how a pattern grows (or shrinks)</p> <p>Describe a pattern using number, eg. my pattern is 2, 3, 2, 3, ...</p>
Applying with understanding	<p>Sort objects into groups in one or more ways and identify which attribute was use to sort (size, shape, color)</p> <p>Identify, reproduce and extend repeating patterns</p> <p>Identify and describe qualitative changes (e.g. temperature.hotter/colder)</p> <p>Use drawings and labels to record solutions of addition and subtraction problems with answers less than or equal to 10</p> <p>Identify and create compare and describe sets of objects as more, less or equal</p>
Data Handling	
Conceptual understandings	<p>Organizing objects and events helps us to solve problems</p> <p>Information can be expressed as organized and structured data</p> <p>Objects and event can be organized in different ways</p> <p>Some events in daily life are more likely to happen than others</p>

TIS Elementary Math Scope and Sequence

	Related concept: classification
Constructing meaning	<p>Observe and describe attributes of objects and sets of objects, such as size, color, shape, and quantity</p> <p>Identify and describe attributes of objects</p> <p>Identify similarities and differences when comparing objects</p> <p>Understand that information about themselves and their surroundings can be obtained in different ways</p> <p>Describe categories for sorting data</p> <p>Collect and keep track of survey data</p> <p>Discuss chance in daily events (<i>Impossible, maybe, certain</i>)</p> <p>Understand the concept of chance in daily events (impossible, less likely, maybe, most likely, certain)</p> <p>Observe, describe, and make sense of different representations of the same data</p> <p>Compose, collect, record, and share yes/no surveys</p>
Transferring meaning into symbols	<p>Collect and represent data or information through pictographs, tally marks or bar graphs</p> <p>Sort, describe and label real objects by attributes</p> <p>Represent relationships between objects using tree, Venn and Carroll diagrams</p> <p>Collect display and interpret data for the purpose of answering questions</p> <p>Interpret results of a data investigation</p>
Applying with understanding	<p>Collect and organize data by counting and using tally marks and other symbols</p> <p>Use tree, Venn and Carroll diagrams to explore and represent relationships between data</p> <p>Identify a real life situation to gather data over time</p> <p>Describe data by using mathematical language such as more than, less than etc</p> <p>Use chance devices like spinners and dice to explore concepts of probability and use tallies to record results in a table, make predictions based on results</p>

Grade 1

Number	
Conceptual Understandings	<p>Numbers can be used in many ways, for different purposes in the real world</p> <p>Making connections between our experiences with number can help us develop number sense</p> <p>Number operations can be modeled in a variety of ways.</p> <p>Understand the concepts of addition and subtraction</p> <p>There are many mental methods that can be applied for exact and approximate computations.</p>
Constructing meaning	<p>Identify some patterns in the number sequence and on the 100 chart</p> <p>Compare two collections using one-to-one correlation</p> <p>Develop a strategy for organizing sets of objects so that they are easier to count and combine</p> <p>Increase familiarity with single-digit addition pairs</p> <p>Share by dealing out an equal number of items</p> <p>Use the language of addition and subtraction, for example, add, take away, plus, minus, sum, difference, combining, and separating</p> <p>Model addition and subtraction of whole numbers</p> <p>Develop strategies for counting accurately</p> <p>Use the number line as a tool for counting</p> <p>Use materials or visualize to decompose numbers into parts</p> <p>Analyze visual images of quantities</p> <p>Recreate an arrangement of objects</p> <p>Practice rote counting sequence forward and backward up to 100</p> <p>Develop meaning for counting by 1, 2, 5, and 10</p> <p>Practice addition combinations</p> <p>Explore relationships among combinations</p> <p>Find combinations of numbers up to 20</p>
Transferring meaning into symbols	<p>Write number sentences that for a story problem</p> <p>Develop and analyze visual images for quantities up to 10</p> <p>Connect written numbers and number names</p> <p>Read, write, and sequence numbers to 100</p> <p>Record what strategies using pictures, numbers, and words</p> <p>Record solutions to problems using +, -, =</p> <p>Use the calendar as a tool for keeping track of time</p>
Applying with understanding	<p>Count forward by 1's to 120 with and without objects and starting with any number less than 120, and count by 2's to at least 100</p> <p>Group and count objects by 2's, 10's and 5's to 100</p> <p>Identify read aloud and write numbers to 100</p> <p>Write compare and order numbers to at least 100 using the words equal to, greater than, less than, greatest and least and recording the results of comparisons with the symbols >, = and < when appropriate</p>

TIS Elementary Math Scope and Sequence

	<p>Use a number line or chart, locate, compare and order whole numbers less than 100 and identify the numbers coming before, after and between given number/s</p> <p>Construct models and identify place value of each digit utilizing standard and expanded form through 99</p> <p>Find the value of a set of decimal coins</p> <p>Use concrete objects to model the addition of 2 or 3 addends and subtraction of whole numbers related to sums less than 20 and write corresponding number sentence</p> <p>Using concrete models or drawings and strategies based on place value, add within 100, including adding a two digit and one digit number</p> <p>Use movement on the number line to demonstrate the inverse relationship between addition and subtraction</p> <p>Identify odd and even numbers to 20 and determine if a set of objects has an odd or even number of elements</p> <p>Recall from memory single digit addition facts (to 9+9) and the corresponding subtraction facts</p> <p>Estimate the number of objects in a group of 100 or less and count to evaluate reasonableness of estimate</p> <p>Given a number and number line/hundreds chart, identify the nearest ten</p> <p>Solve and create a story problem that matches an addition or subtraction expression or equation using physical objects, pictures or words</p> <p>Apply strategies including countin on, back and doubling for addition facts to at least 10</p>
Shape and space	
Conceptual understandings	<p>Shapes are classified and named according to their properties.</p> <p>Some shapes are made up of parts that repeat in some way.</p> <p>Specific vocabulary can be used to describe an object's position in space.</p>
Constructing meaning	<p>Understand that there are relationships among and between 2D and 3D shapes</p> <p>Understand that 2D and 3D shapes can be created by putting together and/or taking apart other shapes</p> <p>Understand that examples of symmetry and transformations can be found in their immediate environment</p> <p>Understand that geometric shapes are useful for representing real-world situations</p> <p>Understand that directions can be used to describe pathways, regions, positions, and boundaries of their immediate environment.</p> <p>Group shapes according to common characteristics</p>
Transferring meaning into symbols	<p>Sort, describe, and label 2D and 3D analyze and describe the relationships between 2D and 3D shapes</p> <p>Create and describe symmetrical patterns</p> <p>Identify lines of reflective symmetry</p> <p>Represent ideas about the real world using geometric vocabulary and symbols (for example, through oral description, drawing, modeling, labeling)</p>

TIS Elementary Math Scope and Sequence

	<p>Interpret and create simple directions, describing paths, regions, positions and boundaries of their immediate environment</p> <p>Fill a given region with shapes</p>
Applying with understanding	<p>Name, sort and sketch 2D shapes (circles, triangles, rectangles including squares regardless of orientation)</p> <p>Identify, name and describe 3D shapes regardless of size or orientation</p> <p>Use positional words down/up, left/right, top/bottom between/middle to describe the relative location of objects</p> <p>Use the direction words left, and right to describe movement</p> <p>Compose and decompose common 2D figures</p> <p>Use the positional and directional terms north, south, east west to describe location and movement</p> <p>Identify what comes next in a step by step story or even sequence</p>
Measurement	
Conceptual understanding	<p>Standard units allow us to have a common language to identify, compare, order and sequence objects and events.</p> <p>We use tools to measure the attributes of objects and events.</p> <p>Estimation allows us to measure with different levels of accuracy.</p>
Constructing meaning	<p>Understand the process of measuring</p> <p>Understand what is length</p> <p>Understand that tools can be used to measure</p> <p>Understand that calendars can be used to determine the date, and to identify and sequence days of the week and months of the year</p> <p>Understand that time is measured using universal units of measure, for example, years, months, days, hours, minutes and seconds</p>
Transferring meaning into symbols	<p>Develop accurate measurement techniques</p> <p>Demonstrates a sense of heavy and light by feel</p> <p>Describe and compare weights</p> <p>Understand that measuring an object using different -length units will result in different measurements</p> <p>Estimate and compare lengths</p>
Applying with understanding	<p>Name in the order the months of the year and use the calendar to identify days, weeks, months and a year</p> <p>Sequence events with respect to time; e.g. yesterday, today, tomorrow, seasons</p> <p>Tell time to the hour and half hour using digital and analogue clock</p> <p>Compare order, describe and represent objects by length and weight</p> <p>Estimate and verify by measuring length, weight and capacity using non standard units (e.g. sticks, paper clips, blocks etc)</p> <p>Identify the appropriate tool used to measure length, weight, time and temperature</p> <p>Compare and order given lengths, capacities, weights, or temperatures that are expressed in the same unit of measure</p>

TIS Elementary Math Scope and Sequence

	Use a variety of non-standard units to measure length
Pattern and function	
Conceptual understandings	Whole numbers exhibit patterns and relationships that can be observed and described. Patterns can be represented using numbers and other symbols.
Constructing meaning	Understand the meaning of a word pattern Understand that patterns have a repeating unit Understand the inverse relationship between addition and subtraction Understand the associative and commutative properties of addition associate counting numbers with elements of a repeating pattern Understand that patterns can be found in numbers, for example, odd and even numbers, skip counting
Transferring meaning into symbols	Represent patterns in a variety of ways (for example, using words, drawings, symbols, materials, actions, numbers) Represent a repeating pattern in more than one way (eg, representing a red-blue-green-red-blue-green cube pattern with the movements clap-slap knees-clap-slap knees) Predict what comes next in a repeating pattern
Applying with understanding	Sort and classify objects by one or two attributes in more than one way Create and explain patterns using concrete objects, numbers, shapes, and colors Formulate, explain and generalize patterns within and across addition and subtraction Identify describe and explain the patterns in repeating situations (adding the same number, e.g. 2,5,8,11 or skip counting) Select and/or write number sentences to find the unknown in problem solving contexts involving single-digit addition and subtraction using appropriate labels Create, compare and describe sets of objects as greater than, less than/ equal to
Data Handling	
Conceptual understandings	Information can be expressed as organized and structured data. Objects and events can be organized in different ways. Some events in daily life are more likely to happen than others.
Constructing meaning	Look carefully at a group of objects to determine how they have been sorted Understanding that the sum of the pieces of data in all categories equals the number of people surveyed Understand how to choose a survey question Collect and keep track of survey data
Transferring meaning into	Describe attributes of objects Make a representation to communicate the results of a survey

TIS Elementary Math Scope and Sequence

symbols	Make sense of data representation, including pictures, bar graphs, tallies, and Venn diagrams Make a plan for gathering, tracking, sorting, categorizing, and recording data Makes sense of other students' representations Describe data quantitatively and qualitatively
Applying with understanding	Gather data and represent data using tallies, tables, picture graphs and bar graphs Identify a real life situation to gather data over time Analyze and interpret data by using mathematical language such as more than, less than etc Conduct simple experiments, record data on a tally chart or table and use the data to predict which of the events is more likely or less likely to occur if the experiment is repeated

Grade 2

Number	
Conceptual Understandings	<p>The base 10 place value system is used to represent numbers and number relationships.</p> <p>Fractions are ways of representing whole part relationships.</p> <p>Understand the concepts of addition and subtraction</p> <p>The operations of addition, subtraction, multiplication and division are related to each other and are used to process information to solve problems.</p>
Constructing meaning	<p>Use the 100 chart as a tool for combining and comparing numbers</p> <p>Compare numbers to 100</p> <p>Model numbers to hundreds or beyond using the base 10 place value system</p> <p>Combining groups of 10s and ones</p> <p>Identifying equal parts of a whole and naming them with fractions (half is one of 2 equal parts; third is one of 3 equal parts etc)</p> <p>Estimate quantities to 100 or beyond model simple fraction relationships</p> <p>Model addition and subtraction of fractions with the same denominator.</p> <p>Estimate sums and differences understand situations that involve multiplication and division</p> <p>Explore patterns on the 100 chart</p> <p>Develop numeration through 100</p> <p>Developing strategies for adding, subtracting, and comparing numbers</p> <p>Identify coins and their values</p> <p>Add coins using their equivalencies</p> <p>Explore counting and grouping</p> <p>Find the total of several single-digit numbers</p> <p>Develop an understanding of the relationship between addition and subtraction</p> <p>Develop fluency with addition and subtraction combinations to 10 + 10</p> <p>Recreate images of dots arranged in 2 by 5 arrays</p> <p>Compare 2 amounts under 45 to find the difference</p> <p>Find missing addends to make a total of 10</p> <p>Skip count by 2's, 5's and 10's fluently</p> <p>Use landmarks such as 10, 25, and 100</p>
Transferring meaning into symbols	<p>Continue to develop strategies for combining and separating story problems</p> <p>Develop strategies for adding and subtracting</p> <p>Match addition and subtraction notations to situations they might represent</p> <p>Write equivalent equations for a given total</p> <p>Read and write whole numbers up to hundreds or beyond</p> <p>Continue to record strategies using pictures, numbers, words, and equations</p> <p>Describe mental and written strategies for adding and subtracting two-digit numbers</p> <p>Recognize that the first digit of a 2-digit number designates the number of groups of 10 and the second digit designates the number of ones</p> <p>Identify patterns in the multiples of 2, 5 and 10</p>

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	Identify and name fractional parts that have numerators greater than 1 ($\frac{2}{3}$, $\frac{2}{4}$, $\frac{3}{4}$)
Applying with understanding	<p>Count by 5's, 10's and 100's starting at any number from 1 - 999</p> <p>Name the number that is 1 more than or 10 more than any number from 0 - 999 and 1 less than or 10 less than any number from 10 - 1000</p> <p>Identify, read aloud and write numbers to 1000</p> <p>Compare and order numbers from 0 to at least 1,000 using the words equal to, greater than, less than, greatest or least and recording the results of comparisons with the symbols $>$, $=$, $<$ when appropriate</p> <p>Use ordinal numbers through 31st as they relate to the calendar</p> <p>Represent fractions that have denominators ranging from 2-12 using physical objects, pictures, numbers and words and translate among representations</p> <p>Use words, number lines and models to compare and order whole numbers through 999</p> <p>Construct models and identify place value of each digit utilizing standard and expanded form through 999</p> <p>Identify that when all fractional parts are included such as four fourths the result is equal to the whole and to one</p> <p>Place 0 and halves on the number line from 0-10</p> <p>Distinguish the equivalency among decimals, fractions and percents (e.g. half = 50%)</p> <p>Determine the value of a given set of decimal coins</p> <p>Demonstrate efficient procedures for adding and subtracting 2 and 3 digit numbers and explain why the procedures work on the basis of place value and number properties</p> <p>Model represent and explain multiplication (products to 81) as a rectangular array, as repeated addition and skip counting, or as equal sized moves on the number line and division as repeated subtraction sharing and grouping</p> <p>Demonstrate the relationships between odd and even numbers in addition and subtraction such as odd + odd = even or odd-even = odd</p> <p>Carry out addition and subtraction mentally involving 3 digit numbers and ones, digit numbers and tens, 3 digit numbers and hundreds</p> <p>Model and justify the relationship between addition and subtraction (fact families)</p> <p>Use rounding to analyze the reasonableness of a sum or a difference</p> <p>Round numbers to the nearest 10 or 100</p> <p>Apply strategies including counting on, counting back, doubling, halving for addition and subtraction facts</p>
Shape and space	
Conceptual understandings	<p>Shapes are classified and named according to their properties.</p> <p>Some shapes are made up of parts that repeat in some way.</p> <p>Specific vocabulary can be used to describe an object's position in space.</p>
Constructing	Understand and visualize a variety of shapes, including squares, rectangles,

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meaning	<p>triangles, and rectangular prisms</p> <p>Understand and visualize the path between two locations in space and on a grid</p> <p>Understand and visualize directions of turns</p> <p>Understand that directions can be used to describe pathways, regions, positions and boundaries of their immediate</p> <p>Understand that geometric shapes are useful for representing real-world situations</p> <p>Explore structure of arrays</p>
Transferring meaning into symbols	<p>Visualize structure of arrays</p> <p>Composes and decomposes shapes</p> <p>create and describe symmetrical and tessellating patterns</p> <p>identify lines of reflective symmetry</p> <p>Uses rotation and reflection to arrange shapes</p> <p>Sorts, describes, and identifies 2-D and 3-D shapes by various attributes</p> <p>Identifies triangles and rectangles based on the number of sides and corners</p> <p>Determine what makes a design symmetrical</p> <p>Finds and describes objects that have a mirror symmetry</p> <p>Follows, gives, and records directions for the how to move in space and on a path by estimating distances</p>
Applying with understanding	<p>Describe, sketch and compare 2D shapes (rhombus, square, triangle, trapezoid, rectangle, pentagon, hexagon, octagon and decagon) regardless of orientation</p> <p>Identify, classify and sort basic geometric figures by shape, size and geometric attributes (e.g. cube, sphere, cylinder, prism, pyramid, cone)</p> <p>Identify congruent and similar shapes (circles, triangles, rectangles)</p> <p>Use positional and directional terms north, south east and west to describe location and movement</p> <p>Predict the results of combining and subdividing polygons and circles</p> <p>Use ordered pairs to identify the locations of points in a grid (e.g. A-10 on map)</p> <p>Sort and classify objects by two or more attributes</p>
Measurement	
Conceptual understandings	<p>Standard units allow us to have a common language to identify, compare, order and sequence objects and events.</p> <p>We use tools to measure the attributes of objects and events.</p> <p>Estimation allows us to measure with different levels of accuracy.</p>
Constructing meaning	<p>Understand the process of measuring</p> <p>Understand that tools can be used to measure</p> <p>Understand the use of standard and non-standard units to measure, for example, length, mass, money, time, temperature</p> <p>Understand that time is measured using universal units of measure, for example, years, months, days, hours, minutes and seconds.</p>
Transferring meaning into	<p>Develop accurate measurement techniques</p> <p>Understand that measuring an object using different -length units will result in</p>

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symbols	<p>different measurements</p> <p>Compares the effects on measurement of using units of different sizes</p> <p>estimate and measure objects using standard units of measurement: length, mass, capacity, money and temperature</p> <p>Read and write the time to the hour, half hour and quarter hour</p> <p>Experiments using a ruler as a standard measuring tool</p>
Applying with understanding	<p>Recognize there are 12 months in the year, 7 days a week, 24 hours in a day</p> <p>Use elapsed time in one hour increments, beginning on the hour to determine start, end, and elapsed time</p> <p>Tell time to the nearest quarter hour and 5 minute interval using digital and analog clocks</p> <p>Compare, order and describe objects by various measurable attributes for length, weight, and temperature</p> <p>Select and use appropriate tools and units to measure length, time, capacity and weight</p> <p>Select appropriate tool for measuring temperature</p> <p>Compare order and describe objects by various measurable attributes for length, weight and temperature</p> <p>Use non standard units to cover a given region</p>
Pattern and function	
Conceptual understandings	<p>Whole numbers exhibit patterns and relationships that can be observed and described.</p> <p>Patterns can be represented using numbers and other symbols.</p>
Constructing meaning	<p>understand the meaning of the word pattern</p> <p>understand that patterns can be found in numbers, for example, odd and even numbers, skip counting</p> <p>understand sorting rules</p> <p>understand the inverse relationship between addition and subtraction</p> <p>understand the associative and commutative properties of addition</p>
Transferring meaning into symbols	<p>represent patterns in a variety of ways, for example, using words, drawings, symbols, materials, actions, numbers</p> <p>describe number patterns, for example, odd and even numbers, skip counting</p> <p>Use table to represent ratio between 2 quantities</p> <p>Use conventional language for tables (rows and columns)</p>
Applying with understanding	<p>Sort, classify and label objects by three or more attributes in more than one way including color, size, shape and thickness</p> <p>Explain analyze and extend repeating and growing patterns</p> <p>use number patterns to skip count by 2's, 3's 5's and 10's</p> <p>Identify patterns of additions and subtraction as represented in charts and tables and in varied forms of skip counting</p> <p>Select and/or write number sentences to find the unknown in problem-solving</p>

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	<p>contexts involving 2 digit addition and subtraction using appropriate labels</p> <p>Model, explain and identify missing operations and missing numbers in open number sentences including number facts in addition and subtraction</p> <p>Model situations and solve equations that involve the addition and subtraction of whole numbers</p> <p>Represent mathematical situations using numbers, symbols and words and complete number sentences with the appropriate words and symbols (+ = -)</p>
Data Handling	
Conceptual understandings	<p>Information can be expressed as organized and structured data.</p> <p>Objects and events can be organized in different ways.</p> <p>Some events in daily life are more likely to happen than others.</p>
Constructing meaning	<p>Representing data on a line plot</p> <p>Choosing a survey question</p> <p>Making a plan for collecting data</p> <p>Gathers, collects, categorizes, and tracks records in data</p> <p>Sees representations as a way of communicating to others</p>
Transferring meaning into symbols	<p>Represents data in several different ways</p> <p>Grouping data into categories based on similar attributes</p> <p>Sorting the same set of data in different ways</p> <p>Sorting a set of data by two attributes at one time</p> <p>Ordering, representing, and describing a set of numerical data in different ways</p> <p>Describing what the data show about the group surveyed</p> <p>Describing important features of a data set</p> <p>Describing a set of numerical data</p> <p>Interpreting and making a hypothesis based on a set of data</p> <p>Making predictions about data to be collected</p> <p>Makes sense of other students' representation of data</p>
Applying with understanding	<p>Use tables, pictographs and bar graphs to represent data</p> <p>Identify real life situations to gather data over time</p> <p>Interpret data presented in circle, line and bar graphs and answer questions about the displayed situation</p> <p>Conduct simple experiments with more than two outcomes and use the data to predict which event is more, less or equally likely to occur if the experiment is repeated</p>

Grade 3

Number	
Conceptual Understandings	<p>The base 10 place value system is used to represent numbers and number relationships.</p> <p>Fractions are ways of representing whole part relationships.</p> <p>The operations of addition, subtraction, multiplication and division are related to each other and are used to process information to solve problems.</p> <p>Number operations can be modeled in a variety of ways.</p> <p>There are many mental methods that can be applied for exact and approximate computations.</p>
Constructing meaning	<p>Model numbers to thousands or beyond using the base 10 place value system</p> <p>Model equivalent fractions</p> <p>Model multiplication and division of whole numbers</p> <p>Realize that repeated addition or skip counting will give the same result as counting by ones</p> <p>Realize that if they share a collection into a number of portions by dealing out or continuous halving and use up the whole quantity, then the portions must be equal regardless of how they look.</p>
Transferring meaning into symbols	<p>Read, write, compare and order whole numbers up to thousands or beyond</p> <p>develop strategies for memorizing</p> <p>Addition, subtraction, multiplication and division number facts</p> <p>Use materials or visualize to decompose small numbers into parts</p> <p>Write number sentences after they have solved the problem with materials; counting or basic facts</p>
Applying with understanding	<p>Count by hundreds and thousands starting with any number from 1 - 9,999</p> <p>Name the number that is 10 more than or 100 more than any number from 0-9,999 and 10 less than or 100 less than any number from 100 through 10,000</p> <p>Identify read aloud and write numbers to 10,000</p> <p>Compare and order numbers from 0 to at least 10,000 using the words equal to, greater than, less than greatest, or least and recording the results of comparisons with the symbols $>$, $=$, $<$ when appropriate</p> <p>Use concrete models and pictorial representations to demonstrate the meaning of fractions (proper and improper) as parts of a whole, parts of a set and division by whole numbers through twelfths.</p> <p>Use symbols and models to compare and order whole numbers through 9,999</p> <p>Model and identify place value of each digit utilizing standard and expanded form through 9999</p> <p>Identify, name and use equivalent fractions with denominators 2,4,8</p> <p>Compare and order fractions by using models, benchmarks (0, $\frac{1}{2}$, 1) or common numerators or denominators</p> <p>Determine possible combinations of (decimal) coins and bills to equal given amounts</p>

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	<p>Read, write and use money notation</p> <p>Apply models of multiplication (e.g. equal sized groups, arrays, area models, etc. and division to solve problems</p> <p>Apply inverse relationship between multiplication and division</p> <p>Use concrete models to add and subtract simple common fractions with the same denominator</p> <p>Identify whole number factors, and or pairs of factors for a given whole number through 24</p> <p>Illustrate with manipulatives when a number is divisible by 2,3,5,10</p> <p>Sort whole numbers into sets containing only odd numbers or only even numbers</p> <p>Add or subtract with numbers less than 100 using mental arithmetic</p> <p>use and explain the operations of multiplication and division including the properties</p> <p>Apply estimation skills</p> <p>Round whole numbers through 10,000 to the nearest ten, hundred and thousand and fractions to the nearest whole number</p> <p>Generate and solve 2 step addition and subtraction problems and 1 step multiplication and division problems</p> <p>Describe and show relationships between strategies and procedures for multiplying and dividing that involve addition and subtraction to explain strategies</p>
Shape and space	
Conceptual understandings	<p>Changing the position of a shape does not alter its properties.</p> <p>Shapes can be transformed in different ways.</p> <p>Geometric shapes and vocabulary are useful for representing and describing objects and events in real-world situations.</p>
Constructing meaning	<p>Compares areas of two shapes by determining whether they cover the same flat space</p> <p>Compares shapes to determine congruence through motions such as rotations (turns) and reflections (flips)</p> <p>Explores relationships among shapes</p> <p>Compares areas of rectangles that have different dimensions</p> <p>Measures area by covering a flat surface with square units</p> <p>Explores, sorts, and describes common geometric solids</p>
Transferring meaning into symbols	<p>Describes physical motions precisely as a series of slides, flips, turns</p> <p>Understands path as representation or records of movement</p> <p>Describes a path using mathematical ideas and language (i.e. closed, corner)</p> <p>Understands turns as changes in orientation or heading</p> <p>Defines and recognizes a triangle as a closed figure having three straight sides and three corners</p> <p>Identifies properties of equilateral triangles</p> <p>Understands that shapes can be reoriented in space without losing their properties</p> <p>Recognizes the components of polygons: sides and vertices (corners)</p>

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	<p>Recognizes the components of polyhedral; faces, vertices, and edges</p> <p>Understands how a pattern for a rectangular box can be folded to make the box</p> <p>Understand the structure of a rectangular prism as arrays of cubes</p>
Applying with understanding	<p>Describe compare analyze and classify two dimensional shapes by sides and angles</p> <p>Identify, describe and classify cube sphere prism pyramid, cone and cylinder in terms of the number and shape of faces, edges and vertices</p> <p>Identify and create shapes that have lines of symmetry</p> <p>Describe the transformational motions of geometric figures (translation/slide, reflection/flip and rotation/turn)</p> <p>Analyze the results of combining and subdividing circles triangles quadrilaterals pentagons, hexagons and octagons</p> <p>Identify draw and describe horizontal vertical and oblique lines</p> <p>Use coordinates to give or follow directions from one point to another on a map or grid</p> <p>Use the quantifiers all, some and none to describe the characteristics of a set</p>
Measurement	
Conceptual understandings	<p>Objects and events have attributes that can be measured using appropriate tools.</p> <p>Relationships exist between standard units that measure the same attributes.</p>
Constructing meaning	<p>Estimates length in paces by visualizing the unit pace repeated over a distance</p> <p>Examines a set of data to determine which piece is the middle-sized piece</p> <p>Shows an awareness of length in inches, feet, and yards</p> <p>Estimates and measures turns</p> <p>Is familiar with a common measurement for turns -degrees- and understands that there are 360 degrees in one full turn, 180 in a half turn, and 90 degrees in a quarter turn</p> <p>Investigate time devices</p>
Transferring meaning into symbols	<p>Demonstrates understanding of the rationale for a standard unit of measurement</p> <p>Represents data involving measurement on a line plot and describes the general features of the data</p> <p>Uses standard measures in complex situations to gather and analyze data concerning size and proportion</p> <p>Understands and uses important equivalences of i.e., money, and linear measurement</p>
Applying with understanding	<p>Recognise the number of weeks in a year, days in a year, and days in each month</p> <p>Use elapsed time in half hour increments beginning on the hour or half hour, to determine start, end and elapsed time</p> <p>Tell the time to the nearest minute using digital and analog clocks</p> <p>Compare, order, and describe objects by various measurable attributes for area and volume/capacity</p> <p>Select and use appropriate metric units of measure and measure to a required degree of accuracy (to the nearest 1/2 unit)</p>

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	<p>Select and use the appropriate standard metric units of measure, abbreviations and tools for measuring length, weight, and capacity</p> <p>Estimate and measure length using fractional parts to the nearest $\frac{1}{2}$ unit in the metric system</p> <p>Estimate and measure perimeter and area, using links, tiles, grid, paper, geoboards and dot paper</p>
Pattern and function	
Conceptual understandings	<p>By analyzing patterns and identifying rules for patterns it is possible to make predictions.</p> <p>Functions are relationships or rules that uniquely associate members of one set with members of another set.</p>
Constructing meaning	<p>Finds net change given starting and ending numbers</p> <p>Uses subtraction to cancel addition</p> <p>Makes the same net change in many different easy using positive and negative numbers</p> <p>Uses net change to determine an endpoint instead of counting each change separately</p> <p>Has a strategy for finding a missing starting number or a previous position along a number line</p> <p>Represents numbers graphically and understand that a ‘going up’ indicates positive change, a ‘going down’ graph indicates negative change, and horizontal graph indicates zero change</p> <p>Finds net change on a graph</p>
Transferring meaning into symbols	<p>Describe the rule for a pattern in a variety of ways</p> <p>Represent rules for patterns using words, symbols and tables</p> <p>Describe the overall shape of a line graph – increasing, decreasing, staying the same.</p> <p>Describing the relationship between two quantities in a situation with a constant rate of change, taking into account a beginning amount and a constant increase.</p> <p>Comparing different representations that show the same situation.</p> <p>Identifying the unit of a repeating pattern</p> <p>Describing and extending a number sequence with a constant increment (e.g., 3, 6, 9,...or 2, 5, 8,...)</p> <p>Determining the element of an ABC pattern associated with a particular counting number.</p> <p>Plotting point on a graph to represent a situation in which one quantity is changing in relation to another.</p>
Applying with understanding	<p>Create describe and extend growing and repeating patterns with physical materials and symbols including numbers</p> <p>Recognize and describe patterns using objects and numbers found in tables, number charts and charts</p>

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	<p>Select and/or write number sentences (equations) to find the unknown in problem solving contexts involving two digit times one digit multiplication using appropriate labels</p> <p>Model explain and solve open number sentences including addition, subtraction and multiplication facts</p> <p>Create models for the concept of equality, recognizing that the equal sign denotes equivalent terms such that $4+3=7$, $4+3=6+1$, $7=5+2$</p> <p>Determine the value of missing quantities or variables within equations or number sentences, and justify the process used</p> <p>Complete number sentences with the appropriate words and symbols (+, -, <, >, =)</p>
Data Handling	
Conceptual Understandings	<p>Data can be collected, organized, displayed and analyzed in different ways.</p> <p>Different graph forms highlight different aspects of data more efficiently.</p> <p>Probability can be based on experimental events in daily life.</p> <p>Probability can be expressed in numerical notations.</p>
Constructing meaning	<p>Understanding that data can be collected, displayed and interpreted using simple graphs, for example, bar graphs, line graphs</p> <p>Understanding that scale can represent different quantities in graphs</p> <p>Understanding that the mode can be used to summarize a set of data</p> <p>Understanding that one of the purposes of a database is to answer questions and solve problems</p> <p>Understanding that probability is based on experimental events.</p> <p>Understanding the relationship between feet, inches, centimeters, and meters.</p>
Transferring meaning into symbols	<p>Associate different temperatures with words like colder and warmer, and establish landmark temperatures.</p> <p>Interpreting what the numbers and symbols on a line plot mean.</p> <p>Reading and interpreting a representation of order numerical data.</p> <p>Using correct notation to write a measurement in feet, inches, centimeters, and meters.</p>
Applying with understanding	<p>Use graphical representations including number lines, frequency tables and pictographs to represent data</p> <p>Pose questions that can be used to guide data collection, organization and representation</p> <p>Compare data and interpret quantities represented on tables and different types of graphs (line plots, pictographs, and bar graphs) make predictions and solve problems based on the information</p> <p>Record results of activities involving chance (e.g. coin flips, dice rolls) and make reasonable predictions based upon data</p>

Grade 4

Number	
Conceptual Understandings	<p>The base 10 place value system is used to represent numbers and number relationships.</p> <p>Fractions are ways of representing whole part relationships.</p> <p>The operations of addition, subtraction, multiplication and division are related to each other and are used to process information to solve problems.</p> <p>Number operations can be modeled in a variety of ways.</p> <p>There are many mental methods that can be applied for exact and approximate computations.</p>
Constructing meaning	<p>Make sense of the notion that there are facts, no matter how they work it out or in what arrangement, is always the same answer. ($4+5=9$)</p> <p>Use the language of multiplication and division, for example, factor, multiple, product, quotient</p> <p>Use the language of fractions, for example, numerator, denominator</p> <p>Model addition and subtraction of fractions with related denominators</p>
Transferring meaning into symbols	<p>Describe mental and written strategies for multiplication and division.</p> <p>Devise addition and subtraction situations in terms of the whole and the two parts and which is missing</p> <p>Read, write, compare and order fractions</p> <p>Read and write equivalent fractions</p>
Applying with understanding	<p>Count by thousands and ten thousands starting at any number from 1 to 99,999</p> <p>Name the number that is 100 more than or 1000 more than any number from 0 through 99,999 and 100 less than or 1000 less than any number from 1000 through 100,000</p> <p>Read and write numbers to at least 100,000</p> <p>Compare and order numbers from 0 to 100,000 using the words equal to, greater than, less than, greatest or least and recording the results of comparisons with the symbols $>$, $<$, $=$, when appropriate</p> <p>Use symbols (i.e. $>=<$ and models to compare and order whole numbers through 99,999</p> <p>Identify and interpret the place value for each digit in numbers through 99,999</p> <p>Use models to connect and compare equivalent fractions and decimals</p> <p>Write a fraction equivalent to a given fraction using common multiples and simplify fractions using common factors</p> <p>Use numbers, words, pictures and physical objects to read write and represent decimal numbers to the hundredths between 0 and 1, between 1 and 2 etc</p> <p>Determine the equivalency among decimals, fractions and percents (e.g. $49/100=0.49=49\%$)</p> <p>Determine totals for monetary amounts in practical situations</p> <p>Read write and use money notations</p> <p>Describe relationships between quantities using ratios</p>

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	<p>Add and subtract whole numbers (up to five digit number)</p> <p>Represent multiplication of up to four digit by one digit numbers and describe how that representation connects to the related number sentence</p> <p>Compare and order positive fractions (including positive mixed numbers) and decimals on the number line, in number sentences, and in lists</p> <p>Identify factors of composite numbers less than 100</p> <p>Use divisibility concepts to classify numbers as</p>

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Applying with understanding	<p>Is developing the skill of translating 2-D pictures into 3-D structures</p> <p>Calculates distances on a grid based on paths along grid lines</p> <p>Applies knowledge of coordinates to locate points on a computer screen</p> <p>Creates and applies patterns and mental arithmetic strategies to solve Geo-Logo turtle geometry problems</p> <p>Uses mirror and rotational symmetry to place rectangles on a grid and to design complex patterns of rectangles</p> <p>Uses the calculator to solve the problems</p> <p>Measures distances on maps using scales</p>
Measurement	
Conceptual understandings	<p>Objects and events have attributes that can be measured using appropriate tools.</p> <p>Relationships exist between standard units that measure the same attributes.</p>
Constructing meaning	<p>Review standard lengths of units of measure (metric and imperial)</p> <p>Estimate lengths based on common units</p> <p>Recognize and explain possible sources of measurement error</p> <p>Compare different paths that have the same length</p> <p>Understand that the larger the unit of area, the smaller the number of units needed to measure the area</p> <p>See that cubes filling a rectangular prism can be decomposed into congruent layers</p> <p>Double the number of cubes for a given box and consider how that changes the dimensions of the original box</p>
Transferring meaning into symbols	<p>Know that a right angle measures 90° and use this as a landmark to find angles of 30°, 45° and 60°</p> <p>Develop a strategy for determining the volume of rectangular prisms</p>
Applying with understanding	<p>Use elapsed time in quarter hour increments, beginning on the quarter hour to determine start end and elapsed time</p> <p>Use A.M. and P.M. appropriately in describing time</p> <p>Estimate and convert units of measure for length, area and weight with the same measurement system (metric)</p> <p>Estimate temperature in practical situations</p> <p>Measure length, area, weight and temperature to a required degree of accuracy in metric systems</p> <p>Use appropriate tools to determine estimate, and compare units for measurement of weight mass area size of angle (using the benchmark angles 45°, 90°, 180°, 270°, 360° degrees, temperature length distance and volume in metric systems and time in real life situations</p> <p>Estimate and measure a given object to the nearest millimeter</p> <p>Convert capacity, weight mass and length within the metric system of measurement</p> <p>Describe relationships of rectangular area to numerical multiplication</p>
Pattern and	

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function	
Conceptual understandings	<p>By analyzing patterns and identifying rules for patterns it is possible to make predictions.</p> <p>Functions are relationships or rules that uniquely associate members of one set with members of another set.</p>
Constructing meaning	<p>Understands how changes and total are related</p> <p>Develops strategies for writing and solving missing-information problems</p> <p>Makes and interprets representations that show change</p> <p>Distinguishes between representations of something that can change and representations that show change</p> <p>Uses curves to communicate information</p> <p>Understands the difference between continuous and discrete changes</p>
Transferring meaning into symbols	<p>Describe the rule for a pattern in a variety of ways</p> <p>Represent rules for patterns using words, symbols and tables</p> <p>Describing the relative steepness of graphs of graphs in terms of different rates of change.</p> <p>Comparing situations by describing the differences in graphs.</p> <p>Describing the relationship between two quantities in a situation with a constant rate of change, taking into account a beginning amount and a constant increase.</p> <p>Identifying the unit of a repeating pattern</p> <p>Describing and extending a number sequence with a constant increment (e.g., 3, 6, 9,...or 2, 5, 8,...)</p> <p>Plotting point on a graph to represent a situation in which one quantity is changing in relation to another.</p>
Applying with understanding	<p>Create describe and extend growing and repeating patterns with physical materials and symbols including numbers</p> <p>Identify and describe patterns resulting from operations involving even and odd numbers (such as even + even = even)</p> <p>Select and/or write number sentences (equations) to find the unknown in problem solving contexts involving two-digit by one-digit division using appropriate labels</p> <p>Determine the rule and explain how change in one variable relates to the change in the second variable given an input/output model using two operations</p> <p>Model explain and solve open number sentences including addition subtraction multiplication and division</p> <p>Select the solution to an equation from a given set of numbers</p> <p>Complete number sentences with the appropriate word and symbols (+, -, <, >, x)</p> <p>Analyze and describe the similarities and differences between and among 2D shapes, figures and models using mathematical language</p> <p>Analyze the relationship between 3D shapes in the form of cubes, rectangular prisms, and cylinders and their two dimensional nets</p> <p>Identify shapes that are congruent similar and/or symmetrical using a variety of methods including transformational motions</p> <p>Compare figures to determine congruence using geometric transformations such</p>

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	<p>as reflections (flips) rotations (turns) and translations (slides)</p> <p>Represent the 2D shapes trapezoids, rhombuses and parallelograms and the 3D shapes cubes, rectangular prisms and cylinders</p> <p>Identify classify and draw triangles based on their properties</p> <p>Identify draw label and describe points line segments, rays and angles</p> <p>Identify, draw, and classify angles including straight, right obtuse and acute</p>
Data Handling	
Conceptual Understandings	<p>Data can be collected, organized, displayed and analyzed in different ways.</p> <p>Different graph forms highlight different aspects of data more efficiently.</p> <p>Probability can be based on experimental events in daily life.</p> <p>Probability can be expressed in numerical notations.</p>
Constructing meaning	<p>Understanding that data can be collected, displayed and interpreted using simple graphs, for example, bar graphs, line graphs</p> <p>Understanding that scale can represent different quantities in graphs</p> <p>Understanding that the mode can be used to summarize a set of data</p> <p>Understanding that one of the purposes of a database is to answer questions and solve problems</p> <p>understand that probability is based on experimental events.</p>
Transferring meaning into symbols	<p>Collecting, display and interpret data using simple graphs, for example, bar graphs, line graphs</p> <p>Identifying, read and interpret range and scale on graphs</p> <p>Identifying the mode of a set of data</p> <p>Using tree diagrams to express</p>
Applying with understanding	<p>Use a variety of graphical representations including frequency tables and plots to organize and represent data</p> <p>Pose questions that can be used to guide data collection, organization, and representation</p> <p>Compare data and interpret quantities represented on tables and graphs including line graphs, bar graphs, frequency tables and stem and leaf plots to make predictions and solve</p> <p>Make predictions and draw conclusions from simple experiments</p> <p>Design and conduct a simple probability experiment using concrete objects examine and list all possible combinations using a tree diagram represent the outcomes as a ratio and present the results</p>

Grade 5

Number	
Conceptual Understandings	<p>The base 10 place value system extends infinitely in two directions</p> <p>Fractions, decimal fractions and percentages are ways of representing whole-part relationships</p> <p>For fractional and decimal computation, the ideas developed for whole-number computations can apply</p>
Constructing meaning	<p>Model numbers to millions or beyond using the base-10 place value system</p> <p>Model ratios</p> <p>Model improper fractions and mixed numbers</p> <p>Simplify fractions using manipulatives</p> <p>Produce diagrams to compare or combine two fractions ensuring that both are represented on identical wholes</p> <p>Count forward and backwards in tenths, hundredths and thousandths</p> <p>Model percentages</p> <p>Model addition, subtraction, multiplication and division of fractions (and use number sentences)</p>
Transferring meaning into symbols	<p>Read, write, compare and order whole numbers up to millions or beyond</p> <p>Read and write ratio</p> <p>Convert improper fractions to mixed numbers and vice versa</p> <p>Simplify fractions in mental and written form</p> <p>Read, write, compare and order percentages</p>
Applying with understanding	<p>Count by thousands, ten thousands and hundred thousands starting at any number from 1 to 999,999</p> <p>Read and write numbers to at least 1,000,000</p> <p>Compare and order numbers from 0 to 1,000,000 using the words equal to, greater than, less than, greatest, or least and recording the results of comparisons with the symbols $>$, $=$, $<$ when appropriate</p> <p>Read write compare and order all whole numbers fractions mixed numbers and decimals using multiple strategies (e.g symbols, number line, place value)</p> <p>Identify and use place value positions of whole numbers and decimals to hundredths</p> <p>Determine decimal equivalents or approximations of common fractions (i.e. $1/2$, $3/4$)</p> <p>Relate equivalent fractions and decimals with and without models, including locations on a number line</p> <p>use models and drawings, and find common denominators to compare fractions with unlike denominators</p> <p>Round, order and compare, using symbols, decimals to the tenths, hundredths and thousandths</p> <p>Determine the equivalency between and among fractions, decimals and percents in contextual situations</p>

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	<p>Determine totals differences and change due for monetary amounts (decimal) in practical situations</p> <p>Describe real world situations using positive and negative numbers</p> <p>Represent ratios and proportions and solve problems using modes and pictures</p> <p>Add subtract multiply and divide with and without remainders using non-negative rational numbers</p> <p>Multiply four digit numbers by two digit numbers</p> <p>Add subtract multiply and divide fractions, decimals, to hundredths using concrete models or drawings and strategies based on place value</p> <p>Model addition and subtraction of mixed numbers with and without regrouping and fractions with like and unlike denominators</p> <p>Identify all whole number factors and pairs of factors for a given whole number through 144</p> <p>Model and distinguish between factor and multiple and prime and composite numbers</p> <p>Recall from memory multiplying and dividing by 10,100 and 1,000</p> <p>Select sequence and use appropriate operations to solve multistep word problems with whole numbers</p> <p>Select and/or use an appropriate operation</p>
Shape and space	
Conceptual Understandings	<p>Manipulation of shapes and space takes place for a particular purpose.</p> <p>Consolidating what we know of geometric concepts allows us to make sense of and interact with our world.</p> <p>Geometric tools and methods can be used to solve problems relating to shape and space</p>
Constructing meaning	<p>Find and understand connections between geometric and numerical patterns</p> <p>Sort and classify triangles and quadrilaterals and uses mathematical vocabulary to describe them</p> <p>Explore the relationship of turns and angles to the total number of sides</p> <p>Understand characteristics of units of volume</p> <p>Measure volume</p> <p>Compares the volume of one large space to another</p> <p>Explores volume relationship between differently shaped containers and between solids</p>
Transferring meaning into symbols	<p>Finds and understands relationships among angles, line lengths, and areas of similar polygons</p> <p>Understands rectangular arrays of cubes as congruent layers</p> <p>Uses multiplication to determine the total number of cubes in a box</p> <p>Understands the relationship between the dimensions of a box and how many rectangular packages fill the box</p> <p>Understands the notion of volume and units of volume</p> <p>Sees and uses cubic centimeters as a unit for</p> <p>Recognizes and names polygons by the number of sides</p>

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	Has an understanding of parallel lines
Applying with understanding	<p>Analyze and describe the characteristics of symmetry relative to classes of polygons (parallelograms, triangles etc)</p> <p>Predict and describe the effects of combining, dividing and changing shapes into other shapes</p> <p>Represent concepts of congruency, similarity and/or symmetry using a variety of methods including dilation and transformational motion</p> <p>Predict results of multiple transformations on a geometric shape when translation, reflection and rotation are used</p> <p>Predict and describe the effects of combining dividing and changing shapes into other shapes.</p> <p>Describe the characteristics of a right triangle</p> <p>Determine the degrees of the interior angles of triangles</p> <p>Identify draw label and describe planes, parallel lines, intersecting lines and perpendicular lines</p> <p>Identify the attributes of an angle and draw angles using protractors</p> <p>Graph coordinates representing geometric shapes in the first quadrant</p> <p>Represent relationships using Venn Diagrams</p>
Measurement	
Conceptual Understandings	<p>Accuracy of measurements depends on the situation and the precision of the tool.</p> <p>Conversion of units and measurements allows us to make sense of the world we live in.</p> <p>A range of procedures exists to measure different attributes of objects and events.</p>
Constructing meaning	<p>Understand procedures for finding area, perimeter and volume</p> <p>Understand the relationships between area and perimeter, between area and volume, and between volume and capacity</p> <p>Understand unit conversions within measurement systems (metric or customary).</p> <p>Identify everyday benchmarks as comparable to standard units of measurement</p> <p>Recognize which measurement units are U.S. standard and which are metric</p> <p>Identify benchmarks for the measure of length, weight, volume, and time</p> <p>Distinguish between quantity and weight</p> <p>Order items by weight and by measures of liquid quantity</p> <p>Reason about factors that influence capacity</p> <p>Develop a sense of volume as the amount of space something takes up or the amount of pourable substance a container can hold</p>
Transferring meaning into symbols	<p>Develop and describe formulas for finding perimeter, area and volume</p> <p>Use decimal and fraction notation in measurement, for example, 3.2 cm, 1.47 kg, 1½ miles</p> <p>Read and interpret scales on a range of measuring instruments</p>

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	<p>Measure and construct angles in degrees using a protractor</p> <p>Carry out simple unit conversions within a system of measurement (metric or customary).</p> <p>Is beginning to develop meaning for the concept of density</p> <p>Uses vocabulary for describing units of time</p>
Applying with understanding	<p>Determine equivalent periods of time, including relationships between and among seconds, minutes, hours, days months and years</p> <p>Estimate and convert units of measure for weight and volume/capacity within the same measurement system (metric)</p> <p>Measure volume and weight to a required degree of accuracy (metric)</p> <p>Select and apply appropriate units for measuring length, mass, volume and temperature in the metric system</p> <p>Estimate and measure length to nearest 1/2 mm</p> <p>Convert units within a given measurement system to include length, weight/mass and volume</p> <p>Estimate and calculate perimeter and area of rectangles, triangles and parallelograms</p>
Pattern and Function	
Conceptual Understandings	<p>By analyzing patterns and identifying rules for patterns, it is possible to make predictions</p> <p>Patterns can often be generalized using algebraic expressions, equations, or function</p>
Constructing meaning	<p>Compares relative motion</p> <p>Explores relationships between discrete and continuous descriptions of motion</p>
Transferring meaning into symbols	<p>Relate number patterns to graphical shapes</p>
Applying with understanding	<p>Identify rule for a pattern involving addition subtraction or multiplication</p> <p>Identify describe and represent patterns and relationships in the number system including triangular numbers and perfect squares</p> <p>Solve problems by finding the next term or missing term in a pattern or function table using real world situations</p> <p>Devise a rule for an input/output function table, describing it in words and symbols</p> <p>Solve equations with whole numbers using a variety of methods including inverse operations, mental math and guess and check</p> <p>Complete number sentences with the appropriate words and symbols</p>
Data Handling	
Conceptual understandings	<p>Data can be presented effectively for valid interpretation and communication.</p> <p>Range, mode, median, and mean can be used to analyze statistical data.</p>

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	Probability can be represented on a scale between 0–1 or 0%–100%.
Constructing meaning	<p>Understand that different types of graphs have special purposes</p> <p>Plot the results of probability experiments on line plots and interprets the data represented</p> <p>Compare expected outcomes with actual outcomes</p> <p>Understand that the mode, median, mean, and range can summarize a set of data</p> <p>Understand probability as how likely something is to occur and that the probability of an event happening ranges from never to always</p> <p>Understand that probability can be expressed in scale (0–1) or percent (0%–100%)</p>
Transferring meaning into symbols	<p>Collect, display and interpret data in circle graphs (pie charts) and line graphs</p> <p>Recognize that probability can be described using fractions, decimals, or percents express probabilities using scale (0–1) or percent (0%–100%).</p> <p>Estimate probabilities based on results of actual trials</p> <p>Use a systematic way to generate a list of all possibilities</p> <p>Use data characteristics to identify data sets, to describe numerical and categorical variables, and to compare a sample to a larger population</p> <p>Understand what a reasonable sample is and why a larger sample tends to reflect a population better than a smaller one</p>
Applying with understanding	<p>Use a variety of graphical representation to organize and represent data</p> <p>Pose questions that can be used to guide the collection of categorical and numerical data</p> <p>Compare data and interpret quantities represented on tables and graphs to make predictions and solve problems based on the information</p> <p>Collect and analyze data using mean, median and mode to determine the best statistical measure</p> <p>Make predictions and draw conclusions based on data collected from a sample group</p> <p>Construct a sample space and make a hypothesis as the probability of a real life situation over time, test and present conclusions</p>