

Kindergarten Pacing Guide

Vision Statement

Imagine a classroom, a school, or a school district where all students have access to high-quality, engaging mathematics instruction. There are ambitious expectations for all, with accommodation for those who need it. Knowledgeable teachers have adequate resources to support their work and are continually growing as professionals. The curriculum is mathematically rich, offering students opportunities to learn important mathematical concepts and procedures with understanding. Technology is an essential component of the environment. Students confidently engage in complex mathematical tasks chosen carefully by teachers. They draw on knowledge from a wide variety of mathematical topics, sometimes approaching the same problem from different mathematical perspectives or representing the mathematics in different ways until they find methods that enable them to make progress. Teachers help students make, refine, and explore conjectures on the basis of evidence and use a variety of reasoning and proof techniques to confirm or disprove those conjectures. Students are flexible and resourceful problem solvers. Alone or in groups and with access to technology, they work productively and reflectively, with the skilled guidance of their teachers. Orally and in writing, students communicate their ideas and results effectively. They value mathematics and engage actively in learning it.

National Council of Teachers of Mathematics

Process Standards

Mathematical Problem Solving

Students will apply mathematical concepts and skills and the relationships among them to solve problem situations of varying complexities. Students also will recognize and create problems from real-life data and situations within and outside mathematics and then apply appropriate strategies to find acceptable solutions. To accomplish this goal, students will need to develop a repertoire of skills and strategies for solving a variety of problem types. A major goal of the mathematics program is to help students become competent mathematical problem solvers.

Mathematical Communication

Students will use the language of mathematics, including specialized vocabulary and symbols, to express mathematical ideas precisely. Representing, discussing, reading, writing, and listening to mathematics will help students to clarify their thinking and deepen their understanding of the mathematics being studied.

Mathematical Reasoning

Students will recognize reasoning and proof as fundamental aspects of mathematics. Students will learn and apply inductive and deductive reasoning skills to make, test, and evaluate mathematical statements and to justify steps in mathematical procedures. Students will use logical reasoning to analyze an argument and to determine whether conclusions are valid. In addition, students will learn to apply proportional and spatial reasoning and to reason from a variety of representations such as graphs, tables, and charts.

Mathematical Connections

Students will relate concepts and procedures from different topics in mathematics to one another and see mathematics as an integrated field of study. Through the application of content and process skills, students will make connections between different areas of mathematics and between mathematics and other disciplines, especially science. Science and mathematics teachers and curriculum writers are encouraged to develop mathematics and science curricula that reinforce each other.

Mathematical Representations

Students will represent and describe mathematical ideas, generalizations, and relationships with a variety of methods. Students will understand that representations of mathematical ideas are an essential part of learning, doing, and communicating mathematics. Students should move easily among different representations—graphical, numerical, algebraic, verbal, and physical—and recognize that representation is both a process and a product.

Strand: Number and Number Sense

Students in grades K–3 have a natural curiosity about their world, which leads them to develop a sense of number. Young children are motivated to count everything around them and begin to develop an understanding of the size of numbers (magnitude), multiple ways of thinking about and representing numbers, strategies and words to compare numbers, and an understanding of the effects of simple operations on numbers. Building on their own intuitive mathematical knowledge, they also display a natural need to organize things by sorting, comparing, ordering, and labeling objects in a variety of collections.

Consequently, the focus of instruction in the number and number sense strand is to promote an understanding of counting, classification, whole numbers, place value, fractions, number relationships (“more than,” “less than,” and “equal to”), and the effects of single-step and multistep computations. These learning experiences should allow students to engage actively in a variety of problem solving situations and to model numbers (compose and decompose), using a variety of manipulatives. Additionally, students at this level should have opportunities to observe, to develop an understanding of the relationship they see between numbers, and to develop the skills to communicate these relationships in precise, unambiguous terms.

Strand: Computation and Number Sense

A variety of contexts are necessary for children to develop an understanding of the meanings of the operations such as addition and subtraction. These contexts often arise from real-life experiences in which they are simply joining sets, taking away or separating from a set, or comparing sets. These contexts might include conversations, such as “How many books do we have altogether?” or “How many cookies are left if I eat two?” or “I have three more candies than you do.” Although young children first compute using objects and manipulatives, they gradually shift to performing computations mentally or using paper and pencil to record their thinking. Therefore, computation and estimation instruction in the early grades revolves around modeling, discussing, and recording a variety of problem situations. This approach helps students transition from the concrete to the representation to the symbolic in order to develop meaning for the operations and how they relate to each other.

In grades K–3, computation and estimation instruction focuses on

- relating the mathematical language and symbolism of operations to problem situations;
- understanding different meanings of addition and subtraction of whole numbers and the relation between the two operations;
- developing proficiency with basic addition, subtraction, multiplication, division and related facts;
- gaining facility in manipulating whole numbers to add and subtract and in understanding the effects of the operations on whole numbers;
- developing and using strategies and algorithms to solve problems and choosing an appropriate method for the situation;
- choosing, from mental computation, estimation, paper and pencil, and calculators, an appropriate way to compute;
- recognizing whether numerical solutions are reasonable;
- experiencing situations that lead to multiplication and division, such as equal groupings of objects and sharing equally; and
- performing initial operations with fractions.

Strand: Measurement

Measurement is important because it helps to quantify the world around us and is useful in so many aspects of everyday life. Students in grades K–3 should encounter measurement in many normal situations, from their daily use of the calendar and from science activities that often require students to measure objects or compare them directly, to situations in stories they are reading and to descriptions of how quickly they are growing.

Measurement instruction at the primary level focuses on developing the skills and tools needed to measure length, weight/mass, capacity, time, temperature, area, perimeter, volume, and money. Measurement at this level lends itself especially well to the use of concrete materials. Children can see the usefulness of measurement if classroom experiences focus on estimating and measuring real objects. They gain deep understanding of the concepts of measurement when handling the materials, making physical comparisons, and measuring with tools.

As students develop a sense of the attributes of measurement and the concept of a measurement unit, they also begin to recognize the differences between using nonstandard and standard units of measure. Learning should give them opportunities to apply both techniques and nonstandard and standard tools to find measurements and to develop an understanding of the use of simple U.S. Customary and metric units.

Teaching measurement offers the challenge to involve students actively and physically in learning and is an opportunity to tie together other aspects of the mathematical curriculum, such as fractions and geometry. It is also one of the major vehicles by which mathematics can make connections with other content areas, such as science, health, and physical education.

Strand: Geometry

Children begin to develop geometric and spatial knowledge before beginning school, stimulated by the exploration of figures and structures in their environment. Geometric ideas help children systematically represent and describe their world as they learn to represent plane and solid figures through drawing, block constructions, dramatization, and verbal language.

The focus of instruction at this level is on

- observing, identifying, describing, comparing, contrasting, and investigating solid objects and their faces;
- sorting objects and ordering them directly by comparing them one to the other;
- describing, comparing, contrasting, sorting, and classifying figures; and
- exploring symmetry, congruence, and transformation.

In the primary grades, children begin to develop basic vocabulary related to figures but do not develop precise meanings for many of the terms they use until they are thinking beyond Level 2 of the van Hiele theory (see below).

The van Hiele theory of geometric understanding describes how students learn geometry and provides a framework for structuring student experiences that should lead to conceptual growth and understanding.

- **Level 0: Pre-recognition.** Geometric figures are not recognized. For example, students cannot differentiate between three-sided and four-sided polygons.
- **Level 1: Visualization.** Geometric figures are recognized as entities, without any awareness of parts of figures or relationships between components of a figure. Students should recognize and name figures and distinguish a given figure from others that look somewhat the same. (This is the expected level of student performance during grades K and 1.)
- **Level 2: Analysis.** Properties are perceived but are isolated and unrelated. Students should recognize and name properties of geometric figures. (Students are expected to transition to this level during grades 2 and 3.)

Strand: Probability and Statistics

Students in the primary grades have a natural curiosity about their world, which leads to questions about how things fit together or connect. They display their natural need to organize things by sorting and counting objects in a collection according to similarities and differences with respect to given criteria.

The focus of probability instruction at this level is to help students begin to develop an understanding of the concept of chance. They experiment with spinners, two-colored counters, dice, tiles, coins, and other manipulatives to explore the possible outcomes of situations and predict results. They begin to describe the likelihood of events, using the terms *impossible*, *unlikely*, *equally likely*, *more likely*, and *certain*.

The focus of statistics instruction at this level is to help students develop methods of collecting, organizing, describing, displaying, and interpreting data to answer questions they have posed about themselves and their world.

Strand: Patterns, Functions, and Algebra

Stimulated by the exploration of their environment, children begin to develop concepts related to patterns, functions, and algebra before beginning school. Recognition of patterns and comparisons are important components of children's mathematical development.

Students in kindergarten through third grade develop the foundation for understanding various types of patterns and functional relationships through the following experiences:

- sorting, comparing, and classifying objects in a collection according to a variety of attributes and properties;
- identifying, analyzing, and extending patterns;
- creating repetitive patterns and communicating about these patterns in their own language;
- analyzing simple patterns and making predictions about them;
- recognizing the same pattern in different representations;
- describing how both repeating and growing patterns are generated; and
- repeating predictable sequences in rhymes and extending simple rhythmic patterns.

The focus of instruction at the primary level is to observe, recognize, create, extend, and describe a variety of patterns. These students will experience and recognize visual, kinesthetic, and auditory patterns and develop the language to describe them orally and in writing as a foundation to using symbols. They will use patterns to explore mathematical and geometric relationships and to solve problems, and their observations and discussions of how things change will eventually lead to the notion of functions and ultimately to algebra.

Kindergarten Quarterly Overview Sheet

1 st Quarter	2 nd Quarter	3 rd Quarter	4 th Quarter
<p>Strand: Number and Number Sense Focus: Whole Number Concepts</p> <p>K.1 (C.5) The student, given two sets, each containing 10 or fewer concrete objects, will identify and describe one set as having more, fewer, or the same number of members as the other set, using the concept of one-to-one correspondence.</p> <p>Strand: Geometry Focus: Plane Figures</p> <p>K.11 (A.1-A.3 & B.2) The student will</p> <ol style="list-style-type: none"> identify, describe, and trace plane geometric figures (circle, triangle, square, and rectangle); and compare the size (larger, smaller) and shape of plane geometric figures (circle, triangle, square, and rectangle). <p>K.12(A.1- A.2 & B.1- B.2) The student will describe the location of one object relative to another (above, below, next to) and identify representations of plane geometric figures (circle, triangle, square, and rectangle) regardless of their positions and orientations in space.</p> <p>Strand: Patterns: Functions & Algebra Focus: Attributes and Patterning</p> <p>K.15(B.4) The student will sort and classify objects according to attributes.</p>	<p>Strand: Number and Number Sense Focus: Whole Number Concepts</p> <p>K.2 (A.1-A.3 & C.5) The student, given a set containing 15 or fewer concrete objects, will</p> <ol style="list-style-type: none"> tell how many are in the set by counting the number of objects orally; write the numeral to tell how many are in the set; and select the corresponding numeral from a given set of numerals. <p>Strand: Measurement Focus: Instruments and Attributes</p> <p>K.8 (A.1) The student will identify the instruments used to measure length (ruler), weight (scale), time (clock: digital and analog; calendar: day, month, and season), and temperature (thermometer).</p> <p>Strand: Probability and Statistics Focus: Data Collection and Display</p> <p>K.14(C.5-C.6) The student will display gathered data in object graphs, picture graphs, and tables, and will answer questions related to the data</p> <p>Strand: Patterns, Functions, and Algebra Focus: Attributes and Patterning</p> <p>K.16(C.1-C.3) The student will identify, describe, and extend repeating patterns.</p>	<p>Strand: Number and Number Sense Focus: Whole Number Concepts</p> <p>K.4(A.1,C.4) The student will</p> <ol style="list-style-type: none"> count forward to 100 and backward from 10; count by fives and tens to 100. <p>Strand: Measurement Focus: Instruments and Attributes</p> <p>K.7(B.1 & C.3) The student will recognize a penny, nickel, dime, and quarter and will determine the value of a collection of pennies and/or nickels whose total value is 10 cents or less.</p> <p>Strand: Measurement Focus: Instruments and Attributes</p> <p>K.9(C.3) The student will tell time to the hour, using analog and digital clocks.</p> <p>K.10(B.2) The student will compare two objects or events, using direct comparisons or nonstandard units of measure, according to one or more of the following attributes: length (shorter, longer), height (taller, shorter), weight (heavier, lighter), temperature (hotter, colder). Examples of nonstandard units include foot length, hand span, new pencil, paper clip, and block.</p>	<p>Strand: Number and Number Sense Focus: Whole Number Concepts</p> <p>K.3(B.5 & C.5) The student, given an ordered set of ten objects and/or pictures, will indicate the ordinal position of each object, first through tenth, and the ordered position of each object.</p> <p>K.4(B.2) The student will</p> <ol style="list-style-type: none"> identify one more than a number and one less than a number <p>K.5(B.1-B.4) The student will identify the parts of a set and/or region that represent fractions for halves and fourths.</p> <p>Strand: Computation and Estimation Focus: Whole Number Operations</p> <p>K.6(C.6) The student will model adding and subtracting whole numbers, using up to 10 concrete objects.</p> <p>Unit: Probability and Statistics Focus: Data Collection and Display</p> <p>K.13(C.4) The student will gather data by counting and tallying.</p>

First Quarter

Topic: Number and Number Sense

Focus: Whole Number Concepts

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.1: (C.5) The student, given two sets, each containing 10 or fewer concrete objects, will identify and describe one set as having more, fewer, or the same number of members as the other set, using the concept of one-to-one correspondence.

Understanding the Standard Background information of teachers

- A set is a collection of distinct elements or items.
- A one-to-one correspondence exists when two sets have an equal number of items.
- Strategies for developing the concept of one-to-one matching involve set comparisons without counting. Hands-on experiences in matching items between two sets by moving, touching, and aligning objects, using one-to-one correspondence, enable visual as well as kinesthetic comparisons of the number of items in the two sets.
- Students can also count to make comparisons between two sets without matching the sets, using one-to-one correspondence.
- Students are generally familiar with the concept of *more*, but have had little experience with the term *less*. It is important to use the terms together to build an understanding of their relationship. For example, when asking which group has more, follow with which group has less and vice versa.

Topic: Number and Number Sense

Focus: Whole Number Concepts

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.1: **(C.5)** The student, given two sets, each containing 10 or fewer concrete objects, will identify and describe one set as having more, fewer, or the same number of members as the other set, using the concept of one-to-one correspondence.

Essential Knowledge and Skills	Essential Questions	Essential Understandings All Students should...	Tasks/ Recommended Activities
<p><i>Essential Vocabulary:</i> Set, more; fewer, same; equal; one-to-one correspondence; 0 through 10</p>			
<ul style="list-style-type: none"> • Match each member of one set with each member of another set, using the concept of one-to-one correspondence to compare the number of members between sets, where each set contains 10 or fewer objects. • Compare and describe two sets of 10 or fewer objects, using the terms <i>more</i>, <i>fewer</i>, and <i>the same</i>. • Given a set of objects, construct a second set which has more, fewer or the same number of objects. 	<p>Factual: Which set had more?</p> <p>Conceptual: Why is the set smaller (or larger)?</p> <p>Higher Level: How do you know? How did you figure that out? Show me.</p>	<ul style="list-style-type: none"> • Understand how quantities relate to each other, which leads to an understanding of how numbers are related to each other. 	

Topic: Geometry

Focus: Plane Figures

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.11(A.1-A.3 & B.2) The student will

- a) identify, describe, and trace plane geometric figures (circle, triangle, square, and rectangle); and
- b) compare the size (larger, smaller) and shape of plane geometric figures (circle, triangle, square, and rectangle).

Understanding the Standard Background information of teachers

- An important part of the geometry strand in grades K through 2 is the naming and describing of figures. Children move from their own vocabulary and begin to incorporate conventional terminology as the teacher uses geometric terms.
- A plane geometric figure is any plane, closed figure. Circles and polygons are examples of plane geometric figures.
- Presentation of triangles, rectangles, and squares should be made in a variety of spatial orientations so that students do not develop the common misconception that triangles, rectangles, and squares must have one side parallel to the bottom of the page on which they are printed.
- The van Hiele theory of geometric understanding describes how students learn geometry and provides a framework for structuring student experiences that should lead to conceptual growth and understanding.
 - **Level 0: Pre-recognition.** Geometric figures are not recognized. For example, students cannot differentiate between three-sided and four-sided polygons.
 - **Level 1: Visualization.** Geometric figures are recognized as entities, without any awareness of parts of figures or relationships between components of a figure. Students should recognize and name figures and distinguish a given figure from others that look somewhat the same (e.g., “I know it’s a rectangle because it looks like a door, and I know that a door is a rectangle.”)
 - **Level 2: Analysis.** Properties are perceived, but are isolated and unrelated. Students should recognize and name properties of geometric figures (e.g., “I know it’s a rectangle because it is closed; it has four sides and four right angles.”).
- A polygon is a geometric figure that
 - has sides that are line segments;
 - is simple (its sides do not cross);
 - is closed; and

- is two-dimensional (lies in a plane).
- A triangle is a polygon with three angles and three sides. Children should be shown different types of triangles such as equilateral, isosceles, scalene, right, acute, and obtuse; however, they are not expected to name the various types.
- A quadrilateral is a polygon with four sides.
- A rectangle is a quadrilateral with four right angles.
 - A square is a rectangle with all four sides of equal length.
 - A circle is a closed curve with all points in one plane and the same distance from a fixed point (the center).
 - Early experiences with comparing and sorting figures assist students in analyzing the characteristics of plane geometric figures.
 - Attribute blocks, relational attribute blocks, and tangrams are among the manipulatives that are particularly appropriate for sorting and comparing size.
- Clay, straws, and paper and scissors are several manipulatives that are appropriate for constructing geometric figures.

Topic: Geometry

Focus: Plane Figures

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.11: (A.1-A.3 & B.2) The student will
 a) identify, describe, and trace plane geometric figures (circle, triangle, square, and rectangle); and
 b) compare the size (larger, smaller) and shape of plane geometric figures (circle, triangle, square, and rectangle).

Essential Knowledge and Skills	Essential Questions	Essential Understandings All Students should...	Tasks/ Recommended Activities
<p><i>Essential Vocabulary:</i> circle; triangles; square; rectangle; size (larger and smaller); plane geometric figures; figure (figures); side (sides); corner (corners); angle (angles); round; curved; a triangle is</p>			
<ul style="list-style-type: none"> • Identify a circle, triangle, square, and rectangle. • Describe the characteristics of triangles, squares, and rectangles, including number of sides and number of angles. • Describe a circle using terms such as round and curved. • Trace a circle, triangle, square, and rectangle. • Compare and group plane geometric figures (circle, triangle, square, and rectangle) according to their relative sizes (larger, smaller). • Compare and group plane geometric figures (circle, triangle, square, and rectangle) according to their shapes. • Distinguish between examples and nonexamples of identified geometric figures (circle, triangle, square, and rectangle). 	<p>Factual: What is this shape?</p> <p>Conceptual: Why is this a _____? (ex. square, - it has 4 sides that are the same size)</p> <p>Higher Level: What is the difference between a _____ and a _____?</p>	<ul style="list-style-type: none"> • Use their knowledge of plane figures to help them systematically represent and describe their world. • Identify the characteristics of plane geometric figures (circle, triangle, square, and rectangle). • Compare the size and shape of plane geometric figures by using strategies to sort and/or group and begin to refine the vocabulary used to explain their strategies. 	

Topic: Geometry

Focus: Plane Figures

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.12 (A.1-A.3 & B.1-B.2) The student will describe the location of one object relative to another (above, below, next to) and identify representations of plane geometric figures (circle, triangle, square, and rectangle) regardless of their positions and orientations in space.

Understanding the Standard Background information of teachers

- Representations of circles, squares, rectangles, and triangles can be found in the students' environment at school and at home. Students should have opportunities to identify/classify things in their environment by the type of figures those things represent.
- Children are often confused when a figure such as a square is rotated: they frequently refer to the rotated square as a diamond. Clarification needs to be ongoing — i.e., a square is a square regardless of its location in space; there is no such geometric figure as a diamond.

Topic: Geometry

Focus: Plane Figures

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.12(A.1-A.2 & B.1-B.2) The student will describe the location of one object relative to another (above, below, next to) and identify representations of plane geometric figures (circle, triangle, square, and rectangle) regardless of their positions and orientations in space.

Essential Knowledge and Skills	Essential Questions	Essential Understandings All Students should...	Tasks/ Recommended Activities
<p><i>Essential Vocabulary:</i> circle; triangles; square; rectangle; size (larger and smaller); plane geometric figures; figure (figures); side (sides); corner (corners); angle (angles); round; curved; a triangle is; equal length, the center; above; below; next to</p>			
<ul style="list-style-type: none"> • Identify pictorial representations of a circle, triangle, square, and rectangle, regardless of their position and orientation in space. • Describe the location of one object relative to another, using the terms <i>above</i>, <i>below</i>, and <i>next to</i>. 	<p>Factual: What shape is above (below, next to) the _____?</p> <p>Conceptual: How can you tell the location of a shape?</p> <p>Higher Level: Does it matter if it is upside down? Why?</p>	<ul style="list-style-type: none"> • Understand that objects can have different orientations in space. 	

Topic: Patterns, Functions, and Algebra

Focus: Attributes and Patterning

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.15:(B.4) The student will sort and classify objects according to attributes.

Understanding the Standard
Background information of teachers

- To classify is to arrange or organize a set of materials according to a category or attribute (a quality or characteristic). An object has many attributes such as color, size, shape, thickness, etc.
- General similarities and differences among objects are easily observed by children entering kindergarten, who are able to focus on any one attribute. The teacher's task is to move students toward a more sophisticated understanding of classification in which two or more attributes connect or differentiate sets, such as those found in nature (e.g., leaves with different colors and different figures).

Topic: Patterns, Functions, and Algebra

Focus: Attributes and Patterning

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.15:(B.4) The student will sort and classify objects according to attributes.

Essential Knowledge and Skills	Essential Questions	Essential Understandings All Students should...	Tasks/ Recommended Activities
<p><i>Essential Vocabulary:</i> classify; pattern; attributes; sort; categories; repeating pattern</p>			
<ul style="list-style-type: none"> • • Sort objects into appropriate groups (categories) based on one attribute. • Classify sets of objects into groups (categories) of one attribute. • Label attributes of a set of objects that has been sorted. • Name multiple ways to sort a set of objects. 	<p>Factual: Tell me how you sorted this group of objects.</p> <p>Conceptual: Which do you have more of?</p> <p>Higher Level: Why does this not belong?</p>	<ul style="list-style-type: none"> • Understand that the same set of objects can be sorted and classified in different ways. 	

Second Quarter

Topic: Number and Number Sense

Focus: Whole Number Concepts

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.2 (A.1-A.3 & C.5) The student, given a set containing 15 or fewer concrete objects, will

- a) tell how many are in the set by counting the number of objects orally;
- b) write the numeral to tell how many are in the set; and
- c) select the corresponding numeral from a given set of numerals.

Understanding the Standard Background information of teachers

- Counting involves two separate skills: verbalizing the list of standard number words in order (“one, two, three, ...”) and connecting this sequence with the objects in the set being counted, using one-to-one correspondence. Association of number words with collections of objects is achieved by moving, touching, or pointing to objects as the number words are spoken. Objects may be presented in random order or arranged for easy counting.
- Kinesthetic involvement (e.g., tracing the numbers, using tactile materials, such as sand, sandpaper, carpeting, or finger paint) facilitates the writing of numerals.
- Articulating the characteristics of each numeral when writing numbers has been found to reduce the amount of time it takes to learn to write numerals.
- Zero (0) is both a number and a digit. As a number, it plays a central role in mathematics as the additive identity of the integers, real numbers, and many other algebraic structures. As a digit, zero is used as a placeholder in systems.
- *Conservation of number* and *cardinality principle* are two important milestones in development to attaching meaning to counting.
- The cardinality principle refers to the concept that the last counted number describes the total amount of the counted set. It is an extension of one-to-one correspondence.
- Conservation of number is the understanding that the number of objects remains the same when they are rearranged spatially.

Topic: Number and Number Sense

Focus: Whole Number Concepts

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.2 (A.1-A.3 & C.5) The student, given a set containing 15 or fewer concrete objects, will

- a) tell how many are in the set by counting the number of objects orally;
- b) write the numeral to tell how many are in the set; and
- c) select the corresponding numeral from a given set of numerals.

Essential Knowledge and Skills	Essential Questions	Essential Understandings All Students should...	Tasks/ Recommended Activities
<i>Essential Vocabulary:</i> Set, one-to-one correspondence; 0 through 15			
<ul style="list-style-type: none"> • Count orally the number of objects in a set containing 15 or fewer concrete objects, using one-to-one correspondence, and identify the corresponding numeral. • Identify written numerals from 0 through 15 represented in random order. • Select the numeral from a given set of numerals that corresponds to a set of 15 or fewer concrete objects. • Write the numerals from 0 through 15. • Write a numeral that corresponds to a set of 15 or fewer concrete objects. • Construct a set of objects that corresponds to a given numeral, including an empty set. 	<p>Factual: Tell me how many circles there are. Write that number for me.</p> <p>Conceptual: Why did you pick that number?</p> <p>Higher Level: Use a billboard to ask how many.</p>	<ul style="list-style-type: none"> • Read and write numerals from 0 through 15. • Understand that the total number of objects can be found by counting. • Understand that the last counted number describes the total amount in the set. • Understand that if the set is empty, it has 0 elements. • Understand that changing the spatial arrangement of a set of objects does not change the total amount of the set. 	

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Topic: Measurement

Focus: Instruments and Attributes

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.8(A.1) The student will identify the instruments used to measure length (ruler), weight (scale), time (clock: digital and analog; calendar: day, month, and season), and temperature (thermometer).

Understanding the Standard
Background information of teachers

- Many experiences in measuring physical objects, using nonstandard and standard units of measure, help to develop an intuitive understanding of measurement and will help students connect a tool with its purpose in measuring.
- Selecting from among various measuring instruments and determining which can be used to solve various real-life problems are introduced at this level.
- A precursor to connecting tools to a type of measurement is an introduction to the concepts of length, weight, time, and temperature.

Topic: Measurement

Focus: Instruments and Attributes

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.8(A.1) The student will identify the instruments used to measure length (ruler), weight (scale), time (clock: digital and analog; calendar: day, month, and season), and temperature (thermometer).

Essential Knowledge and Skills	Essential Questions	Essential Understandings All Students should...	Tasks/ Recommended Activities
<p><i>Essential Vocabulary:</i> ruler; length; weight; scale; time; clock; analog; digital; hour; calendar; day; month; seasons; temperature; thermometer; hot; hotter; cold; colder; shorter; longer; height; taller; shorter; heavier; lighter; hotness; coldness</p>			
<ul style="list-style-type: none"> • Identify a ruler as an instrument to measure length. • Identify different types of scales as instruments to measure weight. • Identify different types of clocks (analog and digital) as instruments to measure time. • Identify the components of a calendar, including days, months, and seasons. • Identify different types of thermometers as instruments used to measure temperature. 	<p>Factual: What is a scale?</p> <p>Conceptual: Which instrument would you use to weigh yourself?</p> <p>Higher Level: What are some things you could do to raise or lower the temperature on a thermometer?</p>	<ul style="list-style-type: none"> • Identify an appropriate measuring tool for a given unit of measure. 	

Topic: Probability and Statistics

Focus: Data Collection and Display

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.14:(C.5-C.6) The student will display gathered data in object graphs, picture graphs, and tables, and will answer questions related to the data.

Understanding the Standard Background information of teachers

- Object graphs are graphs that use concrete materials to represent the categorical data that are collected (e.g., cubes stacked by the month, with one cube representing the birthday month of each student).
- Picture graphs are graphs that use pictures to show and compare information.
- Tables are an orderly arrangement of data in which the data are arranged in columns and rows in an essentially rectangular format. Tables may be used to display some type of numerical relationship or organized lists (e.g., input/output functions, tables showing one candy costs five cents and two candies cost 10 cents).
- Students represent data to convey results of their investigations at a glance, using concrete objects, pictures, and numbers to give a “picture” of the organized data.
- When data are displayed in an organized manner, children can describe the results of their investigations.
- Graphs can be used to make connections between mathematics and social studies and/or science (e.g., job areas and the different people that work in these areas: health — doctors and nurses; education — teachers and principals).

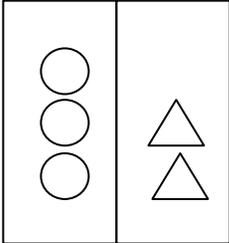
Statements representing an analysis and interpretation of the characteristics of the data in the graph (e.g., similarities and differences, least and greatest, the categories, and total number of responses) should be asked.

Topic: Probability and Statistics

Focus: Data Collection and Display

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.14:(C.5-C.6) The student will display gathered data in object graphs, picture graphs, and tables, and will answer questions related to the data.

Essential Knowledge and Skills	Essential Questions	Essential Understandings All Students should...	Tasks/ Recommended Activities
<p><i>Essential Vocabulary:</i> data; greatest; least; the same; counting; tallying; tables; picture graphs; object graphs</p>			
<ul style="list-style-type: none"> • Display data by arranging concrete objects into organized groups to form a simple object graph. • Display gathered data, using pictures to form a simple picture graph (e.g., a picture graph of the types of shoes worn by students on a given day). • Display gathered data in tables, either in rows or columns. • Answer questions related to the gathered data displayed in object graphs, picture graphs, and tables by: <ul style="list-style-type: none"> • Describing the categories of data and the data as a whole (e.g., the total number of responses) and its parts. • Identifying parts of the data that represent numerical relationships, including categories with the greatest, the least, or the same. 	<p>How many circles are there?</p>  <p>Conceptual: Do we have more circles or more triangles?</p> <p>Higher Level: How many more circles are there than triangles?</p>	<ul style="list-style-type: none"> • Understand that data can be represented using concrete objects, pictures, and graphs. • Understand that different types of representations emphasize different things about the same data. • Understand that picture graphs use pictures to show and compare information; object graphs use concrete materials to represent categorical data; and tables can be used to show an orderly arrangement of data in columns and rows. • Answer questions related to the gathered data from object graphs, picture graphs, and tables. • Relate their ideas about the data to concepts such as part-part-whole and number 	

		relationships.	
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Topic: Patterns, Functions, and Algebra

Focus: Attributes and Patterning

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.16 (C.1-C.3) The student will identify, describe, and extend repeating patterns.

Understanding the Standard Background information of teachers

- Pattern recognition is a fundamental cornerstone of mathematics, particularly algebra.
- In a repeating pattern, the core of the pattern is the string of elements that repeats. By identifying the core, students demonstrate their understanding of the pattern.
- Students should recognize that the sound pattern ‘snap, clap, snap, clap’ is the same in form as the color pattern ‘red, blue, red, blue’.
- Pattern recognition and the extension of the pattern allow students to make predictions.
- The simplest types of patterns are repeating patterns. The patterns can be oral, such as the refrain in “Old MacDonald’s Farm” (“e-i-e-i-o”), or physical with clapping and snapping patterns, or combinations of both, such as is found in songs like the “Hokey Pokey.” In each case, students need to identify the basic unit of the pattern and repeat it. Opportunities to create, recognize, describe, and extend repeating patterns are essential to the primary school experience.
- Sample repeating patterns (repeating the core) are
 - ABABABAB;
 - ABCABC;
 - AABBAABBAABB;
 - AABAAB;
 - AABCAABC; and ABACABAC.

Topic: Patterns, Functions, and Algebra

Focus: Attributes and Patterning

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.16 (C.1-C.3)The student will identify, describe, and extend repeating patterns.

Essential Knowledge and Skills	Essential Questions	Essential Understandings All Students should...	Tasks/ Recommended Activities
<i>Essential Vocabulary:</i> classify; pattern; attributes; repeating pattern			
<ul style="list-style-type: none"> • Observe and identify the basic repeating pattern (core)_found in repeating patterns of common objects, sounds, and movements that occur in practical situations. • Identify the core in a repeating pattern. • Extend a repeating pattern by adding at least two repetitions to the pattern. • Create a repeating pattern. • Compare similarities and differences between patterns. 	<p>Factual: What comes next? (2 objects)</p> <p>Conceptual: Can you extend the pattern?</p> <p>Higher Level: Can you label this pattern using letters ABC, etc.</p>	<ul style="list-style-type: none"> • Understand that patterns are a way to recognize order and organize their world and to predict what comes next in an arrangement. • Understand that the sound pattern ‘snap, clap, snap, clap’ is the same in form as the color pattern ‘red, blue, red, blue’. 	

Third Quarter

Topic: Number and Number Sense

Focus: Whole Number Concepts

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

- K.4: (A.1 & C.4) The student will
- count forward to 100 and backward from 10;
 - count by fives and tens to 100.

Understanding the Standard Background information of teachers

- Counting skills are essential components of the development of number ideas; however, they are only one of the indicators of the understanding of numbers.
- Counting forward by rote advances the child's development of sequencing. The natural numbers are 1, 2, 3, 4.... The whole numbers are 0, 1, 2, 3, 4.... Students should count the whole numbers 0, 1, 2, 3, 4,....
- Counting backward by rote lays the foundation for subtraction. Students should count backward beginning with 10, 9, 8,... through ...3, 2, 1, 0.
- Counting forward and backward leads to the development of counting on and counting back.
- The patterns developed as a result of skip counting are precursors for recognizing numeric patterns, functional relationships, and concepts underlying money, time telling, and multiplication. Powerful models for developing these concepts include, but are not limited to, counters, hundred chart, and calculators.
- Skip counting by fives lays the foundation for reading a clock effectively and telling time to the nearest five minutes, counting money, and developing the multiplication facts for five.
- Skip counting by tens is a precursor for use of place value, addition, counting money, and multiplying by multiples of 10.
- Calculators can be used to display the numeric patterns that result from skip counting.

Topic: Number and Number Sense

Focus: Whole Number Concepts

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.4: (A.1 & C.4) The student will
 a) count forward to 100 and backward from 10;
 c) count by fives and tens to 100.

Essential Knowledge and Skills	Essential Questions	Essential Understandings All Students should...	Tasks/ Recommended Activities
<i>Essential Vocabulary:</i> 0 to 100; fives; tens			
<ul style="list-style-type: none"> Count forward from 0 to 100. Count backward from 10 to 0. Group 100 or fewer objects together into sets of fives or tens and then count them by fives or by tens. Investigate and recognize the pattern of counting by fives to 100, using a variety of tools. Investigate and recognize the pattern of counting by tens to 100, using a variety of tools. 	<p>Factual: What is one more than 8?</p> <p>Conceptual: What tool can we use to help us figure out which number comes before or after?</p> <p>Higher Level: Use the number line to show 2 more.</p>	<ul style="list-style-type: none"> Use the correct oral counting sequence in both forward and backward counting situations. Understand that skip counting can be used to count a collection of objects. Describe patterns in skip counting and use those patterns to predict the next number or numbers in the skip counting sequence. Understand benchmarks of five and ten. 	

Topic: Measurement

Focus: Instruments and Attributes

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.7(B.1 & C.3) The student will recognize a penny, nickel, dime, and quarter and will determine the value of a collection of pennies and/or nickels whose total value is 10 cents or less.

Understanding the Standard Background information of teachers

- Whole numbers are 0, 1, 2, 3, 4, 5, 6, and so on.
 - Addition is the process of combining or joining sets.
 - Subtraction can be viewed as a taking away or separating process or as comparing to find the difference between two sets.
 - Counting on from the larger set to determine the sum of the combined sets is a strategy for finding a sum.
 - Counting backward from the larger set to determine the difference between two sets is a strategy for subtraction.
 - Number relationships, including the following, help students develop strategies for adding and subtracting.
 - Instant recognition of the amount in a set of objects that are arranged in a familiar pattern such as the dots on number cubes
- One more than, one less than, two more than, two less than

Topic: Measurement

Focus: Instruments and Attributes

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.7(B.1 & C.3)The student will recognize a penny, nickel, dime, and quarter and will determine the value of a collection of pennies and/or nickels whose total value is 10 cents or less.

Essential Knowledge and Skills	Essential Questions	Essential Understandings All Students should...	Tasks/ Recommended Activities
<p><i>Essential Vocabulary:</i> money; penny; nickel; dime; quarter; cents</p>			
<ul style="list-style-type: none"> • • Combine two sets with known quantities in each set, and count the combined set using up to 10 concrete objects, to determine the sum, where the sum is not greater than 10. • Given a set of 10 or fewer concrete objects, remove, take away, or separate part of the set and determine the result. 	<p>Factual: Point to the coin that is a penny.</p> <p>Conceptual: How many pennies make a nickel?</p> <p>Higher Level: How many different ways can you make 10 cents with coins?</p>	<ul style="list-style-type: none"> • Understand that addition means putting things together and that subtraction is the inverse of addition and means to separate things out. 	

Topic: Measurement

Focus: Instruments and Attributes

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.9: (C.3) The student will tell time to the hour, using analog and digital clocks.

Understanding the Standard
Background information of teachers

- Many experiences in relating time on the hour to daily routines and school schedules (e.g., catching the bus, lunch time, recess time, and resource time) help students develop personal referents for time.
- Making sense of telling time to the nearest hour is reinforced when students recognize the positions of the hands on an analog clock and identify the corresponding time to the hour.

Topic: Measurement

Focus: Instruments and Attributes

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.9: (C.3) The student will tell time to the hour, using analog and digital clocks.

Essential Knowledge and Skills	Essential Questions	Essential Understandings All Students should...	Tasks/ Recommended Activities
<i>Essential Vocabulary:</i> time (clock); analog and digital; hour			
<ul style="list-style-type: none">Tell time on an analog clock to the hour.Tell time on a digital clock to the hour.	<p>Factual: What time is the clock showing?</p> <p>Conceptual: When it is one o'clock, where is the minute hand pointing?</p> <p>Higher Level: How do you know if it is 10 AM or 10 PM?</p>	Apply an appropriate technique, depending on the type of clock, to determine time to the nearest hour.	

Topic: Measurement

Focus: Instruments and Attributes

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.10(B.2) The student will compare two objects or events, using direct comparisons or nonstandard units of measure, according to one or more of the following attributes: length (shorter, longer), height (taller, shorter), weight (heavier, lighter), temperature (hotter, colder). Examples of nonstandard units include foot length, hand span, new pencil, paper clip, and block.

Understanding the Standard Background information of teachers

- Length is the distance between two points.
- Height is the vertical length of a perpendicular to its base.
- Weight is a measure of the heaviness of an object.
- Temperature is the degree of hotness or coldness of an object (e.g., a body) or environment.
- Students need to identify the attribute that they are measuring (e.g., length, height, weight, temperature) before they begin to measure.
- Multiple hands-on experiences are needed to gain the ability to compare the attributes of objects.

Topic: Measurement

Focus: Instruments and Attributes

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.10:(B.2) The student will compare two objects or events, using direct comparisons or nonstandard units of measure, according to one or more of the following attributes: length (shorter, longer), height (taller, shorter), weight (heavier, lighter), temperature (hotter, colder). Examples of nonstandard units include foot length, hand span, new pencil, paper clip, and block.

Essential Knowledge and Skills	Essential Questions	Essential Understandings All Students should...	Tasks/ Recommended Activities
<p><i>Essential Vocabulary:</i> ruler; length; weight; scale; time; clock; analog; digital; hour; calendar; day; month; seasons; temperature; thermometer; hot; hotter; cold; colder; shorter; longer; height; taller; shorter; heavier; lighter; hotness; coldness</p>			
<ul style="list-style-type: none"> • Compare and describe lengths of two objects (as shorter or longer), using direct comparison or nonstandard units of measure (e.g., foot length, hand span, new pencil, paper clip, block). • Compare and describe heights of two objects (as taller or shorter), using direct comparison or nonstandard units of measure (e.g., book, hand span, new pencil, paper clip, block). • Compare and describe weights of two objects (as heavier or lighter), using direct comparison or nonstandard units of measure (e.g., book, cubes, new pencil, paper clip, block). • Compare and describe temperatures of two objects or environment (as hotter or colder), using direct comparison. 	<p>Factual: Given two objects, name which object is longer.</p> <p>Conceptual: How many paper clips long is your pencil?</p> <p>Higher Level: List 2 different things you could use to measure your desk.</p>	<ul style="list-style-type: none"> • Compare and order objects according to their attributes. • Develop an understanding of measuring with nonstandard and standard units of measure. • Recognize attributes (length, height, weight, temperature) that can be measured. 	

Fourth Quarter

Topic: Number and Number Sense

Focus: Whole Number Concepts

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.3:(B.5 & C.5)The student, given an ordered set of ten objects and/or pictures, will indicate the ordinal position of each object, first through tenth, and the ordered position of each object.

Understanding the Standard Background information of teachers

- Understanding the cardinal and ordinal meanings of numbers are necessary to quantify, measure, and identify the order of objects.
- An ordinal number is a number that names the place or position of an object in a sequence or set (e.g., first, third). *Ordered position*, *ordinal position*, and *ordinality* are terms that refer to the place or position of an object in a sequence or set.
- The ordinal position is determined by where one starts in an ordered set of objects or sequence of objects.

The ordinal meaning of numbers is developed by identifying and verbalizing the place or position of objects in a set or sequence (e.g., the student's position in line when students are lined up alphabetically by first name).

Topic: Number and Number Sense

Focus: Whole Number Concepts

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.3:(B.5 & C.5)The student, given an ordered set of ten objects and/or pictures, will indicate the ordinal position of each object, first through tenth, and the ordered position of each object.

Essential Knowledge and Skills	Essential Questions	Essential Understandings All Students should...	Tasks/ Recommended Activities
<i>Essential Vocabulary:</i> first through tenth; left-to-right; right-to-left; top-to-bottom; bottom-to-top			
<ul style="list-style-type: none">• Identify the ordinal positions first through tenth using ordered sets of ten concrete objects and/or pictures of such sets presented from<ul style="list-style-type: none">• left-to-right;• right-to-left;• top-to-bottom; and/or• bottom-to-top.	<p>Factual: Which is first?</p> <p>Conceptual: Why is it first?</p> <p>Higher Level: If you are the 2nd person, what position is in front of you?</p>	Use ordinal numbers to describe the position of objects in a sequence.	

Topic: Number and Number Sense

Focus: Whole Number Concepts

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.4:(B.2) The student will

- b) identify one more than a number and one less than a number

Understanding the Standard Background information of teachers

- Counting skills are essential components of the development of number ideas; however, they are only one of the indicators of the understanding of numbers.
- Counting forward by rote advances the child's development of sequencing. The natural numbers are 1, 2, 3, 4.... The whole numbers are 0, 1, 2, 3, 4.... Students should count the whole numbers 0, 1, 2, 3, 4,....
- Counting backward by rote lays the foundation for subtraction. Students should count backward beginning with 10, 9, 8,... through ...3, 2, 1, 0.
- Counting forward and backward leads to the development of counting on and counting back.
- The patterns developed as a result of skip counting are precursors for recognizing numeric patterns, functional relationships, and concepts underlying money, time telling, and multiplication. Powerful models for developing these concepts include, but are not limited to, counters, hundred chart, and calculators.
- Skip counting by fives lays the foundation for reading a clock effectively and telling time to the nearest five minutes, counting money, and developing the multiplication facts for five.
- Skip counting by tens is a precursor for use of place value, addition, counting money, and multiplying by multiples of 10.
- Calculators can be used to display the numeric patterns that result from skip counting.

Topic: Number and Number Sense

Focus: Whole Number Concepts

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.4:(B.2) The student will
 b) identify one more than a number and one less than a number

Essential Knowledge and Skills	Essential Questions	Essential Understandings All Students should...	Tasks/ Recommended Activities
<p><i>Essential Vocabulary:</i> set; more; fewer; same; equal; one more than; one less than</p>			
<ul style="list-style-type: none"> Recognize the relationship of one more than and one less than a number using objects (i.e., five and one more is six; and one less than ten is nine). 	<p>Factual: What is one more than 8?</p> <p>Conceptual: What tool can we use to help us figure out which number comes before or after?</p> <p>Higher Level: Use the number line to show 2 more.</p>	<ul style="list-style-type: none"> Use the correct oral counting sequence in both forward and backward counting situations. Understand that numeric relationships include one more than, one less than, two more than, two less than, etc. 	

Topic: Number and Number Sense

Focus: Whole Number Concepts

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.5(B.1-B.4) The student will identify the parts of a set and/or region that represent fractions for halves and fourths.

Understanding the Standard Background information of teachers

- A fraction is a way of representing part of a whole (as in a region/area model) or part of a group (as in a set model).
- In each fraction model, the parts must have the same area.
- The fractional parts of a set model are subsets of an equal number. For example, in a set of ten cubes, each half would be a subset of five cubes.

Informal, integrated experiences with fractions at this level will help students develop a foundation for deeper learning at later grades. Understanding the language of fractions furthers this development (e.g., *fourths* means “four equal parts of a whole” or $\frac{1}{4}$ represents one of four parts of equal size when a pizza is shared among four students).

Topic: Number and Number Sense

Focus: Whole Number Concepts

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.5(B.1-B.4) The student will identify the parts of a set and/or region that represent fractions for halves and fourths.

Essential Knowledge and Skills	Essential Questions	Essential Understandings All Students should...	Tasks/ Recommended Activities
<i>Essential Vocabulary:</i> fraction; whole; part; half; fourth			
<ul style="list-style-type: none">• Recognize fractions as representing parts of equal size of a whole.• Given a region, identify half and/or a fourth of the region.• Given a set, identify half and/or a fourth of the set.	<p>Factual: What fraction is this?</p> <p>Conceptual: Which is more, $\frac{1}{2}$ or $\frac{1}{4}$?</p> <p>Higher Level: Why is $\frac{1}{2}$ more than $\frac{1}{4}$?</p>	<ul style="list-style-type: none">• Understand that fractional parts are equal shares of a whole region or a whole set.• Understand that the fraction name (<i>half, fourth</i>) tells the number of equal parts in the whole.• Understand that the fraction name (<i>half, fourth</i>) of the set model is a subset of the whole set with equal numbers.	

Topic: Computation and Estimation

Focus: Whole Number Operations

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.6: (C.6) The student will model adding and subtracting whole numbers, using up to 10 concrete objects.

Understanding the Standard
Background information of teachers

- Whole numbers are 0, 1, 2, 3, 4, 5, 6, and so on.
- Addition is the process of combining or joining sets.
- Subtraction can be viewed as a taking away or separating process or as comparing to find the difference between two sets.
- Counting on from the larger set to determine the sum of the combined sets is a strategy for finding a sum.
- Counting backward from the larger set to determine the difference between two sets is a strategy for subtraction.
- Number relationships, including the following, help students develop strategies for adding and subtracting.
- Instant recognition of the amount in a set of objects that are arranged in a familiar pattern such as the dots on number cubes
- One more than, one less than, two more than, two less than

Topic: Computation and Estimation

Focus: Whole Number Operations

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.6: (C.6) The student will model adding and subtracting whole numbers, using up to 10 concrete objects.

Essential Knowledge and Skills	Essential Questions	Essential Understandings All Students should...	Tasks/ Recommended Activities
<i>Essential Vocabulary:</i> whole number; addition; subtraction; take away; separate; difference; counting; sum			
<ul style="list-style-type: none">• Combine two sets with known quantities in each set, and count the combined set using up to 10 concrete objects, to determine the sum, where the sum is not greater than 10.• Given a set of 10 or fewer concrete objects, remove, take away, or separate part of the set and determine the result.	<p>Factual: What is $4 + 1$?</p> <p>Conceptual: Why is 7 more than 5?</p> <p>Higher Level: Show me two different ways you could add $3 + 5$.</p>	<ul style="list-style-type: none">• Understand that addition means putting things together and that subtraction is the inverse of addition and means to separate things out.	

Topic: Probability and Statistics

Focus: Data Collection and Display

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.13(C.4)The student will gather data by counting and tallying.

Understanding the Standard Background information of teachers

- Data are pieces of information collected about people or things. The primary purpose of collecting data is to answer questions.
- Tallying is a method for gathering information. Tally marks are used to show how often something happens or occurs. Each tally mark represents one occurrence. Tally marks are clustered into groups of five, with four vertical marks representing the first four occurrences and the fifth mark crossing the first four on a diagonal to represent the fifth occurrence.
- When data are presented in an organized manner, students can describe the results of their investigation (i.e., identifying parts of the data that have special characteristics, including categories with the greatest, the least, or the same number of responses).
- In the process of gathering data, students make decisions about what is relevant to their investigation (e.g., when collecting data on their classmates' favorite pets, deciding to limit the categories to common pets).

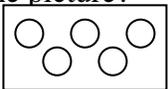
When students begin to collect data, they recognize the need to categorize, which helps develop the understanding of “things that go together.” Categorical data are used when constructing picture graphs and bar graphs.

Topic: Probability and Statistics

Focus: Data Collection and Display

Process standards: The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations.

K.13:(C.4) The student will gather data by counting and tallying.

Essential Knowledge and Skills	Essential Questions	Essential Understandings All Students should...	Tasks/ Recommended Activities
<p><i>Essential Vocabulary:</i> data; greatest; least; the same; more likely; less likely; counting; tallying</p>			
<ul style="list-style-type: none"> Use counting and tallying to gather data on categories identified by the teacher and/or student (e.g., favorites, number of days of various types of weather during a given month, types of pets, types of shoes). 	<p>Factual: How many tally marks? III</p> <p>Conceptual: Why is III more than III?</p> <p>Higher Level: Which set of tally marks goes with the picture? III or II</p> 	<ul style="list-style-type: none"> Pose questions and gather data. Understand how data are collected and presented in an organized manner by counting and tallying. 	