Number Sense & Numeration

Competencies

Kindergarten	First Grade	Second Grade
• Count, recognize, represent, name and order numbers to 30. • Compare 2 or more sets (up to 10 objects in each group) and identify which set is equal to, more than, or less than the other. • Estimate the number of objects in a collection up to 20 with reasonable accuracy (give or take 10). • Understand that the next number in the counting sequence is 1 more than the number just named. • Identify penny, nickel, and dime by name and value.	• Count, read, and write to 100. • Count by 2's to 20, 5's to 100, and 10's to 100. • Order and compare whole numbers to 100. • Estimate the number of objects in a collection up to 100 with reasonable accuracy using a benchmark of 10. • Identify and know the value of coins and show different combinations of coins that equal the same value. • Count mixed collections of dimes, nickels, and pennies to 30¢ and beyond. • Count and group objects into 10's and 1's (*"45 is 4 groups of 10 and 5 more."*).	• Arrange a collection of objects up to 100 by 10's and 1's and use this grouping to count the quantity accurately. • Read and model quantities up to 999 with base ten pieces. • Read and write numbers to 999. • Order and compare whole numbers to 999. • Count by 1's, 2's, 5's, and 10's. • Estimate the number of objects in a collection up to 300 with reasonable accuracy using benchmarks of 10, 25, and 100. • Characterize a number as odd or even in at least 2 different ways. (e.g., "*I know that 7 is odd because one of the tile doesn't have a partner when I build it, and when I split it up, I get two neighbors: 4 and 3.*") • Count mixed collections of quarters, dimes, nickels, and pennies to at least $1.00.

Experiences

• Count by rote: by 10's to 100 by 2's to 10 by 5's to 30 • Read and write numbers to 50. • Count objects by groups of 2's, 5's, and 10's. • Estimate the number of objects in collections up to 30.	• Estimate the number of objects in collections up to 200. • Use a variety of groupings to count objects, including 1's, 2's, 5's, and 10's. • Build and describe odd and even numbers. *"5 is odd because it's not a rectangle, and they don't all have a partner. 6 is a rectangle. See, they're all in 2's."*	• Estimate and count objects in collections up to 500 using benchmarks of 10, 25, and 100. • Understand, model, read, and write fractions to 1/8.

Computation

Kindergarten	First Grade	Second Grade
Competencies		
• Solve story/picture problems involving addition, subtraction, multiplication, or division for quantities under 10 with manipulatives and/or drawings. (e.g., 3 ladybugs each have 2 antennae. How many antennae in all? "*Six!*")	• Solve addition and subtraction story problems with objects/drawings and numbers. • Solve multiplication and division story problems with objects/drawings. • Solve addition and subtraction problems to 20, using a variety of strategies, including forward and backward counting, counting on, working from known facts (5 + 6 = 11 because 5 + 5 = 10), and inverse relationships (10 – 5 = 5 because 5 + 5 = 10).	• Solve addition and subtraction story problems with number sentences. • Solve multiplication and division story problems with drawings and symbols. (e.g., There were 4 kids who each got 11 presents. How many presents in all?) • Quickly figure addition and subtraction combinations to 20, using a variety of strategies. • Use at least 1 efficient mental and/or paper/pencil method for adding any 2 double-digit numbers. • Work with double-digit subtraction, using manipulatives and pictures. Start to develop some efficient mental and/or paper/pencil strategies. • Check solutions for accuracy.
Experiences		
• Invent ways to represent addition and subtraction story problems using objects, pictures, and symbols. (e.g., There are 4 frogs in the pond. 2 more jump in. How many in all?)	• Invent ways to represent multiplication and division story problems using pictures and symbols. (e.g., There are 12 ears sticking out from under the covers. How many teddy bears are hiding?) • Begin to solve double-digit addition problems (e.g., 35 = 27 is 62 because 30 + 20 is 50—51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62).	• Work with multiplication and division symbols. • Work with multiplication facts for 0's, 1's, 2's, 5's, and 10's.

Algebraic Thinking

Kindergarten	First Grade	Second Grade
Competencies		
• Sort a collection of objects by a variety of attributes. • Identify, copy, extend, and create repeating patterns. • Understand that adding 1 more object or taking 1 away is a type of pattern.	• Generate at least 5 or 6 different ways to sort a collection of objects. • Identify a pattern as something that repeats. Copy, extend, and create patterns of at least ABCABC complexity. • Understand that a sequence that changes predictability in quantity (e.g., grows by 1's or 2's or 5's) is another type of pattern. • Given a simple relationship between 2 quantities, determine 1 quantity when given the other, using pictures or objects. ("*If 1 bike has 2 wheels, I know that 2 bikes have 4 wheels and 3 bikes have 6 wheels and 4 bikes have 8 wheels.*") • Identify 1 more than, 1 less than, 10 more than, 10 less than a given number. "*You can see that 23 is 10 more than 13 and 33 is 10 more than 23.*"	• Generate 7 to 10 different ways to sort a collection of objects. • Create a 2-circle Venn Diagram using objects and attribute cards. • Identify, copy, extend, and create repeating patterns of at least ABBCABBC complexity. • Identify a sequence that changes predictably as a pattern. Show the 4th and 5th arrangements of such a pattern, given the first 3. • Given a simple relationship between 2 quantities, determine 1 quantity when given the other. ("*If 1 kid has 2 eyes, I know that 10 kids have 20 eyes in all.*") • Extend number patterns that grow by 2's and 10's starting from any number (e.g., 1, 3, 5, 7,... or 15, 25, 30, 35,...)
Experiences		
• Identify, copy, extend, and create repeating patterns beyond ABABAB complexity, such as ABBABB or ABCABC.	• Sort objects by common attributes and describe the groups formed using categorical labels. • Understand that figuring out patterns and relationships can help solve problems.	• Figure out how a collection of objects has been sorted by examining the evidence. (Start to generate rules.) • Explore 3-circle Venn Diagrams. • Begin to move beyond the next 2 arrangements of a growing pattern to consider the 10th arrangement and beyond. Begin to make generalizations about such patterns. (e.g., "*To make the 10th arrangement of the pattern below, it's just 10 on each side and 1 in the middle.*") • Extend number patterns that grow by 3's, 5's, and other multiples. • Build patterns that are growing predictably, but by changing amounts.

Data Analysis & Probability

Kindergarten	First Grade	Second Grade
Competencies		
• Tell what a 2-column class graph is about and how many more 1 column has than the other. "*2 more people like apples. Not so many like oranges.*"	• Make a variety of statements about simple 2- and 3-column picture graphs, including which column has most, which has least, how many more in 1 column than another, how many fewer, how many in all, and what the graph is about. "*This is a graph about our favorite fruits. Cherries got the most, then apples, then oranges. There are 2 more cherries than oranges, and 1 less orange than apple. 18 kids made our graph.*" • Create a simple 2- or 3-column real graph by sorting a small collection of objects and then graphing the results. • Transfer the information from a real graph to a picture graph, bar graph, or tally chart. Label the columns and give the graph a title. "*I made a picture of my graph about bugs. I have the 8-leg guys on one side and the 6-leg guys on the other.*"	• Read and interpret a variety of picture, symbolic, and bar graphs. Tell which column has most, which has least, how many more in 1 column than another, how many fewer, how many in all, and what the graph is about. • Represent the same data set in more than one way (e.g., chart with tallies, bar graph, pie graph, etc.) • Conduct a simple survey among classmates, present the data in the form of a graph, and explain his or her findings. • Recognize when games or activities depend on chance and begin to predict outcomes that are very likely or very unlikely.
Experiences		
• Create a simple 2-column real graph by sorting a small collection of objects and then graphing the results. "*I made my graph about spiders and insects. See? I put the spiders on one side and the other insects on the other. Do you have any more spiders?*" • Answer the following questions about simple 2-column graphs: how many more, how many fewer, how many in all? • Work with 3- and 4-column real and picture graphs. • Play games with fair and unfair spinners.	• Work with real and picture graphs that involve 4 or more columns. • Move from picture graphs to symbolic graphs. • Recognize when games or activities depend on chance.	• Construct bar graphs in which one box stands for more than one item. • Understand that the outcome of a game or activity depends on how it's set up in the first place.

Measurement

Competencies

Kindergarten	First Grade	Second Grade
• Compare lengths of similar objects (e.g., pieces of ribbon, yarn, wood). Use the terms "*longer than,*" "*shorter than,*" and "*the same as.*" • Explore weights of various objects. • Use a cup to compare the capacity of various containers. Use the terms "*holds more than,*" "*holds less than,*" "*holds the same amount.*" • Understand that people use a clock to tell time, money to buy things, and calendars to tell the day and month.	• Use nonstandard units (e.g., Unifix cubes, popsicle sticks, unit blocks, cups, pennies, tile, etc.) to measure length, capacity, and weight. • Continue to compare the length, weight, and capacity of objects using terms like "*longer than,*" "*shorter than,*" "*heavier than,*" "*lighter than,*" etc. • Use a calendar to determine day and month. Understand yesterday, today, and tomorrow. • Determine duration on the calendar (e.g., keep track of how many days until his or her birthday). • Recognize times on the clock that mark such common events as lunchtime, recess, the start and end of school, and bedtime.	• Use nonstandard units (e.g., Unifix cubes, popsicle sticks, unit blocks, cups, pennies, tile, etc.) to measure length, capacity, weight, area, and perimeter. • Use a ruler, measuring tape, or meter stick to measure length in inches, centimeters, feet, yards, and meters. • Make reasonable estimates of lengths less than a foot; give examples of things that are roughly a foot, or roughly 10 centimeters. • Know the days of the week and the months of the year. Use a calendar to determine day, date, month, and duration. • Tell time to the quarter hour.

Experiences

• Start to determine duration on the calendar (e.g., use the calendar to keep track of how many days it will be until vacation.) • Name the days of the week. • Recognize time to the hour. • Demonstrate understanding of morning, afternoon, and evening; yesterday, today, and tomorrow.	• Tell time to the hour and half hour. • Understand that people use rulers and yard/meter sticks to measure length; cups, quarts, and gallons, to measure volume; scales to determine weight; and thermometers to measure temperature.	• Tell time to the minute. • Use a thermometer to measure temperature. • Use cups, quarts, gallons, and liters to measure liquid. • Use grams, ounces, and pounds to weigh things on a balance scale. • Explore coordinate grids.

Geometry

Kindergarten	First Grade	Second Grade
Competencies		
• Sort 2- and 3-dimensional shapes by a variety of attributes. • Recognize and name these basic shapes and possibly more: square, triangle, circle, rectangle, cube, and cone. • Identify shapes by their association with well-known objects in the environment. "*I know it's a rectangle because it looks like a door.*" "*Triangles look like my roof.*"	• Identify, describe, and triangles, rectangles, squares, and circles. • Classify familiar plane and solid objects by common attributes (shape, size, roundness, number of corners, etc.). • Describe and arrange objects in space in terms of proximity and position (e.g., near, far, below, above, up, down, behind, etc.). • Give and follow directions about location.	• Identify, describe, and compare 2- and 3-dimensional shapes: square, triangle, rectangle, circle, trapezoid, hexagon, and rhombus, cube, sphere, rectangular prism, triangular prism, cylinder, and pyramid. • Classify 2-dimensional shapes by number of corners and sides. • Classify 3-dimensional objects by face shape, number of edges, faces, and vertices. • Identify and construct simple designs that are symmetrical. • Put shapes together and take them apart to form other shapes.
Experiences		
• Build 2- and 3-dimensional constructions with blocks, pattern blocks, and polydrons, etc. • Understand that shapes remain the same even when rotated. "*This is still a triangle, even though it's turned on its point.*" • See and work with many different triangles and quadrilaterals.	• Create constructions with different materials and draw some of the simpler ones. • Explore the concept of symmetry and begin to identify designs, pictures, and constructions that are symmetrical. • Work with the idea that shapes retain their identity even when flipped and rotated. "*No matter how I turn it or twist it, it's still a rectangle.*" • Sort all kinds of triangles and quadrilaterals.	• Make constructions with many different materials. Draw some of the constructions and build from those drawings or the drawings of classmates. • Work with the idea that shapes retain their identity even when flipped and rotated. • Work with area and perimeter. Understand that perimeter means the distance around something, while area refers to the size of its surface. • Explore irregular 5- and 6-sided shapes.