

Investigations in Data, Number, and Space

Math Curriculum Unit Topics 2001-2002

Fifth Grade

Mathematical Thinking at Grade 5 (Introduction, Landmarks in the Number System)

- Relationships among landmarks of 100, 1000, and 10,000
- Computational strategies that rely on landmarks up to 10,000
- Using number characteristics (multiple, factor, even, odd, prime, and square) to solve problems
- Exploring number composition through repeated addition, skip counting, finding factors and factor pairs, and using a calculator to check divisibility
- Magnitude of numbers through 10,000

Picturing Polygons (2-D Geometry)

- Properties of regular and nonregular polygons, particularly triangles and quadrilaterals
- Generating geometric figures with certain properties using Geo-LogoTM, shape pieces, and coordinate grid paper
- Coordinate grids
- Relationships among turns, angles, and other characteristics of polygons
- Similar polygons

Name That Portion (Fractions, Percents, and Decimals)

Different Shapes, Equal Pieces (Investigation 3)

- Equivalent fractions, decimals, and percents
- Relationships among fractions, from halves to twelfths
- Comparing and ordering fractions, decimals, and percents using a variety of models
- Choosing and using models and notation to compute with fractions, decimals, and percents
- Breaking fractions, decimals, and percents into familiar parts
- Planning, conducting, and presenting surveys

Building on Numbers You Know (Computation and Estimation Strategies)

- Strategies for estimating and solving computation problems
- Modeling situations with the four basic operations
- Remainders
- Relationships between multiplication and division

MATHEMATICAL EMPHASIS IN GRADE 5 BY UNIT

Mathematical Thinking in Grade 5 (Introduction, Landmarks in the Number System)

Students are introduced to the methods and materials of the *Investigations* curriculum. They build an understanding of the factors and multiples of 10,000. They develop solutions to computations from their number sense and knowledge of the base 10 system.

Mathematical Emphases

- Developing, discussing, and comparing strategies for solving problems about number relationships and computation
- Reasoning about and describing number characteristics and relationships such as multiple, factor, even, odd, prime, and square
- Representing factor pairs as dimensions of a rectangular array
- Exploring materials that will be used as problem-solving tools, including calculators
- Communicating mathematical thinking through written and spoken language
- Solving problems with one solution, more than one solution, and no solutions
- Using knowledge of landmarks up to 100 (including factors of 100 and multiples of them) to explore landmarks up to 1000, and using landmarks up to 1000 to explore landmarks up to 10,000
- Developing a variety of strategies for exploring number composition (e.g. repeated addition, skip counting, finding factors and factor pairs, using a calculator to check divisibility)
- Reading, writing, and ordering numbers to 1000 and 10,000
- Developing a sense of the magnitude of 1000 and 10,000
- Becoming familiar with skip-counting patterns leading to 1000 (e.g. sequences of multiples of 25, 50, and 75) and 10,000 multiples of 250, 500 and 750
- Becoming familiar with factors and factor pairs of 1000 and 10,000
- Using knowledge of landmarks up to 10,000 (including factors of 1000 and multiples of those factors) to solve puzzles and problems
- Developing mental multiplication and division strategies that rely on landmarks up to 10,000
- Developing mental and written strategies for finding sums and differences of 3- and 4-digit numbers

Picturing Polygons (2-D Geometry)

Students describe and create polygons on paper, with plastic shapes, and with Geo-Logo™. They investigate properties of triangles and quadrilaterals, and work with regularity and similarity.

Mathematical Emphases

- Distinguishing between polygons and nonpolygons and between regular and nonregular polygons
- Recognizing and naming polygons by number of sides
- Locating points on a coordinate grid
- Generating geometric figures with certain properties (including in a geometry computer environment)
- Sorting and classifying triangles and quadrilaterals, and developing vocabulary to describe special cases
- Developing an understanding of parallel lines
- Distinguishing and seeing relationships between turns and angles
- Using known angles to find the measures of others
- Estimating and measuring the sizes of angles and turns
- Finding the sizes and the sums of turns and angles in regular and nonregular polygons, and exploring the relationship to the total number of sides
- Writing computer procedures to draw regular polygons and figures that similar to a given figure
- Creating geometric patterns that grow in regular ways
- Exploring connections between geometric and numerical patterns
- Exploring relationships among angles, line lengths, and areas of similar polygons

Name That Portion (Fractions, Percents, and Decimals)

Students use grids, arrays, number lines, clocks, and gender-participation surveys to make fraction, decimals, and percent comparisons and to solve computation problems. Through games and other activities, they develop familiarity with common fraction relationships.

Mathematical Emphases

- Interpreting everyday situations that involve fractions, decimals, and percents
- Using fractions and percents to name portions of groups
- Breaking fractions, decimals, and percents into familiar parts
- Approximating data as familiar fractions and percents, and in circle graphs
- Identifying and using equivalent fractions, percents, and decimals
- Representing, comparing, and ordering fractions (common; mixed number; with numerators larger than 1; with different denominators), decimals, and percents using landmark numbers and visual models
- Choosing models and notations to compute with fractions, percents, and decimals
- Identifying and labeling fractions between 0 and 1 on a number line to make an array of fractions

- Finding patterns in an array of fraction number lines and in a decimal table
- Solving word problems and expressing answers to fit the context
- Finding decimals that are smaller than, larger than, or in between other decimals
- Planning and conducting surveys, and compiling, organizing, and communicating the results

Building on Numbers You Know (Computation and Estimation Strategies)

Students invent and explain strategies for adding, subtracting, multiplying, and dividing that are based on their understanding of the numbers in the problems.

Mathematical Emphases

- Skip counting by 2-, 3-, 4-digit numbers (including landmark numbers)
- Relating skip counting to multiplication and division
- Finding and using patterns in sequences of multiples
- Reading, writing, and ordering large numbers, and approximating them to the nearest multiple of 100 and 1000
- Developing strategies for determining and comparing distances between numbers
- Using random digits to approximate 4- or 5-digit numbers
- Developing, recording, explaining, and comparing strategies for estimating and solving subtraction, multiplication, and division problems in more than one way
- Making sense of remainders in a variety of contexts
- Interpreting, recording, and using division and multiplication notation in a variety of situations
- Understanding and explaining the relationships among the four basic operations, and using those relationships to solve problems and model situations
- Developing real-life meaning for quantities in the thousands, ten thousands, and hundred thousands, and beginning to acquire a sense of the size of 1,000,000
- Breaking difficult computation problems into manageable parts
- Using a rectangular array model to represent factor pairs of numbers 10,000 and larger