Curriculum Focal Points
for Prekindergarten through Grade 8 Mathematics

Grade 3

The following curriculum focal points and related connections are the recommended content emphases for mathematics in grade 3. It is essential that these focal points be addressed in contexts that promote problem solving, reasoning, communication, making connections, and designing and analyzing representations.

Grade 3 Curriculum Focal Points

Number and Operations and Algebra: Developing understandings of multiplication and division and strategies for basic multiplication facts and related division facts.
Students understand the meanings of multiplication and division of whole numbers through the use of representations (e.g., equal-sized groups, arrays, area models, and equal "jumps" on number lines for multiplication, and successive subtraction, partitioning, and sharing for division). They use properties of addition and multiplication (e.g., commutativity, associativity, and the distributive property) to multiply whole numbers and apply increasingly sophisticated strategies based on these properties to solve multiplication and division problems involving basic facts. By comparing a variety of solution strategies, students relate multiplication and division as inverse operations.

Number and Operations: Developing an understanding of fractions and fraction equivalence.
Students develop an understanding of the meanings and uses of fractions to represent parts of a whole, parts of a set, or points or distances on a number line. They understand that the size of a fractional part is relative to the size of the whole, and they use fractions to represent numbers that are equal to, less than, or greater than 1. They solve problems that involve comparing and ordering fractions by using models, benchmark fractions, or common numerators or denominators. They understand and use models, including the number line, to identify equivalent fractions.

Geometry: Describing and analyzing properties of two-dimensional shapes.
Students describe, analyze, compare, and classify two-dimensional shapes by their sides and angles and connect these attributes to definitions of shapes. Students investigate, describe, and reason about decomposing, combining, and transforming polygons to make other polygons. Through building, drawing, and analyzing two-dimensional shapes, students understand attributes and properties of two-dimensional space and the use of those attributes and properties in solving problems, including applications involving congruence and symmetry.

Connections to the Focal Points

Algebra: Understanding properties of multiplication and the relationship between multiplication and division is a part of algebra readiness that develops at grade 3. The creation and analysis of

patterns and relationships involving multiplication and division should occur at this grade level. Students build a foundation for later understanding of functional relationships by describing relationships in context with such statements as, “The number of legs is 4 times the number of chairs.”

Measurement: Students in grade 3 strengthen their understanding of fractions as they confront problems in linear measurement that call for more precision than the whole unit allowed them in their work in grade 2. They develop their facility in measuring with fractional parts of linear units. Students develop measurement concepts and skills through experiences in analyzing attributes and properties of two dimensional objects. They form an understanding of perimeter as a measurable attribute and select appropriate units, strategies, and tools to solve problems involving perimeter.

Data Analysis: Addition, subtraction, multiplication, and division of whole numbers come into play as students construct and analyze frequency tables, bar graphs, picture graphs, and line plots and use them to solve problems.

Number and Operations: Building on their work in grade 2, students extend their understanding of place value to numbers up to 10,000 in various contexts. Students also apply this understanding to the task of representing numbers in different equivalent forms (e.g., expanded notation). They develop their understanding of numbers by building their facility with mental computation (addition and subtraction in special cases, such as 2,500 + 6,000 and 9,000 – 5,000), by using computational estimation, and by performing paper-and-pencil computations.

Related Expectations from Principles and Standards for School Mathematics Content Standards: Grade 3

The following content expectations are linked to the Grade 3 focal points or connections.

Number and Operations

- Understand the place-value structure of the base-ten number system and be able to represent and compare whole numbers and decimals
- Recognize equivalent representations for the same number and generate them by decomposing and composing numbers
- Develop understanding of fractions as parts of unit wholes, as parts of a collection, as locations on number lines, and (in Grade 6 Curriculum Focal Points) as divisions of whole numbers
- Use models, benchmarks, and equivalent forms to judge the size of fractions
- Understand various meanings of multiplication and division

- Understand the effects of multiplying and dividing whole numbers
- Identify and use relationships between operations, such as division as the inverse of multiplication, to solve problems
- Understand and use properties of operations, such as the distributivity of multiplication over addition
- Develop fluency with basic number combinations for multiplication and division and use these combinations to mentally compute related problems, such as 30 × 50
- Develop fluency in adding, subtracting, multiplying, and dividing whole numbers
- Develop and use strategies to estimate the results of whole-number computations and to judge the reasonableness of such results
- Select appropriate methods and tools for computing with whole numbers from among mental computation, estimation, calculators, and paper and pencil according to the context and nature of the computation and use the selected method or tool

Algebra

- Describe, extend, and make generalizations about geometric and numeric patterns
- Represent and analyze patterns and functions, using words, tables, and graphs
- Identify such properties as commutativity, associativity, and distributivity and use them to compute with whole numbers
- Express mathematical relationships using equations
- Model problem situations with objects and use representations such as graphs, tables, and equations to draw conclusions

Geometry

- Identify, compare, and analyze attributes of two- and three-dimensional shapes and develop vocabulary to describe the attributes
- Classify two- and three-dimensional shapes according to their properties and develop definitions of classes of shapes such as triangles and pyramids
- Investigate, describe, and reason about the results of subdividing, combining, and transforming shapes
- Explore congruence and similarity

- Make and test conjectures about geometric properties and relationships and develop logical arguments to justify conclusions
- Make and use coordinate systems to specify locations and to describe paths
- Build and draw geometric objects
- Create and describe mental images of objects, patterns, and paths
- Use geometric models to solve problems in other areas of mathematics, such as number and measurement
- Recognize geometric ideas and relationships and apply them to other disciplines and to problems that arise in the classroom or in everyday life

Measurement

- Understand such attributes as length, area, weight (identified in Grades 1 and 2 Curriculum Focal Points), volume, and size of angle and select the appropriate type of unit for measuring each attribute
- Carry out simple unit conversions, such as from centimeters to meters, within a system of measurement
- Explore what happens to measurements of a two-dimensional shape such as its perimeter and area when the shape is changed in some way
- Develop strategies for estimating the perimeters, areas, and volumes of irregular shapes
- Select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles (measuring time and temperature is not identified as a focal point or connection)
- Select and use benchmarks to estimate measurements (also in Grade 2 Curriculum Focal Points)

Data Analysis and Probability

- Design investigations to address a question and consider how data-collection methods affect the nature of the data set
- Collect data using observations, surveys, and experiments
- Represent data using tables and graphs such as line plots, bar graphs, and line graphs

- Describe the shape and important features of a set of data and compare related data sets, with (in Grade 8 Curriculum Focal Points) an emphasis on how the data are distributed

- Compare different representations of the same data and evaluate how well each representation shows important aspects of the data (also in Grade 8 Curriculum Focal Points)

- Propose and justify conclusions and predictions that are based on data and design studies to further investigate the conclusions or predictions (designing such studies is not identified as a focal point or connection)

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