

## Grade 1

The following curriculum focal points and related connections are the recommended content emphases for mathematics in grade 1. It is essential that these focal points be addressed in contexts that promote problem solving, reasoning, communication, making connections, and designing and analyzing representations.

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### Grade 1 Curriculum Focal Points

#### **Number and Operations and Algebra: Developing understandings of addition and subtraction and strategies for basic addition facts and related subtraction facts.**

Children develop strategies for adding and subtracting whole numbers on the basis of their earlier work with small numbers. They use a variety of models, including discrete objects, length-based models (e.g., lengths of connecting cubes), and number lines, to model “part-whole,” “adding to,” “taking away from,” and “comparing” situations to develop an understanding of the meanings of addition and subtraction and strategies to solve such arithmetic problems. Children understand the connections between counting and the operations of addition and subtraction (e.g., adding two is the same as “counting on” two). They use properties of addition (commutativity and associativity) to add whole numbers, and they create and use increasingly sophisticated strategies based on these properties (e.g., “making tens”) to solve addition and subtraction problems involving basic facts. By comparing a variety of solution strategies, children relate addition and subtraction as inverse operations.

#### **Number and Operations: Developing an understanding of whole number relationships, including grouping in tens and ones.**

Children compare and order whole numbers (at least to 100) to develop an understanding of and solve problems involving the relative sizes of these numbers. They think of whole numbers between 10 and 100 in terms of groups of tens and ones (especially recognizing the numbers 11 to 19 as 1 group of ten and particular numbers of ones). They understand the sequential order of the counting numbers and their relative magnitudes and represent numbers on a number line.

#### **Geometry: Composing and decomposing geometric shapes.**

Children compose and decompose plane and solid figures (e.g., by putting two congruent isosceles triangles together to make a rhombus), thus building an understanding of part-

whole relationships as well as the properties of the original and composite shapes. As they combine figures, they recognize them from different perspectives and orientations, describe their geometric attributes and properties, and determine how they are alike and different, in the process developing a background for measurement and initial understandings of such properties as congruence and symmetry.

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## **Connections to the Focal Points**

### **Number and Operations and Algebra**

Children use mathematical reasoning, including ideas such as commutativity and associativity and beginning ideas of tens and ones, to solve two-digit addition and subtraction problems with strategies that they understand and can explain. They solve both routine and nonroutine problems.

### **Measurement and Data Analysis**

Children strengthen their sense of number by solving problems involving measurements and data. Measuring by laying multiple copies of a unit end to end and then counting the units by using groups of tens and ones supports children's understanding of number lines and number relationships. Representing measurements and discrete data in picture and bar graphs involves counting and comparisons that provide another meaningful connection to number relationships.

### **Algebra**

Through identifying, describing, and applying number patterns and properties in developing strategies for basic facts, children learn about other properties of numbers and operations, such as odd and even (e.g., "Even numbers of objects can be paired, with none left over"), and 0 as the identity element for addition.

## **Related Expectations from Principles and Standards for School Mathematics Content Standards: Grade 1**

The following content expectations are linked to the [Grade 1 focal points](#) or connections.

### **[Number and Operations](#)**

- Develop understanding of the relative position and magnitude of whole numbers and of ordinal and cardinal numbers and their connections
- Develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing, and decomposing numbers

- Connect number words and numerals to the quantities they represent, using various physical models and representations
- Understand various meanings of addition and subtraction of whole numbers and the relationship between the two operations
- Understand the effects of adding and subtracting whole numbers

### Algebra

- Illustrate general principles and properties of operations, such as commutativity, using specific numbers
- Use concrete, pictorial, and verbal representations to develop an understanding of invented and conventional symbolic notations
- Model situations that involve the addition and subtraction of whole numbers, using objects, pictures, and symbols
- Describe quantitative change, such as a student's growing two inches in one year

### Geometry

- Recognize, name, build, draw, compare, and sort two- and three-dimensional shapes (naming of three-dimensional shapes occurs in Grade 5 Curriculum Focal Points)
- Describe attributes and parts of two- and three-dimensional shapes
- Investigate and predict the results of putting together and taking apart two- and three-dimensional shapes
- Recognize and create shapes that have symmetry
- Create mental images of geometric shapes using spatial memory and spatial visualization
- Recognize and represent shapes from different perspectives
- Recognize geometric shapes and structures in the environment and specify their location

### Measurement

- Recognize the attributes of length, volume, weight, area, and time (time is not identified as a focal point or connection)

## Data Analysis and Probability

- Sort and classify objects according to their attributes and organize data about the objects
- Represent data using concrete objects, pictures, and graphs
- Describe parts of the data and the set of data as a whole to determine what the data show

