Essential Learning from 3rd Grade to 4th Grade

(CA Math Framework pp. 183-185)

For more in-depth examples of tasks, expectations, and student reasoning on these topics, refer to the 3rd Grade CA Math Framework at http://www.cde.ca.gov/ci/ma/cf/documents/mathgrade3fwlmg2.pdf

In kindergarten through grade five, the focus is on the addition, subtraction, multiplication, and division of whole numbers, fractions, and decimals, with a balance of concepts, procedural skills, and problem solving. Arithmetic is viewed as an important set of skills and also as a thinking subject that, when done thoughtfully, prepares students for algebra. Measurement and geometry develop alongside number and operations and are tied specifically to arithmetic along the way. Multiplication and divi- sion of whole numbers and fractions are an instructional focus in grades three through five.

To be prepared for grade-four mathematics, students should be able to demonstrate they have acquired certain mathematical concepts and procedural skills by the end of grade three and have met the fluency expectations for the grade. For third-graders, the expected fluencies are to add and subtract within 1000 using strategies and algorithms (3.NBT.2), multiply and divide within 100 using various strategies, and know all products of two one-digit numbers from memory (3.OA.7). These fluencies and the conceptual understandings that support them are foundational for work in later grades.

Of particular importance for grade four are concepts, skills, and understandings needed to represent and solve problems involving multiplication and division (3.OA.1–4); understand properties of multiplication and the relationship between multiplication and division (3.OA.5–6); multiply and divide within 100 (3.OA.7); solve problems involving the four operations and identify and explain patterns in arithmetic (3.OA.8–9); develop understanding of fractions as numbers (3.NF.1–3); solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects (3.MD.1–2); and geometric measurement—concepts of area and relating area to multiplication and to addition (3.MD.5–7).

Multiplication and Division

By the end of grade three, students develop both conceptual understanding and procedural skills of multiplication and division. Students are expected to fluently multiply and divide within 100 and to know from memory all of the products of two one-digit numbers (3.OA.7). Fluency in multiplication and division within 100 includes understanding and being able to apply strategies such as using mental math, understanding division as an unknown-factor problem, applying the properties of operations, and identifying arithmetic patterns. Students also need to understand the relationship between multiplication and division and apply that understanding by using inverse operations to verify the reasonableness of their answers. Students with a firm grasp of grade-three multiplication and division can apply their knowledge to interpret, solve, and even compose simple word problems, including problems involving equal groups, arrays, and measurement quantities. Fluency in multiplication and division ensures that when students know from memory all of the products of two one-digit numbers, they have an understanding of the two operations—and have not merely learned to produce answers through rote memorization.

Fractions

In grade three, students are formally introduced to fractions as numbers, thus broadening their under- standing of the number system. Students must understand that fractions are composed of unit fractions; this is essential

for their ongoing work with the number system. Students must be able to place fractions on a number line and use the number line as a tool to compare fractions and recognize equivalent fractions. They should be able to use other visual models to compare fractions. Students also must be able to express whole numbers as fractions and place them on a number line. It is essential for students to understand that the denominator determines the number of equally sized pieces that make up a whole and the numerator determines how many pieces of the whole are being referred to in the fraction.

Addition and Subtraction

By the end of grade three, students are expected to fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction (3.NBT.2). This fluency is both the culmination of work at previous grade levels and preparation for solving multi-step word problems using all four operations beginning in grade four. Students should be able to use more than one strategy to add or subtract and should also be able to
relate the strategies they use to a written method.