

# CCSS/KCAS Mathematics: Fraction Progressions

## Conceptual Understanding of Fractions

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### 2<sup>nd</sup> Grade:

Students will partition circles and rectangles into **two, three, or four equal shares**, describe the shares using the **words** halves, thirds, half of, a third of, etc., and describe the whole as two **halves**, three **thirds**, four **fourths**. Recognize that **equal shares of identical wholes need not have the same shape**. (2.G.3)

\*Note: The writers of the standards note the importance of students developing the language of fractions before they see the fraction notation ( $1/2$ , for example) in 3<sup>rd</sup> grade

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### 3<sup>rd</sup> Grade: (Denominators for 3<sup>rd</sup> grade: 2, 3, 4, 6, 8)

(CCSS, p. 21)

Students develop an understanding of fractions, **beginning with unit fractions ( $1/b$ )**. Students view fractions in general as being built out of unit fractions, and they use fractions along with visual fraction models to represent parts of a whole.

\*Note: Students begin to count by fractions ( $1/4, 2/4, 3/4, 4/4, 5/4, 6/4, \dots$ ) and can locate them on a number line and can represent them with models.

Students understand that **the size of a fractional part is relative to the size of the whole**. *For example,  $1/2$  of the paint in a small bucket could be less paint than  $1/3$  of the paint in a larger bucket, but  $1/3$  of a ribbon is longer than  $1/5$  of the same ribbon because when the ribbon is divided into 3 equal parts, the parts are longer than when the ribbon is divided into 5 equal parts.*

Students are able to **use fractions to represent numbers equal to, less than, and greater than one**.

\*Note: It is NOT important for students to begin recognizing mixed number equivalencies, but to focus on the whole number equivalencies, instead. *Ex:  $12/4$  is at 3 on the number line.  $12/4$  represents 3 wholes in fraction models.*

They **solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators**.

\*Note: Please do not resort to 'giving a rule' regarding equal numerators /denominators when students make comparisons. Allow students to recognize comparisons, first by comparing on a number line and using fraction models.

**\*Important Consideration for 3<sup>rd</sup> grade:** *It is not intended that students use symbols (+ and -) when composing and decomposing fractions. Instead, it is important that they can show the concept of addition and subtraction of fractions on a number line, using fraction models, and in the context of a solving a problem.*

#### **4<sup>th</sup> Grade: (Denominators for 4<sup>th</sup> Grade: 2, 3, 4, 5, 6, 8, 10, 12, 100)**

(CCSS, p. 27)

Students develop understanding of **fraction equivalence** and **operations with fractions**. They **recognize that two different fractions can be equal** (e.g.,  $15/9 = 5/3$ ), and **they develop methods for generating and recognizing equivalent fractions**.

\*Note: Emphasis is on EQUIVALENCY. The phrases “simplify a fraction” and “reduce to lowest terms” are left out of the standards ON PURPOSE. The purpose is that those phrases can create misconceptions. In all other language situations, when something is ‘reduced’ it is made smaller. It is implied that size changes. Also, what is meant by “simplify?” For some,  $35/100$  is easier use in calculations, or in understanding size, than  $7/20$ .

Students **extend previous understandings about how fractions are built from unit fractions, composing fractions** from unit fractions, **decomposing fractions into unit fractions**, and **using the meaning of fractions and the meaning of multiplication to multiply a fraction by a whole number**.

\*Note: It is important to multiply fractions by whole numbers at this grade level, making sense of the multiplication using skip counting, number lines, and fraction models.

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#### **5<sup>th</sup> Grade: (No restrictions on denominators.)**

(CCSS, p. 33)

Students **apply their understanding of fractions and fraction models** to represent the addition and subtraction of fractions with unlike denominators **as equivalent calculations** with like denominators.

\*Note: The phrases “greatest common factor” and “least common multiple” are not introduced in the standards until 6<sup>th</sup> grade. Therefore, it is expected that students draw on their previous understanding of fractions, including generating and recognizing equivalent fractions, to add and subtract fractions with unlike denominators.

They develop fluency in calculating sums and differences of fractions, and **make reasonable estimates of them**.

Students also use the meaning of fractions, of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for multiplying and dividing fractions make sense. **(Note: this is limited to the case of dividing unit fractions by whole numbers and whole numbers by unit fractions.)**

\*Note: Students discover efficient methods for dividing unit fractions by whole numbers and whole numbers by unit fractions by using number lines and fraction models and recognizing patterns.