

NUMERACY CONSULTANTS LLC

Fractional Reasoning Program

Skills: Standards and Curriculum Alignment

All standards are aligned to the [Common Core State Standards for Mathematics \(CCSSM\)](#). Click any standard code below to view the full standard on thecorestandards.org.

Skill 1

Understanding unit fractions and fractions as quantities

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.3.NF.A.1	Grade 3	Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size $1/b$.

Skill 1.1

Representing fractions on a number line

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.3.NF.A.2	Grade 3	Understand a fraction as a number on the number line; represent fractions on a number line diagram.
CCSS.MATH.CONTENT.3.NF.A.2.A	Grade 3	Represent a fraction $1/b$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size $1/b$ and that the endpoint of the part based at 0 locates the number $1/b$ on the number line.
CCSS.MATH.CONTENT.3.NF.A.2.B	Grade 3	Represent a fraction a/b on a number line diagram by marking off a lengths $1/b$ from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.

Skill 2

Whole numbers as fractions; decomposing fractions

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.3.NF.A.3.C	Grade 3	Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form $3 = 3/1$; recognize that $6/1 = 6$; locate $4/4$ and 1 at the same point of a number line diagram.
CCSS.MATH.CONTENT.3.NF.A.1	Grade 3	Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b

CCSS Standard	Grade	Standard Description
		equal parts; understand a fraction a/b as the quantity formed by a parts of size $1/b$.
CCSS.MATH.CONTENT.4.NF.B.3.B	Grade 4	Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2 \frac{1}{8} = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.

Skill 3

Fractions greater than 1 as sums of unit fractions

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.4.NF.B.3	Grade 4	Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.
CCSS.MATH.CONTENT.4.NF.B.3.B	Grade 4	Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2 \frac{1}{8} = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.

Skill 3.1

Decomposing fractions (extended)

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.4.NF.B.3.B	Grade 4	Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2 \frac{1}{8} = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.

Skill 4

Expressing whole numbers as fractions

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.3.NF.A.3.C	Grade 3	Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form $3 = 3/1$; recognize that $6/1 = 6$; locate $4/4$ and 1 at the same point of a number line diagram.

Skill 5

Addition and subtraction of fractions: conceptual foundation

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.4.NF.B.3.A	Grade 4	Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

Skill 6

Fractions as sums of unit fractions (applied)

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.4.NF.B.3	Grade 4	Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.

Skill 7

Comparing fractions with like numerators or denominators

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.3.NF.A.3.D	Grade 3	Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.

Skill 8

Comparing fractions with like numerators or denominators (extended)

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.3.NF.A.3.D	Grade 3	Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.

Skill 9

Comparing fractions with unlike numerators and denominators

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.4.NF.A.2	Grade 4	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.

Skill 10

Comparing fractions with unlike numerators and denominators (extended)

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.4.NF.A.2	Grade 4	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.

Skill 12

Understanding equivalent fractions

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.3.NF.A.3.A	Grade 3	Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
CCSS.MATH.CONTENT.3.NF.A.3.B	Grade 3	Recognize and generate simple equivalent fractions, e.g., $\frac{1}{2} = \frac{2}{4}$, $\frac{4}{6} = \frac{2}{3}$. Explain why the fractions are equivalent, e.g., by using a visual fraction model.

Skill 13

Generating equivalent fractions

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.3.NF.A.3.B	Grade 3	Recognize and generate simple equivalent fractions, e.g., $\frac{1}{2} = \frac{2}{4}$, $\frac{4}{6} = \frac{2}{3}$. Explain why the fractions are equivalent, e.g., by using a visual fraction model.

Skill 14

Equivalent fractions using multiplication

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.4.NF.A.1	Grade 4	Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

Skill 15

Comparing fractions; adding fractions with unlike denominators

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.4.NF.A.2	Grade 4	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $1/2$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.
CCSS.MATH.CONTENT.5.NF.A.1	Grade 5	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, $2/3 + 5/4 = 8/12 + 15/12 = 23/12$.

Skill 16/17

Adding and subtracting mixed numbers with like denominators

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.4.NF.B.3.C	Grade 4	Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.

Skill 18

Addition and subtraction of fractions: joining and separating

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.4.NF.B.3.A	Grade 4	Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

Skill 19

Adding and subtracting fractions with unlike denominators

CCSS Standard	Grade	Standard Description
<u>CCSS.MATH.CONTENT.5.NF.A.1</u>	Grade 5	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$.

Skill 20

Adding and subtracting mixed numbers with like denominators

CCSS Standard	Grade	Standard Description
<u>CCSS.MATH.CONTENT.4.NF.B.3.C</u>	Grade 4	Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.

Skill 21

Adding and subtracting fractions with unlike denominators (extended)

CCSS Standard	Grade	Standard Description
<u>CCSS.MATH.CONTENT.5.NF.A.1</u>	Grade 5	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$.

Skill 22

Word problems: addition and subtraction of fractions

CCSS Standard	Grade	Standard Description
<u>CCSS.MATH.CONTENT.5.NF.A.2</u>	Grade 5	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.

Skill 23

Fractions as multiples of unit fractions

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.4.NF.B.4.A	Grade 4	Understand a fraction a/b as a multiple of $1/b$. For example, use a visual fraction model to represent $5/4$ as the product $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$.

Skill 24

Multiplying fractions

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.5.NF.B.4.A	Grade 5	Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$, and create a story context for this equation.

Skill 25

Dividing unit fractions and whole numbers

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.5.NF.B.7.A	Grade 5	Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for $(1/3) \div 4$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$.
CCSS.MATH.CONTENT.5.NF.B.7.B	Grade 5	Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for $4 \div (1/5)$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$.
CCSS.MATH.CONTENT.5.NF.B.7.C	Grade 5	Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem.

Skill 26

Dividing fractions by fractions

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.6.NS.A.1	Grade 6	Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.

Skill 27

Scaling: comparing products to factors using fractions

CCSS Standard	Grade	Standard Description
CCSS.MATH.CONTENT.5.NF.B.5.A	Grade 5	Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
CCSS.MATH.CONTENT.5.NF.B.5.B	Grade 5	Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number; explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.

Additional State Standards Alignments

This program aligns with CCSSM, which has been adopted in whole or in part by most U.S. states. If your state uses alternate standards, consult the following resources for crosswalks and alignment information:

- [Achieve the Core – State Standards Comparison](#)
- [Texas TEKS – Mathematics \(Grades 3–6\)](#)
- [Virginia SOL – Mathematics](#)
- [Florida BEST Standards – Mathematics](#)