SD Common Core State Standards Disaggregated Math Template

Domain:	Number & Operations - Fractions	**Cluster:**	Use equivalent fractions as a strategy to add & subtract fractions.	**Grade level:**	5

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
4 NF. 1 Extend understanding of fraction equivalence & ordering. 1. Explain why a fraction *a*/*b* is equivalent to a fraction (*n* °— *a*)/(*n* °— *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. 2. 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.	5 NF. 1 Add and subtract 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, ⅔ + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)*	6.NS.1 Apply and extend previous understandings of multiplication and division to divide fractions by fractions. 1. 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. *For* *example, create a story context for (2/3) °“ (3/4) and use a visual fraction* *model to show the quotient; use the relationship between multiplication* *and division to explain that (2/3) °“ (3/4) = 8/9 because 3/4 of 8/9 is 2/3.* *(In general, (a/b) °“ (c/d) = ad/bc.) How much chocolate will each person* *get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup* *servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of* *land with length 3/4 mi and area 1/2 square mi?*

Student Friendly Language:

I can add fractions with unlike denominators by finding common denominators.
I can subtract fractions with unlike denominators by finding common denominators.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Equivalent fractions • Common denominator • Fraction - consisting of a numerator and a denominator • Mixed Number - for this application, consisting of a whole number and a fraction • how to find the sum or difference for fractions with like and unlike denominators • how to simplify fractions • how to form a mixed number from improper fractions	There are multiple ways to find common denominators. Finding common denominators makes addition and subtraction of fractions possible.	Solve to find equivalent fractions. Calculate the sum and difference of fractions. Create equivalent fractions by finding common denominators. Create a model showing equivalent fractions.

Key Vocabulary:

numerator, denominator, common denominator, equivalent fractions, mixed numbers, improper fraction, simplify

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question “why do I have to learn this”?

Baking & cooking
Example: converting a recipe - doubling or halving fractions
Linear measurement
Example: measuring the perimeter of picture to determine the needed size of a frame.
Construction – reading a tape measure
Example: the perimeter of the floor is 6 ½ in. by 2 ¾ in.

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Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
4.NF.3 Understand a fraction a/b with a>1 as a sum of fractions 1/b. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. 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 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8. c. 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. d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.	5.NF.2. 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. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.*	6.NS.1 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.*For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi? Compute fluently with multi-digit numbers and find common factors and multiples.*

Student Friendly Language:

I can add and subtract fractions with denominators that are the same when solving word problems.
I can add and subtract fractions with denominators that are different when solving word problems.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• benchmark fractions help to form a mental estimate • visual fraction models • fractions are part of a whole	Fractions can be combined. Fractions with the same denominators can be combined. Fractions with different denominators can be combined	Calculate the sum of fractions with like and unlike denominators. Calculate the difference of fractions with like and unlike denominators Use concepts to solve non-routine word problems involving addition and subtraction of fractions with unlike denominators Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers Interpret word problems and apply correct operation Assess the reasonableness of a solution

Key Vocabulary:

common denominator, unlike denominator, benchmark fractions, reasonableness, whole

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Baking & cooking
Example: converting a recipe - doubling or halving fractions
Building specs (measurements)
Solving real world problems using elapsed time.
Agriculture (feed quantity)
Mechanics (5/16 wrench)
Solving real world problems involving distance.

SD Common Core State Standards Disaggregated Math Template

Domain:	Number and Operations – Fraction	**Cluster:**	Apply and extend previous understandings of multiplication and division to multiply and divide fractions	**Grade level:**	5

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
4.NF.3 – Understand a fraction a/b with a > 1 as a sum of fractions 1/b. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. 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. c. 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. d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.	5.NF.3 - Interpret a fraction as division of the numerator by the denominator (a/b = a÷b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers. e.g., by using visual fraction models or equations to represent the problem. For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?	6.RP.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."* 6.RP.2 Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship.6.RP.3 Use ratio and rate reasoning to solve real-world and mathematical problems. e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed n 35 hours? At what rate were lawns being mowed?* c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

Student Friendly Language:

I can identify a fraction as a division problem.
I can solve a whole number division word problem as a fraction
I can write the quotient as a fraction or mixed number.

Know (Factual)	Understand (Conceptual) I want students to understand that:	Do (Procedural, Application, Extended Thinking)
• Denominator • Numerator • Fraction • Mixed Number • Remainder • Divisor • Division • Equation • Visual fraction model	There is a relationship between a fraction and a division problem. A remainder can be expressed as a fraction whose denominator is the divisor Fractions lie between two whole numbers. Multiplication and division are inverse operations	Construct a fraction model showing the relationship between a fraction and division and vice versa Recognize the remainder can be a fraction of the whole Show how to change the remainder into a fraction Solve word problems involving division of whole numbers leading to answers in the form of mixed numbers or fractions.

Key Vocabulary:

Interpret, fraction, division, numerator, denominator, mixed numbers, visual fraction, model, remainder

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Reducing a recipe. If a recipe calls for 2c. of flour, and you are making1 /3 of the original recipe, how much flour is needed?

If sales in a business have decreased by 1/4, calculate the current sales as a fraction.

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Domain:	Number and Operations-Fractions	**Cluster:**	Apply and extend previous understandings of multiplication and division to multiply & divide fractions	**Grade level:**	5

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
4.NF.4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a.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 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).* b.Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)* c.Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*	5.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the product (*a/b*) × *q* as *a* parts of a partition of *q* into *b* equal parts; equivalently, as the result of a sequence of operations *a* × *q* ÷ *b*. *For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)* b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.	6.NS.1 Apply & extend previous understandings of multiplication & division to divide fractions by fractions.

Student Friendly Language:

I can multiply a fraction or whole number by a fraction.
I can find the area of a rectangle using fraction side lengths
I can find the area of a rectangle by tiling it with unit squares.

Know (Factual)	Understand (Conceptual) I want students to understand that:	Do (Procedural, Application, Extended Thinking)
• Multiplication table • Numerator and denominator • Improper/proper fractions • product • Mixed numbers • Area = length x width • Whole number sense	A whole number can be written as a fraction. A mixed number can be written as a fraction. A fraction is a part of a whole. When you double or triple fractions, you multiply the whole number times the numerator and divide the quotient by the denominator The area of a rectangle can be found by multiplying fractions.	Multiply a numerator times a numerator and a denominator times a denominator. (multiply a fraction by different representations of one) Convert whole numbers into improper fractions. Use a visual fraction model to interpret (a/b) x (c/d) = ac/bd Create a story problem to explain the visual fraction model. Multiply fractional side lengths of a rectangle to find the area. Use tiles to find the area of a rectangle with fractional side lengths.

Key Vocabulary:

fraction, whole number, numerator, denominator, product, improper fraction, proper fraction, mixed number, area, equation, rectangle

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

If a recipe calls for 2/3c. and you are tripling it, how much do you need?
You need 5 pieces of wood each 3/4 foot long, how much wood should you buy to cut all of the pieces from one piece of wood?

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Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
4.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. b. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express 3 x (2/5) as 6 x (1/5), recognizing this product as 6/5. (In general, n x a/b) = (n x a)/b.)	5.NF.5 Interpret multiplication as scaling (resizing), by: a. 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. b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); 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 x a)/(n x b) to the effect of multiplying a/b by 1.	6.RP.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two examples.

Student Friendly Language:

I can describe the relationship between scaling (resizing) and multiplication.
I can describe how a factor changes when resized or scaled.
I can explain why when I multiply a number by a fraction greater than 1, the product is greater than the original number.
I can explain why when I multiply a number by a fraction less than 1, the product is less than the original number.
I can create equivalent fractions.

Know (Factual)	**Understand (Conceptual)** **I want students to understand that:**	**Do (Procedural, Application, Extended Thinking)**
• Product • Factor • Greater than • Less than • <u>Scaling</u> • <u>Resizing</u> • Fraction Equivalence	A product can be the result of scaling or resizing one factor to another Scaling is a form of multiplication. Scaling/multiplying a number by a fraction greater than 1, results in a product greater than the original number. Scaling/multiplying a number by a fraction less than 1, results in a product less than the original number. Equivalent fractions can be made by multiplying the numerator and denominator by the same number.	Compare in words or diagrams the relationship between the size of the product and the size of a factor that has been sized or rescaled. Describe how scaling is a form of multiplication. Explain the effect of multiplying a number by a fraction greater than 1. Explain the effect of multiplying a number by a fraction less than 1. Create equivalent fractions by multiplying the numerator and denominator by the same number.

Key Vocabulary:

Scaling	resizing	comparing	interpret	factor	product
equivalence	multiplying	greater than	less than	fraction equivalence	relationship

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

To compare the products of equations with related factors (ex. how does the product of 30 x 50 compare to the product of 60 x 50?).
To compare areas with different dimensions (ex. how does the area of a garden that is ¾yd x 10yd compare with the area of a garden that is 4/3 x 10yd?).
As mathematicians, engineers, builders, architects, etc, we use fractions EVERY DAY! Understanding how fractions affect the relative size of areas and products is essential!

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Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
4.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.	5.NF.6 Solve real world problems involving multiplication of fractions and mixed numbers, e.g. by using visual fraction models or equations to represent the problem.	6.NS.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions.

Student Friendly Language:
I can use problem solving strategies/ideas to multiply fractions and mixed numbers in everyday life. I can use visual fraction models to show the solution.

Know (Factual)	**Understand (Conceptual) I want students to understand that:**	**Do (Procedural, Application, Extended Thinking)**
• Fractions • Mixed numbers • Multiplication • Problem solving strategies • Numerator and Denominator • Simplify/Reduce	Multiplying by a fraction less than one decreases the product. Multiplying by a whole number or a mixed number increases the product A quantity can be represented as a mixed number or improper fraction. There is a relationship between a mixed number and an improper fraction as one can be converted to the other. There are various strategies to solving problems. There is a correlation between a multiplication problem and an addition problem.	Apply/use multiplication of fractions to solve real world problems. Apply/use multiplication of mixed numbers to solve real world problems. Prove/explain solutions using manipulatives or models.

Key Vocabulary:				
Mixed numbers	Improper fractions	Fractions	Numerator Denominator	Product
Simplify/Reduce	Correlations	Real world problems	Problem Solving Strategies	

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Home:
Ex: Baking, Cooking, Reading labels, Sewing, Woodworking
Suzy wants to make cupcakes for her birthday and the recipe calls for ¾ cup of sugar. The recipe makes a dozen cupcakes. If she wants to make enough cupcakes for ½ dozen, how much sugar does she need?
Jobs:
Ex: Carpentry, Baker, Restaurant
Joe is working as a carpenter and wants to make a 2 1/2 inch cut on a board. He then needs to cut that piece of board in ½. Where does he need to make his cut?
Real World:
Ex: Elections, Farming, Economics, Geography
The fraction of the earth is ¾ water and ¼ of that is fresh water, how much of the earth's water is just fresh water?

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Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
4.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. 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 x (1/4), recording the conclusion by the equation 5/4 = 5 x (1/4).* b. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 x (2/5) as 6 x (1/5), recognizing this product as 6/5. (In gneral, n x (a/b) = (n x a)/b.)* c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*	5.NF.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.[1] a. 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) / 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) / 4 = 1/12 because (1/12) x 4 = 1/3.* b. Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for 4 / (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 / (1/5) = 20 because 20 x (1/5) = 4.* c. 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. *For example, how much chocolate will each person get if 3 people share 1/2 lb. of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?* d. Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.	6.NS.1 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. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?*

Student Friendly Language:

I can divide a fraction (less than 0) by a whole number greater than 0 by using what I know about multiplication.
I can divide a whole number greater than 0 by a fraction (less than 0) by using what I know about multiplication.
I can use models to prove my answers.
I can use what I know in real world examples.

Know (Factual)	Understand (Conceptual) I want students to understand that:	Do (Procedural, Application, Extended Thinking)
• inverse properties of multiplication and division • multiplication and division with unit fractions • write a whole number as a fraction • reciprocal of a fraction and a whole number	Multiplication and division are inverse operations; if one is known for a given fact family, the other is also known.	Interpret division of a unit fraction by a whole number greater than 0. Interpret division of a whole number greater than 0 by a unit fraction. Compute the quotients. Show the problems and solutions with visual fraction models. Create a story for the problem. Solve real world problems involving division between whole numbers greater than 0 and unit fractions.

Key Vocabulary:

inverse operation/property reciprocal equation quotient fact family unit fraction

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

If three people share 1/2 lb. of chocolate, how much would each person receive?
How many 1/3 c. servings are in 2 cups of raisins?
If five children are to split 3/4 hour on the computer, what part of an hour would each one get?
How many 1/2 inch cuts could I make in a 12 inch piece of wood?