

Richmond Public Schools
Curriculum Framework
Math 6

Strand: Computation and Estimation

6.5 The student will

- a. multiply and divide fractions and mixed numbers;***
- b. solve single-step and multistep practical problems involving addition, subtraction, multiplication, and division of fractions and mixed numbers; and
- c. solve multistep practical problems involving addition, subtraction, multiplication, and division of decimals.



***On the state assessment, items measuring this objective are assessed without the use of a calculator.**

Suggested Pacing

Second Nine Weeks-12 instructional days

Related Standards

3.5 The student will solve practical problems that involve addition and subtraction with proper fractions having like denominators of 12 or less.

4th

4.5 The student will a) determine common multiples and factors, including least common multiple and greatest common factor; b) add and subtract fractions and mixed numbers having like and unlike denominators; and c) solve single-step practical problems involving addition and subtraction with fractions and mixed numbers.

7.2 The student will solve practical problems involving operations with rational numbers.

7.3 The student will solve single-step and multistep practical problems, using proportional reasoning.

8.4 The student will solve practical problems involving consumer applications.

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4.6 The student will a) add and subtract with decimals; and b) solve single-step and multistep practical problems involving addition and subtraction with decimals.

5.5 The student will a) estimate and determine the product and quotient of two numbers involving decimals; and b) create and solve single-step and multistep practical problems involving addition, subtraction, and multiplication of decimals, and create and solve single-step practical problems involving division of decimals.

5.6 The student will a) solve single-step and multistep practical problems involving addition and subtraction with fractions and mixed numbers; and b) solve single-step practical problems involving multiplication of a whole number, limited to 12 or less, and a proper fraction, with models.

Essential Questions	Common Misconceptions
<p>6.5a</p> <ul style="list-style-type: none"> ● Where in a fractions multiplication model do you find the factors? Where is the product? ● How can a model be used to understand the algorithm used to multiply/divide fractions? ● How can you explain that the shaded area represents the quotient when using a fraction division model? ● Why are common denominators needed sometimes and not other times? 	<p>When adding or subtracting fractions, students add and subtract the denominator. For example, students may incorrectly state $\frac{1}{4} + \frac{1}{4} = \frac{2}{8}$</p> <p>Students add or subtract fractions without finding a common denominator first.</p> <p>Student misrepresent whole numbers in problems involving fractions.</p> <p>Students multiply mixed numbers by multiplying the whole number and fractions separately instead of first converting them to improper</p>

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<ul style="list-style-type: none"> ● How is computation with rational numbers similar and different to whole numbers? ● When multiplying, is the product always bigger than the factors? Explain. ● When dividing, is the quotient always smaller than the dividend? Explain. <p>6.5bc</p> <ul style="list-style-type: none"> ● How do I make a reasonable estimate? ● Why is estimating important when solving real world problems with fractions and decimals? ● How do I know when a result is reasonable? ● How can you tell which operations are required to solve real world problems? ● How do I decide what strategy will work best in a given problem situation? ● How can number lines and diagrams be used to interpret solutions of real-world problems? ● Where are mixed numbers used in the real world? ● How can you use (apply) decimal operations in real life? 	<p>fractions. For example, students may incorrectly state $3\frac{1}{3} \times 1\frac{1}{2} = 3\frac{1}{6}$</p>
Understanding the Standard	Essential Knowledge and Skills
<ul style="list-style-type: none"> ● A fraction can be expressed in simplest form (simplest equivalent fraction) by dividing the numerator and denominator by their greatest common factor. ● When the numerator and denominator have no common factors other than 1, then the fraction is in simplest form. 	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p>

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| <ul style="list-style-type: none">● Addition and subtraction are inverse operations as are multiplication and division.● Models for representing multiplication and division of fractions may include arrays, paper folding, repeated addition, repeated subtraction, fraction strips, fraction rods, pattern blocks, and area models.● It is helpful to use estimation to develop computational strategies.<ul style="list-style-type: none">○ Example: $2\frac{7}{8} \times \frac{3}{4}$ is about $\frac{3}{4}$ of 3, so the answer is between 2 and 3.● When multiplying a whole number by a fraction such as $3\frac{1}{2}$, the meaning is the same as with multiplication of whole numbers: 3 groups the size of $\frac{1}{2}$ of the whole.● When multiplying a fraction by a fraction such as $\frac{2}{3} \times \frac{3}{4}$, we are asking for part of a part.● When multiplying a fraction by a whole number such as $\frac{1}{2} \times 6$, we are trying to determine a part of the whole.● A multistep problem is a problem that requires two or more steps to solve.● Different strategies can be used to estimate the result of computations and judge the reasonableness of the result.<ul style="list-style-type: none">○ Example: What is an approximate answer for $2.19 \div 0.8$? The answer is around 2 because $2.19 \div 0.8$ is about $2 \div 1 = 2$.● Understanding the placement of the decimal point is important when determining quotients of decimals. | <ul style="list-style-type: none">● Demonstrate/model multiplication and division of fractions (proper or improper) and mixed numbers using multiple representations. (a)● Multiply and divide fractions (proper or improper) and mixed numbers. Answers are expressed in simplest form. (a)● Solve single-step and multistep practical problems that involve addition and subtraction with fractions (proper or improper) and mixed numbers, with and without regrouping, that include like and unlike denominators of 12 or less. Answers are expressed in simplest form. (b)● Solve single-step and multistep practical problems that involve multiplication and division with fractions (proper or improper) and mixed numbers that include denominators of 12 or less. Answers are expressed in simplest form. (b)● Solve multistep practical problems involving addition, subtraction, multiplication and division with decimals. Divisors are limited to a three-digit number, with decimal divisors limited to hundredths. (c) |
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Examining patterns with successive decimals provides meaning, such as dividing the dividend by 6, by 0.6, and by 0.06.

- Solving multistep problems in the context of practical situations enhances interconnectedness and proficiency with estimation strategies.
- Examples of practical situations solved by using estimation strategies include shopping for groceries, buying school supplies, budgeting an allowance, and sharing the cost of a pizza or the prize money from a contest.

Vocabulary

fraction	mixed number
simplest form	numerator
factor	product
dividend	common factor
model	regrouping
estimate	improper fraction
divisor	quotient
reciprocal	inverse operations

Instructional Activities Organized by Learning Objective

Textbook

Eureka:

Eureka Grade	Module	Topic	Lesson(s)
6	2	A	1-8
6	2	B	9-11
6	2	C	12-15

Virginia Math Connects, Course 1, ©2012, Glencoe/McGraw-Hill
page(s) 96 -101 and 104 - 115 - Fraction Multiplication
page(s) 117 – 133– Fraction Division

Decimal Multiplication - page(s) 32 – 41

Decimal Division- page(s) 47 – 60

Decimal Addition and Subtraction page(s) 7 -9 and 562

Notes

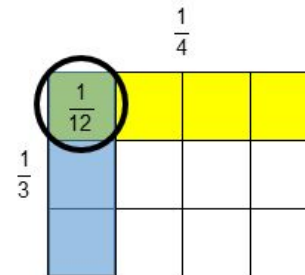
6.6 Fraction and Mixed Number Multiplication and Division
Interactive Notes

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<table border="1"> <tr> <td>equivalent fraction</td> <td>decimal</td> </tr> <tr> <td>approximate</td> <td>simplify</td> </tr> </table>	equivalent fraction	decimal	approximate	simplify		<p>6.7 Decimal Operations Interactive Notes</p> <p>Resources</p> <ul style="list-style-type: none"> • Print <p>Coach book, 6th Grade Virginia Gold Edition Fractions – page(s) 69 – 75 (multiplication) 76 – 82 (division) Fraction Word Problems – page(s) 62 – 68 and 83 – 89 Decimals - page(s) 90 – 95 (addition and subtraction) page(s) 96 – 103 (multiplication and division)</p> <ul style="list-style-type: none"> • Technology-based <p>Illustrative Math - Multiply Fractions Task Eureka - Dividing Fractions Model - Module 2 Topic A SMART board- Multiply and Divide Jeopardy Open Up - Unit 4 - Lessons 2-13</p> <p>Geogebra Area Model: Multiplying Fractions Gizmos Area Model: Dividing Fractions</p> <p>Station Activities See SOL 6.5 Folder for additional activities</p>
equivalent fraction	decimal					
approximate	simplify					
Assessment						
Cross-Curricular Connections		Tiered Differentiation				
<p>We encounter rational numbers everyday. Do you have enough sugar to double your recipe? Did you receive the correct amount of change from the store? How many servings are in a box of cereal?</p>		<p>6.5a</p> <ul style="list-style-type: none"> • Suggested manipulatives: number lines, base ten blocks, fraction bars, fraction circles, pattern blocks, square tiles, grid paper. • When introducing both multiplication and division, start with whole number examples. 				

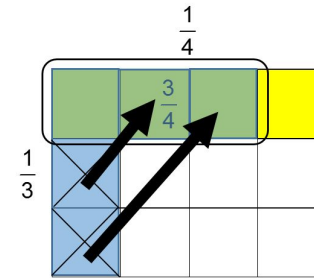
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- Emphasize that multiplication means groups of (I.e. 3×4 can be read as 3 groups of 4, $3 \times \frac{1}{2}$ can be read as 3 groups of $\frac{1}{2}$, and $\frac{1}{4} \times \frac{1}{2}$ is $\frac{1}{4}$ of a group of $\frac{1}{2}$)
- Reinforce the idea of multiplication as repeated addition.
- Use the area, set, and length models to help build foundational understanding and the algorithm for multiplying and dividing fractions.
- Area model example:
 - Multiplication example: One-third of a group of one-fourth--- $\frac{1}{3} \times \frac{1}{4} = \frac{1}{12}$



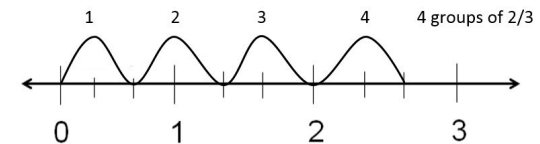
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- Division example: One-fourth out of a group of one-third --- $\frac{1}{4}$ divided by $\frac{1}{3}$ equals $\frac{3}{4}$

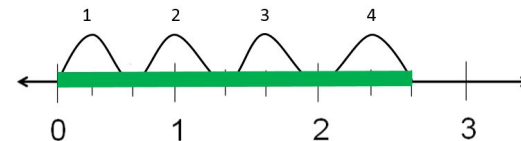


- Number line model example:

- Multiplication: Four groups of $\frac{2}{3}$ --- $4 \times \frac{2}{3} = 2 \frac{2}{3}$



- Division: $2 \frac{2}{3}$ divided by 4 or $2 \frac{2}{3}$ divided by $\frac{2}{3}$



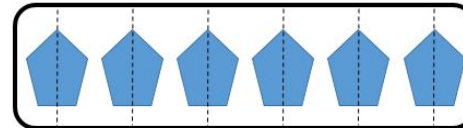
- Set model example:

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- Multiplication: two-thirds of 6 --- $\frac{2}{3} \times 6$



- Division: How many groups of $\frac{1}{2}$ are in 6? ---6 divided by $\frac{1}{2}$ equals 12



- Use a multiplication chart to help students simplify their answers.
- Encourage students to estimate their answers before solving by using the benchmarks 0, $\frac{1}{2}$, and 1.
- Calculators may not be used for this part of SOL 6.5.

6.5bc

- Suggested manipulatives: number lines, base ten blocks, fraction bars, fraction circles, pattern blocks, square tiles, grid paper.
- Review addition, subtraction, and multiplication with decimals.
- Review adding and subtracting fractions.
- Encourage students to estimate their answers before solving by using the benchmarks 0, $\frac{1}{2}$, and 1.
- Encourage students to draw pictures to represent the problem.

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	<ul style="list-style-type: none">• Examples of practical situations solved by using both estimation strategies and actual computation can include but are not limited too; shopping for groceries, buying school supplies, budgeting an allowance, deciding what time to leave for school or the movies, sharing a pizza, money, travel, changing a recipe...• Bring in actual items for students to use while problem solving. I.e. rice, flour, pieces of wood, yarn, ribbon..., etc.
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