

Unit 1a: Fraction Supplemental

Content Area: **Mathematics**
Course(s): **Math 3, Math 4, Math 5, Math 6**
Time Period: **September**
Length: **3-4 weeks: Ongoing as needed**
Status: **Published**

Unit Summary

By working with fractions, students develop math concepts that go beyond basic computations and begin to think in a more abstract manner. Since fractional concepts are main foundational skills towards mastering more complex math concepts, it is essential that students feel comfortable and confident with their understanding of fractions. Students working within the resource setting often struggle with fractional concepts, so although this is not a required unit for sixth grade students, students working in the resource setting will complete this supplemental unit. Due to the extensive number of skills and objectives within this unit, it is important to note that not all students will be able to complete all the objectives. Teachers will pre assess the students to determine their skill level and move them forward. If a student's knowledge is minimal, it is not reasonable for him to reach the level of dividing fractions. Throughout the year, learned skills will be practiced and new concepts will be integrated within other units.

This unit will be taught based on individual student need. Since this is an extremely complex topic for many students, the unit as a whole will be broken into various sections. For example, students will work on fractional concepts for 3-4 weeks. Then they will work on the ratios unit. Then they will return to the fractions unit. This will continue throughout the year.

Standards

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| MA.6.NS.A | Apply and extend previous understandings of multiplication and division to divide fractions by fractions. |
| MA.6.NS.A.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. |
| MA.6.NS.B | Compute fluently with multi-digit numbers and find common factors and multiples. |
| MA.6.NS.B.2 | Fluently divide multi-digit numbers using the standard algorithm. |
| MA.6.NS.B.3 | Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. |
| MA.6.NS.B.4 | Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. |
| MA.5.NF.A | Use equivalent fractions as a strategy to add and subtract fractions. |
| MA.4.NF | Number and Operations—Fractions |
| MA.5.NF.A.1 | 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. |
| MA.4.NF.A.1 | 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.

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| MA.5.NF.A.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. |
| MA.4.NF.A.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. |
| MA.4.NF.B | Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. |
| MA.5.NF.B | Apply and extend previous understandings of multiplication and division to multiply and divide fractions. |
| MA.4.NF.B.3 | Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. |
| MA.5.NF.B.3 | Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). 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. |
| MA.4.NF.B.3a | Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. |
| MA.4.NF.B.3b | 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. |
| MA.5.NF.B.4 | Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. |
| MA.5.NF.B.4a | 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 $a \times q \div b$. |
| MA.3.NF.A | Develop understanding of fractions as numbers. |
| MA.4.NF.B.3c | 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. |
| MA.3.NF.A.1 | 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 $1/b$. |
| MA.5.NF.B.4b | 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. |
| MA.3.NF.A.2 | Understand a fraction as a number on the number line; represent fractions on a number line diagram. |
| MA.5.NF.B.5 | Interpret multiplication as scaling (resizing), by: |
| MA.4.NF.B.4 | Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. |
| MA.3.NF.A.2a | 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. |
| MA.5.NF.B.5a | 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. |

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| MA.4.NF.B.4a | Understand a fraction a/b as a multiple of $1/b$. |
| MA.3.NF.A.2b | 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. |
| MA.3.NF.A.3 | Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. |
| MA.5.NF.B.5b | 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 $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1. |
| MA.3.NF.A.3a | Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. |
| MA.5.NF.B.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. |
| MA.3.NF.A.3b | Recognize and generate simple equivalent fractions (e.g., $1/2 = 2/4$, $4/6 = 2/3$). Explain why the fractions are equivalent, e.g., by using a visual fraction model. |
| MA.5.NF.B.7 | Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. |
| MA.4.NF.B.4c | 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. |
| MA.3.NF.A.3c | Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. |
| MA.5.NF.B.7a | Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. |
| MA.3.NF.A.3d | 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. |
| MA.5.NF.B.7b | Interpret division of a whole number by a unit fraction, and compute such quotients. |
| MA.4.NF.C.5 | Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. |
| MA.5.NF.B.7c | 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. |
| MA.4.NF.C.6 | Use decimal notation for fractions with denominators 10 or 100. |
| MA.4.NF.C.7 | Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model. |
| MA.3.G.A.2 | Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. |
| PFL.9.1.8.E.1 | Explain what it means to be a responsible consumer and the factors to consider when making consumer decisions. |
| PFL.9.1.8.E.3 | Compare and contrast product facts versus advertising claims. |
| PFL.9.1.8.E.5 | Analyze interest rates and fees associated with financial services, credit cards, debit cards, and gift cards. |
| PFL.9.1.8.E.6 | Compare the value of goods or services from different sellers when purchasing large |

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| | quantities and small quantities. |
| TECH.8.1.8.A.1 | Demonstrate knowledge of a real world problem using digital tools. |
| TECH.8.1.8.A.2 | Create a document (e.g., newsletter, reports, personalized learning plan, business letters or flyers) using one or more digital applications to be critiqued by professionals for usability. |
| TECH.8.1.8.A.3 | Use and/or develop a simulation that provides an environment to solve a real world problem or theory. |
| TECH.8.1.8.A.CS1 | Understand and use technology systems. |
| TECH.8.1.8.A.CS2 | Select and use applications effectively and productively. |
| TECH.8.1.8.B.1 | Synthesize and publish information about a local or global issue or event (ex. telecollaborative project, blog, school web). |
| TECH.8.1.8.B.CS1 | Apply existing knowledge to generate new ideas, products, or processes. |
| TECH.8.1.8.B.CS2 | Create original works as a means of personal or group expression. |
| TECH.8.1.8.D.4 | Assess the credibility and accuracy of digital content. |
| TECH.8.1.8.D.CS1 | Advocate and practice safe, legal, and responsible use of information and technology. |
| TECH.8.1.8.D.CS2 | Demonstrate personal responsibility for lifelong learning. |
| TECH.8.1.8.D.CS3 | Exhibit leadership for digital citizenship. |
| TECH.8.2.8.A.CS3 | The relationships among technologies and the connections between technology and other fields of study. |

Student Learning Objectives

- Students will learn a fraction represents part of a whole.
- Students will learn a fraction represents division.
- Students will learn fractions and decimals are different ways to show the same amount.
- Students will learn to compare and order fractions with like and unlike denominators.
- Students will learn to represent fractions in multiple forms.
- Students will learn the processes for all four fraction and mixed number operations.

Essential Questions

- What is a fraction and how can it be represented?
- How can you compare and order fractions?
- How do I compare fractions with unlike denominators?
- How do you know fractions are equivalent?
- How do we locate fractions on a number line?
- How are fractions used in problem-solving situations?
- How can a fraction represent parts of a set?
- How can I compute fractions with like and unlike denominators?
- How are improper fractions and mixed numbers alike and different?
- How do we apply our understanding of fractions in everyday life?
- What do the parts of a fraction tell about its numerator and denominator?
- What are mixed numbers and improper fractions and how can they be represented?
- Why does the denominator stay the same when I add fractions with like denominators?

Enduring Understandings

- Students will understand that fractions and decimals are related.
- Students will understand that fractions are part of a whole.
- Students will understand that one can add, subtract, multiply and divide fractions.
- Students will understand that one can find a fractional amount of a set.
- Students will understand that fractions can be compared and ordered.
- Students will understand that fractions can be compared and ordered with decimals.
- Students will understand that mixed numbers and improper fractions represent more than one.
- Students will understand that denominators represent the amount of the whole being divided
- Students will understand that numerators represent the part of the whole.

Application

- Students will be able to independently use their learning to identify the components of a fraction (numerator, denominator, etc.)
- Students will be able to independently use their learning to convert a fraction into a division equation.
- Students will be able to independently use their learning to solve real world problems involving fractions
- Students will be able to independently use their learning to use fractional concepts to work on and solve more complex and abstract mathematical concepts.

Skills

Students will be skilled at:

- Identifying and representing fractions (reading and writing).
- Comparing and ordering fractions.
- Determining equivalency.
- Computing using fractions
- Identifying and converting improper and mixed numbers.
- Plotting a fractional amount on a numberline.
- Simplifying fractions.