

# 04: Operations with Fractions

Content Area: **Math**  
Course(s):  
Time Period: **Full Year**  
Length: **3 weeks**  
Status: **Published**

## **General Overview, Course Description or Course Philosophy**

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In this unit, students will develop an understanding of the four basic arithmetic operations with fractions and mixed numbers. They will use models and diagrams to help solve real-world mathematical problems.

## **OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS**

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### *Objectives:*

- Add, subtract, multiply, and divide fractions

### *Essential Questions:*

- How do we solve real world application fraction problems?

### *Enduring Understandings:*

- Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
- Computational fluency requires efficient, accurate and flexible methods for computing.

## **CONTENT AREA STANDARDS**

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### **6.NS**

**A. Apply and extend previous understandings of multiplication and division to divide fractions by fractions**

**B. Compute fluently with multi-digit numbers & find common factors & multiples**

MA.6.EE.A.2	Write, read, and evaluate expressions in which letters stand for numbers.
MA.6.EE.A.3	Apply the properties of operations to generate equivalent expressions.
MA.6.EE.A.2a	Write expressions that record operations with numbers and with letters standing for numbers.
MA.6.EE.A.2b	Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity.
MA.6.EE.A.2c	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including

those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).

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.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.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.

## **RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)**

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9.1.8.PB.7: Brainstorm techniques that will help decrease expenses including comparison shopping, negotiating, and day-to-day expense management.

CS.K-12.3	Recognizing and Defining Computational Problems
CS.K-12.3.a	Identify complex, interdisciplinary, real-world problems that can be solved computationally.
CS.K-12.3.b	Decompose complex real-world problems into manageable sub-problems that could integrate existing solutions or procedures.
CS.K-12.3.c	Evaluate whether it is appropriate and feasible to solve a problem computationally.
LA.K-12.NJSLSA.R10	Read and comprehend complex literary and informational texts independently and proficiently with scaffolding as needed.
LA.K-12.NJSLSA.SL1	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
WRK.K-12.P.4	Demonstrate creativity and innovation.
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.

## **STUDENT LEARNING TARGETS**

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Refer to the 'Declarative Knowledge' and 'Procedural Knowledge' sections.

## **Declarative Knowledge**

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Students will understand that:

- Content specific vocabulary: algorithm, number sentence, underestimate, benchmark, overestimate, fact family, reciprocal
- Ways to model situations involving multiplication or division of fractions

## **Procedural Knowledge**

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Students will be able to:

- 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 of fractions with like denominators.
- Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators.
- Estimate mentally and assess the reasonableness of answers to word problems involving addition and subtraction.
- Interpret a fraction as division of the numerator by the denominator ( $a/b = a \div b$ ).
- Compute products of fractions.
- Interpret multiplication as scaling (resizing) by explaining why multiplying a given number by a fraction results in a product greater than, less than, or equal to the given number.
- Solve real world problems involving multiplication of fractions and mixed numbers.
- Compute quotients of fractions.
- Solve word problems involving division of fractions by fractions.
- Interpret quotients of fractions.

## **EVIDENCE OF LEARNING**

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Refer to the 'Formative Assessments' and 'Summative Assessments' sections.

## **Alternate Assessments**

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- Portfolios
- Verbal Assessment (instead of written)

- Multiple choice
- Modified Rubrics
- Performance Based Assessments

### **Benchmark Assessments**

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- BOY Diagnostic Snapshot Assessment
- MP1 Quarterly Assessment
- MP2 Quarterly Assessment
- MP3 Quarterly Assessment
- MP4 Quarterly Assessment
- EOY Diagnostic Snapshot Assessment

### **Formative Assessments**

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- Observations
- Classwork
- Homework Assignments
- Do Now Questions
- Exit Tickets
- Self Assessment Questions
- Proficiency Scale

### **Summative Assessments**

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- Quizzes
- Unit Assessments
- Graded Assignments
- Projects

## **RESOURCES (Instructional, Supplemental, Intervention Materials)**

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### **Core Instructional Materials**

- *CMP3 Let's Be Rational*
- [Savvas Realize](#) (teacher and student resources)

### **Supplemental Instructional Materials**

- Additional Resources linked [HERE](#)
- Math 6 Enriched Let's Be Rational folder linked [HERE](#)
- [Khan Academy](#)
- [Delta Math](#)
- Illustrative Math Performance Tasks:
  - [6.NS.A Reciprocity](#)
  - [6.NS.A.1 Baking Cookies](#)
  - [6.NS.A.1 Running to School, Variation 3](#)
  - [6.NS.A.1 Traffic Jam](#)
  - [6.NS.A.1 How Many \\_\\_\\_ in \\_\\_\\_?](#)
  - [6.NS.A How Many Batches/What Fraction of a Batch?](#)
- [IXL](#)- Recommended Skills Practice
  - J.3 Add & Subtract Fractions with Unlike Denominators
  - J.6 Add & Subtract Mixed Numbers
  - J.7 Add & Subtract Mixed Numbers: Word Problems
  - K.6 Multiply Two Fractions
  - K.13 Multiply Mixed Numbers
  - K.14 Multiply Mixed Numbers: Word Problems
  - L.5 Divide Fractions
  - L.7 Divide Fractions & Mixed Numbers
  - L.8 Divide Fractions & Mixed Numbers: Word Problems

## **INTERDISCIPLINARY CONNECTIONS**

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- Computations
- Financial/Economic/Business/Entrepreneurial Literacy

## **ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS**

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See link to Accommodations & Modifications document in course folder.

