

03. Fraction Concepts, Addition, and Subtraction

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **5 weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

In Grade 5, instructional time should focus on three critical areas:

- Developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions)
- Extending division to 2-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations
- Developing understanding of volume

In this unit, students will understand that fractions represent division, how to apply and use equivalent fractions to create strategies for adding and subtracting fractions, and use visual models to make estimates and add and subtract fractions and mixed numbers.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Students will understand that:

- Fractions represent division.
- The application and use of equivalent fractions is critical in developing strategies for adding and subtracting fractions.
- Visual models are used to make estimates, add and subtract fractions and mixed numbers, and check the reasonableness of sums and differences.

Essential Questions:

- How does the concept of fractions as division help us understand and interpret fractional parts of a whole or a set?
- How do equivalent fractions support us in simplifying problems involving fractions and mixed numbers?
- How do visual representations, such as fraction bars, area models, or number lines, aid in estimating, adding, and subtracting fractions?
- Why is it important to visually represent fractions when checking the reasonableness of sums and differences?
- How are fractions used in everyday situations, such as cooking recipes, measurements, or financial transactions? How does understanding fractions enhance these activities?
- How does the relationship between fractions and division relate to the concept of multiplying fractions? How do these connections aid in problem-solving?

- What strategies can be used when adding and subtracting fractions, and how does the use of visual models reinforce these strategies?

STUDENT LEARNING TARGETS

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

Declarative Knowledge

Students will know:

- Problem-solving strategies
- A fraction represents the result of equal-sharing
- Patterns and generalizations for relating fractions and division
- Remainders in whole-number division problems as fractions
- Relationships between circle fraction manipulatives, pictorial representations and symbolic when solving number stories
- The denominator of a fraction represents how the whole is divided and the numerator represents the number of equal parts under consideration
- The interval between any two consecutive whole numbers can be divided into equal parts according to the denominator of a fraction
- The number line as a visual tool for estimation, addition, and reasoning with equivalent fractions

Procedural Knowledge

Students will be able to:

- Write number models to build an understanding of fractions as division and solve division number stories that lead to fractional answers
- Apply their understanding of fractions as division to report remainders as fractions
- Use number lines to represent, compare, and rename fractions
- Use fraction number sense to estimate and assess the reasonableness of answers to fraction addition

and subtraction problems

- Use benchmarks to estimate sums and differences of fractions
- Rename mixed numbers and fractions greater than 1 by composing and breaking apart wholes
- Apply strategies and tools for adding and subtracting fractions and mixed numbers
- Use manipulatives to generate equivalent fractions and add fractions
- Solve fraction-of problems

CONTENT AREA STANDARDS

5.NF

A. Use equivalent fractions as a strategy to add and subtract fractions

B. Apply and extend previous understandings of multiplication and division to multiply and divide fractions

5.M

A. Convert like measurement units within a given measurement system

B. Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition

5.DL

A. Understand and analyze data visualizations

5.G

A. Graph points on the coordinate plane to solve real-world and mathematical problems

B. Classify two-dimensional figures into categories based on their properties

MA.5.OA.A.2	Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.
MA.5.NBT.B.6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
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.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.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.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.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.

INTERDISCIPLINARY CONNECTIONS

Fractional Patterns in Music/Art:

- Students will explore how fractions and equivalent fractions are used in music compositions or artistic patterns. Students can create their own musical patterns or artwork based on fraction representations.

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

CS.K-12.2.d	Evaluate and select technological tools that can be used to collaborate on a project.
CS.K-12.7.a	Select, organize, and interpret large data sets from multiple sources to support a claim.
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.
TECH.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
TECH.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.

EVIDENCE OF LEARNING

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

Alternate Assessments

- Portfolios
- Verbal Assessment (instead of written)

- Multiple choice
- Modified Rubrics
- Performance Based Assessments

Formative Assessments

- Journal Pages
- Homelinks
- Math Boxes
- Observations
- Classwork
- Homework Assignments
- Do Now Questions
- Exit Tickets
- Self Assessment Questions

Summative Assessments

- Check Points
- Unit 3 Assessment
- Graded Assignments
- Project-based assessments

Benchmark Assessments

- IXL Screener / Diagnostic Snapshot BOY
- Trimester 1 Benchmark Assessment
- IXL Diagnostic Snapshot MOY
- Trimester 2 Benchmark Assessment
- IXL Diagnostic Snapshot EOY
- Trimester 3 Benchmark Assessment

RESOURCES (Instructional, Supplemental, Intervention Materials)

Core Instructional Materials:

- Everyday Math Unit 3 Resources (Math Masters, Student Journal Volume 1) / ConnectED
- Calendar Math

Supplemental Materials:

- Illustrative Math Tasks
- IXL
- Games
 - Power Up (Lesson 3-2): Using exponents to denote powers of 10 and multiplying whole numbers by powers of 10
 - Prism Pile-Up (Lesson 3-3): Finding volumes of rectangular prisms
 - Multiplication Top-It: Larger Numbers (Lesson 3-4): Multiplying multi-digit numbers
 - Build-It (Lesson 3-6): Comparing and ordering fractions
 - Fraction Spin (Lesson 3-7): Estimating sums and differences of fractions
 - Rename That Mixed Number (Lesson 3-8): Renaming mixed numbers
 - Division Dash (Lesson 3-9): Solving division problems involving multiples of 10
 - Fraction Capture (Lesson 3-11): Finding fractions that add to a given sum
 - Fraction Of (Lesson 3-13): Solving fraction-of problems
 - Number Top-It (Lessons 3-14): Using place-value to build and compare multi-digit numbers
- Manipulatives
 - Fraction circles
 - 6-sided dice
 - Counters
 - Number card sets 0-9, 1-9, 1-10, 1-12, 1-16, 1-20
 - Base-10 blocks
 - Stopwatch

Intervention Materials:

- Number Worlds
- Touch Math Now

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.