Unit 2: Operations on Fractions

Content Area: **Mathematics**
Course(s):
Time Period: **Generic Time Period**
Length: **8 weeks**
Status: **Published**

Standards

MA.5.5.NF.B.4	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
MA.5.5.NF.B.4a	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.)
TECH.8.1.5	All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.5.C	Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
TECH.8.1.5.E	Students apply digital tools to gather, evaluate, and use information.
TECH.8.1.5.F	Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
TECH.8.2.5	All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.
TECH.8.2.5.E	Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.
LA.5.L.5.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
MA.5.5.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.5.5.NF.B.5	Interpret multiplication as scaling (resizing), by:
LA.5.W.5.10	Write routinely over extended time frames (time for research, reflection, metacognition/self-correction and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.
MA.5.5.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.
MA.5.5.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×a)/(n×b) to the effect of multiplying a/b by 1.
LA.5.RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
MA.5.5.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.
CAEP.9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.
MA.5.5.NF.B.7	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
MA.5.5.NF	Number and Operations—Fractions
MA.5.5.NF.A	Use equivalent fractions as a strategy to add and subtract fractions.
MA.5.5.NF.B.7a	Interpret division of a unit fraction by a non-zero whole number, and compute such quotients.
LA.5.RI.5.3	Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.
MA.5.5.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.
	For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)
	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) × 4 = 1/3.
MA.5.5.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.5.5.NF.B.7b	Interpret division of a whole number by a unit fraction, and compute such quotients.
	For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.
	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 × (1/5) = 4.
LA.5.W.5.4	Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
MA.5.5.NF.B	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.
MA.5.5.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.
	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?

MA.5.5.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.
	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?
CAEP.9.2.8.B.1	Research careers within the 16 Career Clusters ® and determine attributes of career success.

Learning Objectives

Unit Focus:

- Perform operations with multi-digit whole numbers and with decimals to hundredths

- Use equivalent fractions as a strategy to add and subtract fractions

- Apply and extend previous understandings of multiplication and division

Critical Area:

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).

Chapter Six:

Lesson Learning Objectives:

6.1: Use models to add fractions that have different denominators.

6.2: Use models to subtract fractions with unlike denominators.

6.3: Make reasonable estimates of fraction sums and differences.

6.4: Find a common denominator or a least common denominator to write equivalent fractions.

6.5: Use equivalent fractions to add and subtract fractions.

6.6: Add and subtract mixed numbers with unlike denominators.

6.7: Rename to find the difference of two mixed numbers.

6.8: Identify, describe, and create numeric patterns with fractions.

6.9: Solve problems using the strategy work backward.

6.10: Add fractions and mixed numbers with unlike denominators using the properties.

Chapter Seven:

Lesson Learning Objectives:

7.1: Model to find the fractional part of a group.

7.2: Model the product of a fraction and a whole number.

7.3: Multiply fractions and whole numbers.

7.4: Multiply fractions using models.

7.5: Relate the size of the product compared to the size of one factor when multiplying fractions.

7.6: Multiply fractions.

7.7: Use a model to multiply two mixed numbers and find the area of a rectangle.

7.8: Relate the size of the product to the factors when multiplying fractions greater than one.

7.9: Multiply mixed numbers.

7.10: Solve problems using the strategy guess, check, and revise.

Chapter Eight:

Lesson Learning Objectives:

8.1: Divide a whole number by a fraction and divide a fraction by a whole number.

8.2: Solve problems using the strategy draw a diagram.

8.3: Interpret a fraction as division and solve whole-number division problems that result in a fraction or mixed number.

8.4: Divide a whole number by a fraction and divide a fraction by a whole number.

8.5: Represent division by drawing diagrams and writing story word problems and equations.

Essential Questions

Chapter Six:

Chapter Essential Question:

How can you add and subtract fractions with unlike denominators?

Lesson Essential Questions:

6.1: How can you use models to add fractions that have different denominators?

6.2: How can you use models to subtract fractions that have different denominators?

6.3: How can you make reasonable estimates of fraction sums and differences?

6.4: How can you add and subtract mixed numbers with unlike denominators?

6.5: How can you use a common denominator to add and subtract fractions with unlike denominators?

6.6: How can you add and subtract mixed numbers with unlike denominators?

6.7: How can you use renaming to find the difference of two mixed numbers?

6.8: How can you use addition or subtraction to describe a pattern or create a sequence with fractions?

6.9: How can the strategy work backward help you solve a problem with fractions that involves addition and subtraction?

6.10: How can properties help you add fractions with unlike denominators?

Chapter Seven:

Chapter Essential Question:

How do you multiply fractions?

Lesson Essential Questions:

7.1: How can you find a fractional part of a group?

7.2: How can you use a model to show the product of a fraction and a whole number?

7.3: How can you find the product of a fraction and a whole number without using a model?

7.4: How can you use an area model to show the product of two fractions?

7.5: How does the size of the product compare to the size of one factor when multiplying fractions?

7.6: How do you multiply fractions?

7.7: How can you use a unit tile to find the area of a rectangle with fractional side lengths?

7.8: How does the size of the product compare to the size of the one factor when multiplying fractions greater than one?

7.9: How do you multiply mixed numbers?

7.10: How can you use the strategy guess, check, and revise to solve problems with fractions?

Chapter Eight:

Chapter Essential Question:

What strategies can you use to solve division problems involving fractions?

Lesson Essential Questions:

8.1: How do you divide a whole number by a fraction and divide a fraction by a whole number?

8.2: How can the strategy draw a diagram help you solve fraction division problems by writing a multiplication sentence?

8.3: How does a fraction represent division?

8.4: How can you divide fractions by solving a related multiplication sentence?

8.5: How can you use diagrams, equations, and story problems to represent division?

Materials

Go Math Digital Resources:

iStudent Edition

eTeacher Edition

Personal Math Trainer

Math on the Spot Video

Real World Video

Animated Math Models

iTools

HMH Mega Math

iPad

Computer

Go Math Print Resources:

Student Edition

Practice and Homework (in the Student Edition)

Reteach (in the Chapter Resources)

Enrich (in the Chapter Resources)

Grab-and-Go Centers Kit

Achieve the Core:

http://achievethecore.org/page/2853/go-math-k-5-guidance-documents

Activities

Operations with Fractions

Unit Project: The Rhythm Track

Chapter Six: Add and Subtract Fractions with Unlike Denominators

Vocabulary Game: Going to Chicago

Lesson 1: Investigate-Addition with Unlike Denominators

Lesson 2: Investigate-Subtraction with Unlike Denominators

Lesson 3: Estimate Fraction Sums and Differences

Lesson 4: Common Denominators and Equivalent Fractions

Lesson 5: Add and Subtract Fractions

Mid-Chapter Checkpoint

Lesson 6: Add and Subtract Mixed Numbers

Lesson 7: Subtraction with Renaming

Lesson 8: Algebra-Patterns with Fractions

Lesson 9: Problem Solving-Practice Addition and Subtraction

Lesson 10: Algebra-Use Properties of Addition

Chapter Seven: Multiply Fractions

Vocabulary Game: Guess the Word

Lesson 1: Find Part of a Group

Lesson 2: Investigate-Multiply Fractions and Whole Numbers

Lesson 3: Fraction and Whole Number Multiplication

Lesson 4: Investigate-Multiply Fractions

Lesson 5: Compare Fraction Factors and Products

Lesson 6: Fraction Multiplication

Mid-Chapter Checkpoint

Lesson 7: Investigate-Area and Mixed Numbers

Lesson 8: Compare Mixed Number Factors and Products

Lesson 9: Multiply Mixed Numbers

Lesson 10: Problem Solving-Find Unknown Lengths

Chapter Eight: Divide Fractions

Vocabulary Game: Pick It

Lesson 1: Investigate-Divide Fractions and Whole Numbers

Lesson 2: Problem Solving-Use Multiplication

Lesson 3: Connect Fractions to Division

Mid-Chapter Checkpoint

Lesson 4: Fraction and Whole Number Division

Lesson 5: Interpret Division with Fractionsd

Other Activities:

5.NF.A.1 Making S'Mores

5.NF.A.2 Do These Add Up?

5.NF.A Measuring Cups

[5.NF.B.3 How Much Pie?](#)

[5.NF.B.4b Chavone's Bathroom Tiles](#)

[5.NF.B.4b New Park](#)

[5.NF.B.5 Comparing Heights of Buildings](#)

[5.NF.B.5 Grass Seedlings](#)

[5.NF.B.5b Mrs. Gray's Homework Assignment](#)

[5.NF.B.6 To Multiply or not to multiply?](#)

[5.NF.B.7 Banana Pudding](#)

[5.NBT.A.2 Multiplying Decimals by 10](#)

[5.NBT.A.2 Marta's Multiplication Error](#)

[5.NBT.B.7 The Value of Education](#)

[5.MD.A.1, 5.NF.B.3 Converting Fractions of a Unit into a Smaller Unit](#)

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Assessment

MAP Assessment

Diagnostic:

Show What You Know

Digital Personal Math Trainer

Formative:

Lesson Quick Check

Mid-Chapter Checkpoint

Digital Personal Math Trainer

- Assessment Animation

- Assessment Video

Summative:

Chapter Review/Test

Chapter Test

Performance Assessment Task

Digital Personal Math Trainer

Fact Fluency

Go Math Resources for Fact Fluency

- Fluency Standard Lessons (Student Edition)

- Fluency Builder (Teacher Edition)

- Strategies and Practice for Skills and Facts Fluency-Intermediate G3-6

- HMH Mega Math

- Personal Math Trainer: Standards Quizzes

- Animated Math Models

Other Resources for Fact Fluency

- Mad Minutes

- Rocket Math

MA.5.5.NBT.B.5   Fluently multiply multi-digit whole numbers using the standard algorithm.

Accomodations and Modifications

Materials and Resources that provide opportunities to accommodate and modify include:

Personal Math Trainer (adaptive assessment and intervention system)

Interactive Student Edition

Leveled Quizzes, Tests, and Performance Tasks

Grab & Go Differentiated Centers

Intensive Intervention Resource

Strategic Intervention Resource

Reteach Activities

RTI Tiered Resources and Activities

Math on the Spot Videos

Others/Notes

Standards for Mathematical Practice

MP.1 Make sense of problems and perserve in solving them.

MP.2 Reason abstractly and quantitavely.

MP.3 Construct viable arguments and critique the reasoning of others.

MP.4 Model with mathematics.

MP.5 Use appropriate tools strategically.

MP.6 Attend to precision.

MP.7 Look for and make use of structure.

MP.8 Look for and express regularity in repeated reasoning.