Unit 3: Domain: Fractions

Content Area: **Mathematics**
Course(s): **Mathematics**
Time Period: **Marking Period 2**
Length: **8-9 Weeks**
Status: **Published**

Unit Overview

In this unit the students will use equivalent fractions as a strategy to add and subtract fractions. The students will also apply and extended previous understandings of multiplications and division to multiply and divide fractions. The students will be applying multiplication and division of fractions to find area of models. The students will use real-world problems, models, draw pictures to evaluate the fractions. The teacher will use various types of station activities in these areas, and final assess daily in ticket to leaves.

Standards

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.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.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.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.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.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.5.NF.B.7a	Interpret division of a unit fraction by a non-zero whole number, and compute such quotients.
MA.5.NF.B.7b	Interpret division of a whole number by a unit fraction, and compute such quotients.
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.

Essential Questions

- How are fractions, whole numbers, and mixed numbers related?
- How can multiplication and division of the fractions help us to solve real world problems?
- How do multiplication and division of fractions relate to each other?
- How do operations affect numbers?
- Why do we take the reciprocal of the second fraction in a division problem?

Application of Knowledge and Skills...

Students will know that...

- a fraction represents the division of the numerator by the denominator (a/b = a ÷ b).
- equivalent fractions can be used to find the sum or difference of fractions/mixed numbers with unlike denominators
- if they can multiply fractions, they can develop strategies to divide fractions by reasoning about the relationship between multiplication and division
- the product (a/b) × q as a part of a partition of q into b equal parts; equivalently, as the result of a sequence of operations, a × q ÷ b.
- their previous understandings of division will help them to divide unit fractions by whole numbers and whole numbers by unit fractions.
- visual fraction models or equations can represent word problems involving division.
- when multiplying a given number by a fraction less than 1, the result is a product smaller than the given number.
- word problems involving division of whole numbers may lead to answers in the form of fractions or mixed numbers.

Students will be skilled at...

- adding and subtracting fractions and mixed numbers with unlike denominators by finding equivalent fraction
- 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.
- 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.

- multiplying a fraction or whole number by a fraction.
- relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.
- relating the strategy used to solve a problem to a written method and explain the reasoning used.
- solving division problems of a unit fraction by a non-zero whole number.
- solving division problems of a whole number by a unit fraction.
- solving real-world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions by using visual fraction models and equations to represent the problem.
- solving real-world problems involving multiplication of fractions and mixed numbers by using visual fraction models or equations to represent the problem.

Assessments

- Benchmark Tests
- End of the Year Test
- Other visual assessments During the guided practice part of the lesson, students record responses to problems on individual whiteboards. Teacher will monitor for errors, and assist where needed
- Placement Test: used to test prior knowledge
- Task Cards: used as a reinforcement of a to
- Topic Math Projects
- Topic Quick Checks: can be given after each section in the topic to check for understanding
- Topic Tests: given after each topic

Activities

Problem of the Day-Present a daily problem that serves as a review from the previous day's lesson.

Vocabulary Chart- Have students create a chart for each new vocabulary word that includes the word's meaning and an example.

Station activities- Each section has center activities to reinforce skill (leveled)

- Toss and Talk - Toss a die and complete the problem to that number. Explain and discuss with your partner.
- Display the Digit- Choose a table. Explain how each number in the bottom row is related to the one about it. Find the missing number. Display each 0-9 tiles exactly once. Take turns with partner.
- Clip and Cover - Pick two numbers and cover answer with paper clip. The person to cover three in a row wins.
- Teamwork - As a team (2-4 students) pick a tile (1-4) and chose from the list of jobs (A-F) to complete.
- Quick Question- Toss two number cubes and then ask the question that correlate to the list. Discuss the and agree on the correct answer
- Ipad apps - Splash Math grade 5

Algebra Connection - Simplifying Numerical Expression - page 215

- Equations with Fractions - page 221

STEM - Certain sections have Going Digital integrating technology and the use of calculators

- Mixed Problem Solving: Science - page 235
- Mixed Problem Solving: Social Studies - page 257

Projects - There is a math project for each topic (Topic 9-11) - (See Cross-Disciplinary Instruction for projects and page numbers)

Practice work - Communicator practice can be done using Independent work and problem- solving practice problems in each section.

Soccer Shootout (online game): (see link)

Score and Save by correctly answering math problems- add, subtract, multiply, and divide fractions

Multiplying Fractions Millionaire Game: (see link)

In this millionaire game, students will practice multiplying fractions and writing the answer in simplest form.

Hands-on activities - Fraction activities on adding and subtracting fractions. (see link)

- Play SCOOT for certain sections or review for topic tests
- Make Task cards and use answer sheets for assessment

Ticket to Leave - Quick Checks on each sections

hands-on activities

Soccer Shootout

Millionaire Game: Multiplying Fractions

Activities to Differentiate Instruction

General strategies for modification of this curriculum for students with special needs, ELL, and gifted learners:

- **General strategies:**
  - preferential seating
  - manipulatives
  - modified workbook pages

    - practice or enrich homework pages
- **Center activities** - There are leveled center activities for each section. There is a separate activity for "Intervention", and then "On-Level" and "Advanced" are in spiral book.
- **Leveled practice pages** - There are three leveled (Reteaching, Practice, and Enrichment) sheets that can be used for practice or homework.
- **Math Concept Readers:** These readers allow the student to read the story at different levels- above level, on level, and below level. (also available on line with audio) Complete the Think and Respond and Write Math questions at the conclusion of each book.
- **Assessment**- Using Quick Check Review can determine differentiated instruction levels using sample answers and using the rubric at the Close/ Assess and Differentiate section in the teacher edition.

Content specific modification for students with special needs, ELL, and gifted learners:

- **Topic 9**
    - **Below level students:**
        - At-risk students may benefit from using fraction manipulatives to model practice problems.
        - At-risk students may struggle because some aspect of computation with fractions remains confusing. Guiding these students to pinpoint the source of their frustration can help them develop the confidence they need to be more successful.
        - Problem sets that look overwhelming may discourage at-risk students from attempting even a single problem.You can address this issue by having them choose a subset of exercises on which they can focus.
    - **Students with special needs:**
        - Students who have difficulty with symbolic representation of fractions may benefit from consistent and systematic use of fraction strips to model problems.
        - Students who have difficulty sequencing steps may benefit from a chart of step-by-step procedures to remind them how to determine a common denominator.
        - You may wish to have students with special needs choose a single computation problem to solve when you assign independent practice. Encourage them to work slowly and systematically so that they can focus on deepening their understanding.
    - **ELL**
        - Students who are learning English may need to be reminded of the meanings of the terms numerator and denominator and how fractions are represented.
        - **Emerging:** Point out to students that the word numerator is similar to the word number (or numero in Spanish). This should help them remember that it is the numerator that tells the number of parts that the fraction represents. The word denominator starts with a d like divide and represents the total number of parts that the whole is divided into.
        - **Expanding:** Review the terms proper fraction and improper fraction with students.
        - **Bridging:** Ask students why we don't ever talk about the least common numerator of two fractions.
    - **Advanced/Gifted:**
        - Challenge students with strong number sense to consider addition or subtraction problems involving fractions in which only one denominator needs to be rewritten. Ask students to explain how the denominators are related. (One is a multiple of the other).

- **Topic 10**
    - **Below level students:**
        - At-risk students may become discouraged by the many steps it takes to add and subtract mixed numbers with unlike denominators. Have students write on separate index cards the following: write equivalent fractions with a common denominator; add or subtract the fractions; add or subtract the whole numbers; simplify the sum or difference. Encourage them to choose three exercises from the exercise set to solve, then use the steps written on the index cards to work through the problems. They should begin with writing equivalent fractions with a common denominator and finish with simplifying the sum or difference.
    - **Students with special needs:**
        - Students who have difficulty with the abstract representation of mixed numbers and fractions would benefit from using fraction manipulatives to model some of the simpler addition and subtraction problems in the textbook.
        - For students who prefer concrete examples, focus on the story problems given or have them write real-world situations for some of the simpler addition and subtraction problems.

- Limit problems to denominators involving halves, fourths, and eights, and have students look at an inch ruler to model the addition or subtraction of mixed numbers and improper fractions.

- **ELL**
  - Students who are learning English may need additional help distinguishing between proper fractions, mixed numbers, and improper fractions.
  - **Emerging:** Have students model a mixed number. Have them indicate which part of the model represents each part as you name the mixed number and the equivalent improper fraction. Then have them repeat after you to name each part.
  - **Expanding:** Have volunteers explain how to change a mixed number to an improper fraction. Encourage students to use math vocabulary such as multiply, denominator, add, numerator.
  - **Bridging:** Ask students to explain how the process of changing a mixed number to an improper fraction is the inverse of the process of changing an improper fraction to a mixed number.

- **Advanced/Gifted:**
  - Students who are skillful at adding two mixed numbers can be challenged to add three or four mixed numbers.
  - Challenge students to create a subtraction problem of two mixed numbers with unlike denominators in which one of the mixed numbers must be renamed.

- **Topic 11**
  - **Below level students:**
    - Students with retention difficulties may need extra practice multiplying fractions and mixed numbers.
    - Have students copy the steps for multiplying fractions and mixed numbers as you write them on the board. Have students use the steps as they practice problems.
      - Change mixed numbers to improper fractions.
      - Multiply numerators and denominators.
      - Simplify. Convert improper fractions to mixed numbers if necessary.
  - **Students with special needs:**
    - For students who have trouble understanding division of a whole number by a fraction, use fraction strips. For example, show a 1-strip above four 1/4 strips. Then point out that four 1/4 strips are needed to have the same length as the 1-strip. So $1 \div 4 = 4$.

  - **ELL**
    - English learners may need clarification of the meanings of such terms as mixed number and improper fractions.
    - **Emerging:** Explain that a mixed number is mixed because it contains a whole number part and a fraction part.
    - **Expanding:** Remind students that the word "of" means to multiply. For instance, 3 groups of 2 items means that there are 3 x 2, or 6 items. As practice, ask students, "What is one-half of one-third?"
    - **Bridging:** These students may need help with the meaning of improper fractions. Explain that these are "top-heavy" fractions and are "improper" because the numerator is greater than or equal to the denominator.

  - **Advanced/Gifted:**
    - Students with strong communication skills can build their understanding of fractions by explaining the concept of reciprocal to weaker students.
    - Ask students to make up two multiplication equations that have a solution of 1/2.
    - Have student tutors assist their classmates in solving the equations. Make sure students stress the importance of using the reciprocal to isolate the variable.

Integrated/Cross-Disciplinary Instruction

Topic 9 - Science: Spiders - Have students research the size of several species of spider. Then analyze their length by using number line and explaining their findings.

Topic 10 - Science: Bats - Have students research the lengths of different species of bats. Find the length of the each bat's wingspan and then making a number story.

Topic 11- Science: Plants - Have students compare the weight on earth to of the other plants. Draw charts and analyze the findings.

Resources

Topic 9 - Add and Subtracting Fractions

Topic 10 - Adding and Subtracting Mixed Numbers

Topic 11- Multipling and Dividing Fractions and Mixed Numbers

On line Resources available at www.pearsonrealize.com

- Teacher Edition (TE) Textbook
- Student Edition (SE) Textbook
- Tests on line
- Concepts videos
- Math Tools

North Carolina's description of each Common Core standard with sample problems (see links)

NC's description of Common Core Math Standards and Sample Problems

21st Century Skills

CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use

	effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP8.1	Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.