Unit 3: Domain: Number and Operations-Fractions

Content Area: **Mathematics**
Course(s): **Mathematics**
Time Period: **Marking Period 3**
Length: **5-6 Weeks**
Status: **Published**

Unit Overview

In this unit, students will develop their understanding of and ability to work with fractions. They will learn to identify fractions as parts of a whole and as parts of a set. Fractions will come to be seen as numbers on a number line and students will use number lines to represent fractions. They will also come to recognize that shapes can be partitioned into parts with equal area and that the area of each part can be expressed as a unit fraction. Students will develop the ability to reason about the size of fractions and use their reasoning skills to explain equivalence of fractions and to compare fractions. They will use visual fraction models to help them recognize and generate simple equivalent fractions. Finally, they will express whole numbers as fractions.

Standards

MA.3.OA.C.7	Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
MA.3.NF.A	Develop understanding of fractions as numbers.
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.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.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.3a	Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
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.3.NF.A.3c	Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.
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.3.G.A.2	Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.

Essential Questions

- How can a number line be used to represent numbers?
- How can we use models to represent mathematical relationships?
- How do mathematical ideas interconnect and build on one another?

Application of Knowledge and Skills...

Students will know that...

- a fraction is a number that names part of a whole or part of a group
- any number, expression, or equation can be represented in an infinite number of ways that have the same value.
- each real number can be associated with a unique point on the number line.
- equivalent fractions are two or more fractions that are the same size or the same point on a number line
- fractions can be compared by modeling or reasoning about their size
- mathematics content and practices can be applied to solve problems.
- mixed numbers can be located on a number line.
- numbers, expressions, measures, and objects can be compared and related to other numbers, expressions, measures, and objects in different ways.
- the denominator is the part of a fraction below the line which tells how many equal parts there are in the whole or in the group
- the numerator is the part of a fraction above the line which tells how many parts are being counted
- the set of real numbers (whole numbers, integers, and fractions) is infinite and ordered.

Students will be skilled at...

- comparing and ordering fractions to solve problems.
- dividing regions into equal-sized parts.
- finding fractional parts of a set.
- identifying fractional parts and mixed numbers on a number line.
- identifying regions that have been divided into equal-sized parts
- locating and comparing fractions on a number line.
- using fractions to describe the length of an object.
- using models and number lines for finding fraction names for whole numbers.
- using models and number lines to identify equivalent fractions.
- using models and reasoning to compare fractions with the same denominator or numerator.
- using models, symbols, and words to describe fractional parts.

- using number lines to compare fractions.

Assessments

- Basic Facts Timed Tests
- Benchmark Tests
- End of Year Test-administered after completing program
- Placement Tests-administered prior to delivering program.
- Task Cards
- Topic Math Projects
- Topic Quick Check
- Topic Tests

Activities

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

Vocabulary - Have students create a chart for each new vocabulary word that includes the word's meaning and an example or use vocabulary cards as flash card game

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

- Clip and Cover- Students answer questions and try to cover four spaces in a row on a gameboard to win.
- Display the Digits- Students answer the problem and display the tile that represents the answer.
- Quick Questions- Toss number cubes and answer questions.
- Team Work- Students in turn explain the steps in a multi-step process.
- Think Together- Students choose and discuss answers to problems.
- Tic Tac Toe- Students use algebra to compute solutions to problems.
- Toss and Talk- Students toss number cubes and explain how to solve resulting problems.

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

- Factoid Topic Opener Math Project, p 241E

Interactive Learning - Problem-Based Interactive learning activities at the beginning of each topic

Topic Opener Projects - There is a math project for each topic (Topic 9-10). 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.

Ticket to Leave - Quick Checks on each sections

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:**
    - Students experiencing difficulty in seeing fraction relationships will benefit from hands-on opportunities using fraction strips.
      - Provide students with fraction strips for 1 hole, halves, fourths, and eighths. Have students align the fraction strips to see the equivalent fractions.
  - **Students with special needs:**
    - Use of visual fractions will help special needs students grasp the concept of equal parts and parts of a whole.
      - Begin with pieces of colored construction paper. Have students fold the paper into halves. Ask them to write 1 and 2 in the two sections of the paper. How many equal parts are there? (2) What do you call the equal parts? (halves) Repeat the process for fourths, sixths, eighths, and tenths. Allow students to use their fraction strips to help.
  - **ELL**

- Repeated oral language practice with fraction names will help English learners understand fraction concepts.
    - Model equal parts of halves, thirds, and so on. Ask questions such as What are four equal parts? (fourths) What are six equal parts? (sixths)
    - Provide students with fraction flashcards. The front of the card models part of a region, such as 1/3 or 1/5. The back of the card has the numerical fraction. Let students take turns quizzing each other using the cards.
    - Provide pairs with centimeter grid paper. One student blocks out a rectangle that encompasses less than thirteen centimeter squares, then colors a portion of the centimeter squares to show a fractional amount. The partner writes the fraction, such as 3/9, and says the fraction name aloud.

- **Advanced/Gifted:**
    - Students who have mastered fraction concepts may enjoy playing games with fractions.
        - Prepare a set of 26 to 30 index cards with a different fraction written on each card.
        - Groups of students mix up the cards and deal them out to each player.
        - Students turn over the first card int heir stack. The student with the card showing the greatest fractional amount keeps the whole pile.

- **Topic 10**
    - **Below level students:**
        - Students experiencing difficulty in seeing fraction relationships will benefit from hands-on opportunities using number lines.
            - Provide students with number lines divided into halves, fourths, and eighths. Have students align the number lines to see the equivalent fractions.
    - **Students with special needs:**
        - Use fraction strips to help special-needs students visualize the meaning of the denominators and numerators in fractions. Then relate the meaning to the process of comparing fraction. Ask: Which is greater, 1/2 or 1/4?
        - Emphasize the differences in the number of equal parts in denominators. Guide students to choose the correct fraction strips when modeling fraction comparisons.

    - **ELL**
        - Repeated oral language practice with comparison terms, such as less than, greater than, and equal to, will help English learners understand fraction relationships.
            - On the board, draw models to show halves and fourths. Point to the fractions as you say: One half is greater than one fourth. One fourth is less than one half. One half is equal to two fourths. Have students repeat after you.
            - Guide students to compare fractions by asking such questions as: Which is greater, 4/5 or 2/5?
            - Have students explain in their own words how to order three fractions from greatest to least.

    - **Advanced/Gifted:**
        - Advanced/gifted students should be able to visualize fractions and use logic to compare them. Challenge students to look for patterns in equivalent fractions.
            - Write the fraction 1/2 on the board. What are some fractions that are equivalent to 1/2? (Possible answers: 2/4, 3/6, 4/8, 6/12). Describe the relationship between the numerator and the denominators. (The denominator is 2 times the numerator).
            - Ask students to predict what the relationship might be between the numerator

and denominator of fractions that are equivalent to 1/3. (The denominators is 3 times the numerators). Write several fractions equivalent to 1/3 and check your prediction. (Possible answers: 2/6, 3/9, 4/12).

Integrated/Cross-Disciplinary Instruction

Reading and Writing: The Worldscapes Readers present math problems to be solved within the context of nonfiction text. Think and Respond and Write Math questions can be found at the conclusion of the books.

Topic 9: Social Studies: Keeping Count- Students design a flag representing equal parts or fractions.

Topic 10: Science: Surviving the Odds- Students create a project they can use to compare fractions.

Resources

Topics Categories in book form:

Topic 9: Understanding Fractions

Topic 10: Fraction Comparison and Equivalence

Master Enrichment pages

Master Reteaching pages

Master Practice pages

Student Edition workbook

On line Resources available at www.pearsonrealize.com

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

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.