

08. Fraction Operations; Applications

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

General Overview, Course Description or Course Philosophy

In Grade 4, instructional time should focus on three critical areas:

1. Developing understanding and fluency with multi-digit multiplication, and developing an understanding of dividing to find quotients involving multi-digit dividends;
2. Developing an understanding of fraction equivalence, addition, and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers;
3. Understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Essential Questions:

- How can we visually represent and verify fractional computation?
- How can we apply our knowledge to real-life situations?

Enduring Understandings:

Students will understand that:

- Authentic, real-world scenarios call for the application of knowledge of fractions, number concepts, patterns, and geometry in multi-step representations and solutions.

STUDENT LEARNING TARGETS

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

Declarative Knowledge

Students will understand that:

- Adding and subtracting angles, symmetry, patterns, and line plots appear in many real-world problems and tasks.
- Skills with fractions and mixed numbers can be applied to solve perimeter and area problems and problems involving various units of measurement.
- Knowledge of place value and operations are used to solve cryptarithms.

Procedural Knowledge

Students will be able to:

- Make sense of and solve multistep number stories.
- Find unknown angle measures.
- Find the measures of unknown angles in pattern blocks.
- Draw lines of symmetry in shapes.
- Complete a line plot and use it to solve problems involving addition and subtraction of fractions.
- Use a formula to find the perimeters of rectangles.
- Translate from decimal notation to fraction notation, compute with the fractions, and translate back to decimal notation.
- Find the area of rectangles using fractions and mixed numbers.
- Multiply a fraction by a whole number to solve number stories.
- Add and subtract mixed numbers to solve measurement number stories.
- Multiply a fraction by a whole number.
- Solve addition and subtraction puzzles.
- Write equivalent names for numbers.

CONTENT AREA STANDARDS

4.OA

A. Use the four operations with whole numbers to solve problems

B. Gain familiarity with factors and multiples

C. Generate and analyze patterns

4.NBT

A. Generalize place value understanding for multi-digit whole numbers

B. Use place value understanding and properties of operations to perform multi-digit arithmetic

4.NF

A. Extend understanding of fractions equivalence and ordering

B. Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers

C. Understand decimal notation for fractions and compare decimal fractions

MA.4.MD.A.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
MA.4.MD.C.7	Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.
MA.4.NF.B.3	Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.
MA.4.NF.B.4	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
MA.4.NF.B.3c	Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
MA.4.NF.B.3d	Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
MA.4.NF.B.4b	Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number.
MA.4.NF.B.4c	Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem.
MA.4.NF.C.5	Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.
MA.4.NF.C.6	Use decimal notation for fractions with denominators 10 or 100.

INTERDISCIPLINARY CONNECTIONS

Architecture:

- Design blueprints of dream rooms, calculating area and perimeter using mixed numbers for dimensions.

Standards are Required)

CS.3-5.8.1.5.DA.1	Collect, organize, and display data in order to highlight relationships or support a claim.
LA.SL.4.1.A	Explicitly draw on previously read text or material and other information known about the topic to explore ideas under discussion.
LA.SL.4.1.B	Follow agreed-upon rules for discussions and carry out assigned roles.
LA.SL.4.1.C	Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.
LA.SL.4.1.D	Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.
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.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
WRK.K-12.P.9	Work productively in teams while using cultural/global competence.
TECH.9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).
TECH.9.4.2.CT.1	Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2).
TECH.9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
TECH.9.4.2.IML.2	Represent data in a visual format to tell a story about the data (e.g., 2.MD.D.10).
TECH.9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).

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

Summative Assessments

- Unit 8 Progress Checks (1 & 2)
- Department Interim Assessment #2
- End-of-Year Assessment

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 8 Resources
 - Math Masters
 - Student Journal Volume 2
 - [ConnectED](#)

Supplemental Instructional Materials

- [IXL](#)
- Illustrative Math Tasks
- Games
 - Fishing for Fractions, Subtraction (Lesson 8-1): Subtracting fractions
 - Angle Add-Up (Lessons 8-2, 8-11): Using addition and subtraction to find unknown angle measurements
 - Fraction Multiplication Top-It (Lesson 8-5): Multiplying a fraction by a whole number
 - Division Dash, Advanced Version (Lesson 8-6): Dividing a 4-digit dividend by a 1-digit divisor
 - Fishing for Fractions, Mixed-Number Addition (Lesson 8-7): Adding mixed numbers
 - Multiplication Wrestling (Lesson 8-8): Multiplying 2-digit by 2-digit numbers
 - Fishing for Fractions, Mixed-Number Subtraction (Lesson 8-9): Subtracting mixed numbers

- Name That Number (Lesson 8-13): Representing numbers in different ways by using any of the four operations
- Manipulatives
 - Base-10 blocks (longs and cubes)
 - 1 Complete Everything Math Deck
 - Fraction circles
 - One 10-sided die labeled 0-9
 - Geoboard
 - Geometry Template
 - Measuring cup
 - Number cards 1-8, 0-9 (4 of each)
 - Pattern blocks
 - Protractor
 - Rubber bands
 - Ruler
 - Tape measure
 - Yardstick

Intervention Materials:

- Number Worlds
- Touch Math Now

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.