03_Fractions and Decimals

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 compare and contrast numbers?
- How do mathematical ideas interconnect and build on one another?

Enduring Understandings:

Students will understand that:

- Fractions are numerical values that can be compared and ordered.
- Comparing and ordering decimals uses the same methods as for comparing fractions.
- Fractions and decimals can be equivalent and can be renamed in infinitely many ways.

STUDENT LEARNING TARGETS

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

Declarative Knowledge

Students will understand that:

- Fractions are numeric quantities.
- A fraction (a/b) is equivalent to (n+a)/(n+b).
- Any fraction can be renamed in infinitely many ways, all of which are equivalent to each other.
- A millimeter is one-tenth the length of a centimeter. (0.1 cm = 1 mm, meaning there is one tenth of a centimeter in one millimeter)
- A centimeter is ten times the length of a millimeter.
- (10 mm = 1 cm, meaning there are ten millimeters in one centimeter)
- Fractions can be converted to decimal form and vice versa.
- A fraction and its decimal equivalent locate the same point on one number one.
- Fractions have a measurement and a point meaning that should be applied appropriately.
- Two fractions or decimals can only be compared if the unit whole is the same for both.
- Rulers are a convenient and important representation for whole numbers and fractions.
- Decimals extend the base-10 system of numeration used for whole numbers.

Procedural Knowledge

Students will be able to:

- Subdivide shared quantities into equal fractional pieces.
- Use fraction circles to find equivalences for ¼ from 8ths through 12ths.
- Use number lines to identify equivalent fractions for fifths.
- Use a visual model to find equivalent fractions in name-collection boxes.
- Use drawings and explanations to show quantities shared and compared.
- Use a visual model to compare fractions.
- Use a model to compare fractions to a benchmark fraction.
- Use a model to change from fractions with 10 in the denominators to decimals.
- Represent decimals to the tenths and hundredths.
- Represent shaded grids as a fraction and a decimal.

- Represent decimals to the hundredths using longs and cubes.
- Plot centimeter measurements on a number-line scale.
- Compare decimals using a model.
- Find decimal equivalences.

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

4.M

A. Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit

MA.4.NBT.A.2	Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
MA.4.NBT.B.4	Fluently add and subtract multi-digit whole numbers using the standard algorithm.
MA.4.NF.A.1	Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

MA.4.NF.A.2	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.
MA.4.NF.C.6	Use decimal notation for fractions with denominators 10 or 100.
MA.4.NF.C.7	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.
MA.4.MD.A.1	Know relative sizes of measurement units within one system of units including km, m, cm, mm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two column table.

INTERDISCIPLINARY CONNECTIONS

Writing:

- Students will write a "how to" guide explaining how to compare and order fractions and decimals and give examples.

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

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.
CS.3-5.8.1.5.DA.1	Collect, organize, and display data in order to highlight relationships or 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.
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.9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
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).
TECH.9.4.5.IML.2	Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.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 3 Progress Checkpoints (1&2)

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:

- IXL
- Illustrative Math Tasks
- Games
    - Fraction Match (Lessons 3-2, 3-9, 3-12): Identifying equivalent fractions
    - Buzz and Bizz-Buzz (Lessons 3-3): Practicing naming multiples
    - Spin-and-Round (Lesson 3-7): Practicing rounding numbers through the hundred-thousands
    - Fraction Top-It (Lessons 3-7, 3-11): Comparing and ordering fractions
    - Rugs and Fences (Lessons 3-8): Using formulas to find the perimeters and areas of rectangles
    - Polygon Capture (Lesson 3-10): Identifying polygons by their properties
    - Base-10 Decimal Exchange (Lesson 3-10): Exploring the relationships between hundredths, tenths, and ones
    - Coin Top-It (Lessons 3-13): Comparing decimals in a money context
    - Decimal Top-It (Lessons 3-13): Comparing decimals to the hundredths place
- Manipulatives
    - Base-10 blocks
    - Base-10 cubes
    - Base-10 longs
    - Fraction cards
    - Fraction circles
    - Meterstick
    - Metric ruler
    - Number cards 0-8, 0-9 (4 of each)
    - Pattern blocks
    - Slate
    - Two 6-sided dice

Intervention Materials:

- Number Worlds
- Touch Math Now

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.