Unit 4 - Operations and Algebraic Thinking, Number and Operations-Fractions, Measurement, Data Literacy, Geometry

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

Unit Overview

Enduring Understandings

Solve problems involving the multiplication of a unit fraction by a whole number.
Multiply fractions and mixed numbers by whole numbers.
Solve word problems involving multiplication of fractions and mixed numbers by whole numbers.
Express fractions with denominators of 10 as equivalent fractions with denominators of 100.
Represent fractions with denominators of 10 and 100 as decimals.
Compare decimals using representations and by expressing them as fractions.
Add decimals and decimal fractions by using equivalent fractions and the relationship between money (dollars, dimes, cents).
Use multiplication and equivalence tables to convert from a larger unit of measure to a smaller unit of measure and solve problems involving metric and customary units of measurement.

Essential Questions

How can I multiply a fraction by a whole number?
How can I represent and compare decimal fractions?
How can I use and compare units of measurement?
How can I solve problems involving geometric figures?

Learning Objectives

Apply their understanding of fractions and multiplication to multiply a unit fraction by a whole number and use fraction models to represent a fraction as a multiple of a unit fraction.
Multiply a fraction by a whole number using visual fraction models and write multiples of fractions as multiples of a unit fraction.
Use their understanding of fractions as multiples of unit fractions to multiply a fraction by a whole number.
Multiply mixed numbers by whole numbers by using strategies, such as equivalent fractions and decomposing the mixed number into whole number and fractional parts.
Represent fractions with denominators of 10 and denominators of 100 using fraction models; express a fraction with a denominator of 10 as an equivalent fraction with a denominator of 100.

Express fractions with denominators of 10 or 100 using decimal notation; extend the place-value chart to hundredths, and use place-value reasoning to understand that the decimal point separates the ones place from the tenths place.
Compare two decimals using representations, such as decimal grids and number lines; compare two decimals by expressing the decimals as fractions.
Use equivalent fractions to add fractions with denominators of 10 and 100.
Solve problems involving money using the relationship between tenths and hundredths by representing with dollars, dimes, and pennies.
Convert larger metric units of length, liquid volume, and mass to smaller equivalent units.
Express larger units of weight in terms of smaller units.
Express larger units of capacity in terms of smaller units.
Express larger units of time in terms of smaller units.
Convert larger metric units of length, liquid volume, and mass to smaller equivalent units.
Solve word problems that involve converting metric units of measure by using representations.
Use representations to solve word problems that involve converting units of measure.
Use the formula for the perimeter of a rectangle and use the formula to solve real-world problems.
Use the formula for the area of a rectangle and use the formula to solve real-world problems.
Solve real-world problems by applying the area and perimeter formulas.
Create line plots to display measurement data sets in fractions of a unit. Students interpret measurement data displayed on a line plot to answer questions.
Solve problems involving addition and subtraction of fractions based on analysis of data displayed in line plots.
Identify and draw points, lines, line segments, and rays.
Recognize that an angle is formed when two rays share a common endpoint and they classify angles as right, acute, or obtuse.
Recognize that an angle's measure is the number of degrees one ray rotates about the endpoint and measure angles.
Draw and identify perpendicular and parallel lines.
Decompose an angle into two or more angles and recognize that the whole angle is the sum of the decomposed angles.
Represent and solve problems involving an unknown angle measure using an equation with a variable.
Identify properties of quadrilaterals and classify them based on these properties.
Use side lengths and angle size to classify triangles.
Identify lines of symmetry on 2-dimensional figures.
Draw lines of symmetry on 2-dimensional figures and identify attributes of 2-dimensional figures that are symmetrical

Standards: Content

MATH.4.NF.B.4	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
MATH.4.NF.B.4.a	Understand a fraction a/b as a multiple of $1/b$.
MATH.4.NF.B.4.b	Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number.
MATH.4.NF.B.4.c	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.
MATH.4.NF.C	Understand decimal notation for fractions and compare decimal fractions

MATH.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.
MATH.4.NF.C.6	Use decimal notation for fractions with denominators 10 or 100.
MATH.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.
MATH.4.M.A	Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit
MATH.4.M.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.
MATH.4.M.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.
MATH.4.M.A.3	Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
MATH.4.M.B	Geometric measurement: understand concepts of angle and measure angles
MATH.4.M.B.4	Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:
MATH.4.M.B.4.a	An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360th of a circle is called a “one-degree angle,” and can be used to measure angles.
MATH.4.M.B.4.b	An angle that turns through n one-degree angles is said to have an angle measure of n degrees.
MATH.4.M.B.5	Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
MATH.4.M.B.6	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.
MATH.4.DL.A	Organize data and understand data visualizations
MATH.4.DL.A.1	Create data-based questions, generate ideas based on the questions, and then refine the questions.
MATH.4.DL.A.2	Develop strategies to collect various types of data and organize data digitally.
MATH.4.DL.A.3	Understand that subsets of data can be selected and analyzed for a particular purpose.
MATH.4.DL.A.4	Analyze visualizations of a single data set, share explanations and draw conclusions that the data supports.
MATH.4.G.A	Draw and identify lines and angles, and classify shapes by properties of their lines and angles
MATH.4.G.A.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
MATH.4.G.A.2	Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize

	right triangles as a category and identify right triangles.
MATH.4.G.A.3	Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

Standards: Interdisciplinary

PFL.9.1.2.PB.1	Determine various ways to save and places in the local community that help people save and accumulate money over time.
PFL.9.1.2.PB.2	Explain why an individual would choose to save money.
CS.3-5.8.1.5.DA.1	Collect, organize, and display data in order to highlight relationships or support a claim.
CS.3-5.8.1.5.DA.5	Propose cause and effect relationships, predict outcomes, or communicate ideas using data.
CS.3-5.8.2.5.ED.2	Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
CS.3-5.8.2.5.ED.3	Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.
CS.3-5.8.2.5.ED.5	Describe how specifications and limitations impact the engineering design process.
WRK.9.2.5.CAP.6	Compare the characteristics of a successful entrepreneur with the traits of successful employees.
WRK.9.2.5.CAP.7	Identify factors to consider before starting a business.
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.9.4.2.IML.3	Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults (e.g., 6.3.2.GeoGI.2, 6.1.2.HistorySE.3, W.2.6, 1-LSI-2).

Assessment Evidence

Formative	Collaborative Activities, Homework, Daily Classwork, Discussion, Independent Class Assignment, Informal Observations of Students, Games, Exit Slips, Questioning, Teacher Made Pages, Learning Centers, Problem of the Day, Reveal Workbooks, Fluency Checks, Curious, Activity Based Exploration, Guided Exploration, On My Own.
Summative	Tests, Mid-Chapter Checkpoint assessments, teacher generated assessments
Alternative & Benchmark	Alternative – Reteaching, One on One Conferencing, Learning Centers, student portfolio of assignments, Homework, Higher Order Thinking Problems, Additional leveled practice, orally administered assessments. Benchmark - LinkIt Benchmark Assessments, Totowa TPA
Assessment Evidence Resource	

Instructional Resources

Smartboard, Computers, websites and digital interactives/models, Multi-media presentations, video streaming, Brain Pop, Microsoft 365, Primary and Secondary Source Documents, Reveal Math Resources, manipulatives, post-it notes, markers, number lines, chart & graph paper, construction paper, glue, scissors, paperclips, crayons, envelopes, dot ink & cards, geo blocks, number cubes/dice.

Instructional Resource List

Curricular Mandates

Below are the curricular requirements as defined in NJ Administrative Code and Statute

	Amistad		Diversity, Equity, and Inclusion
	Holocaust		LGBT and Disabilities (Grades 6-12)
	Climate Change		Asian American & Pacific Islander

Social Emotional Learning (SEL) Competencies

NJ Social and Emotional Learning Competencies & Sub-Competencies

X	Self-Awareness	X	Relationship Skills
X	Responsible Decision-Making	X	Social Awareness
X	Self-Management		

21st Century Skills & Themes

	Global and Cultural Awareness	X	Technology Literacy		Planning and Budgeting
X	Creativity and Innovation		Financial Institutions		Risk Management and Insurance

	Information and Media Literacy		Digital Citizenship		Economic and Government Influences
X	Critical Thinking and Problem Solving		Credit Profile		Career Awareness and Planning
	Civic Financial Responsibility		Financial Psychology		