

Young Scholars of Western Pennsylvania Charter School

4th Mathematics YSWPCS

- Units

Unit 1: Naming and Constructing Geometric Figures

Concepts

Introduction to the *Student Reference Book*, points, line segments, lines, and rays; angles, triangles, and quadrangles; parallelograms, polygons, drawing a circle with a compass, hexagon and triangle constructions.

PA Common Core Standards

2.3.4.A.1

Draw lines and angles and identify these in two-dimensional figures.

2.3.4.A.2 Classify two-dimensional figures by properties of their lines and angles.

2.1.4.B.2 Use place value understanding and properties of operations to perform multi-digit arithmetic.

2.1.4.B.1 Apply place value concepts to show an understanding of multi-digit whole numbers.

PA Eligible Content

M04.A-T.1.1.1 Demonstrate an understanding that in a multi-digit whole number (through 1,000,000) a digit in one place represents ten times what

it represents in the place to its right. *Example: Recognize that in the number 770, the 7 in the hundreds place is ten times the 7 in the tens place.*

M04.A-T.2.1.1 Add and subtract multi-digit whole numbers (limit sums and subtrahends up to and including 1,000,000).

M04.C-G.1.1.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

M04.C-G.1.1.2 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.

Common Core State Standards

4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

4.G.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.

4.NBT.1 Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division.*

4.NBT.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.

Vocabulary

angle

center (of a circle)

circle

compass

concentric circles

congruent

convex

endpoint

equilateral triangle

heptagon

hexagon

inscribed square

interior

intersect

kite

line

line segment

n-gon

nonagon

nonconvex or concave

octagon

parallel line segments

parallel lines

parallel rays

parallelogram

pentagon

perpendicular line segments

point

polygon

quadrangle

quadrilateral

radius
ray
rectangle
regular polygon
rhombus
right angle
side
square
trapezoid
triangle
vertex (vertices)

Assessment(s)

Daily Assessments: Teacher Manual Page 8.
Core Assessment: Teacher Manual page 9
Progress check 1: (Unit 1 Test)

Duration

Lessons 1-1 to Lessons 1-8: 8 days, plus three extra days. Test: 1 day. Total: 12 days

- Units

Unit 2: Using Numbers and Organizing

Concepts

World Project Tour: Applying math, equivalent names for whole numbers and name-collection boxes, place value in whole numbers, place value with a calculator, organizing and displaying data; median, addition of multi-digit numbers, displaying data with graphs, and subtraction of multi-digit numbers.

PA Common Core Standards

2.2.4.A.4 Generate and analyze patterns using one rule.

2.2.4.A.1 Represent and solve problems involving the four operations.

2.1.4.B.1 Apply place value concepts to show an understanding of multi-digit whole numbers.

2.4.4.A.1 Solve problems involving measurement and conversions from a larger unit to a smaller unit.

2.4.4.A.4 Represent and interpret data involving fractions using information provided in a line plot

2.3.4.A.1 Draw lines and angles and identify these in two-dimension

2.3.4.A.2 Classify two-dimensional figures by properties of their lines and angles.

al figures.

PA Eligible Content

M04.A-T.1.1.1 Demonstrate an understanding that in a multi-digit whole number (through 1,000,000) a digit in one place represents ten times what it represents in the place to its right. *Example: Recognize that in the number 770, the 7 in the hundreds place is ten times the 7 in the tens place.*

M04.B-O.3.1.1 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *Example 1: Given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Example 2: Given the rule “increase the number of sides by 1” and starting with a triangle, observe that the tops of the shapes alternate between a side and a vertex.*

M04.B-O.1.1.3 Solve multi-step word problems posed with whole numbers using the four operations. Answers will be either whole number or have remainders that must be interpreted yielding a final answer that is a whole number. Represent these problems using equations with a symbol or letter standing for the unknown quantity.

M04.B-O.1.1.1 Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations. *Example 1: Interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Example 2: Know that the statement 24 is 3 times as many as 8 can be represented by the equation $24 = 3 \times 8$ or $24 = 8 \times 3$.*

M04.C-G.1.1.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

M04.C-G.1.1.2 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.

Common Core State Standards

4.NBT.1 Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division.*

4.NBT.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.

4.NBT.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.

4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm; 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. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*

4.MD.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.

4.MD.4 Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*

4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

4.G.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.

Vocabulary

ballpark estimate

bar graph

column-addition method

counting number

digit

equivalent name

estimate

expanded notation

guess

landmark

line plot

maximum

median

minimum

mode

name-collection box

partial-differences method

partial-sums method

place

range

tally chart

trad-first method

whole number

Assessment(s)

Daily Assessments: TM page 72

Progress Check Unit 2: TM 72

Core Assessment Resources: TM 73

Duration

Lessons 2-1 to Lessons 2-9: 9 days, plus three extra days. Test: 1 day. Total: 13 days

- Units

Unit 3: Multiplication and Division; Number Sentences, and Algebra.

Concepts

Review "What's My Rule?" (Input/Output Tables), multiplication facts, division, interpreting data: applying mathematics, finding air distances using a map scale, guide to solving number stories, true or false number sentences, parentheses in number sentences, and open sentences.

PA Common Core Standards

2.2.4.A.1 Represent and solve problems involving the four operations.

2.2.4.A.2 Develop and/or apply number theory concepts to find factors and multiples.

2.2.4.A.4 Generate and analyze patterns using one rule.

2.1.4.B.1 Apply place value concepts to show an understanding of multi-digit whole numbers.

2.1.4.B.2 Use place value understanding and properties of operations to perform multi-digit arithmetic.

2.4.4.A.1 Solve problems involving measurement and conversions from a larger unit to a smaller unit.

2.3.4.A.1 Draw lines and angles and identify these in two-dimensional figures.

2.3.4.A.2 Classify two-dimensional figures by properties of their lines and angles.

PA Eligible Content

M04.C-G.1.1.2 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.

M04.C-G.1.1.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

M04.D-M.1.1.2 Use the four operations to solve word problems involving distances, intervals of time (such as elapsed time), liquid volumes, masses of objects; 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.

M04.D-M.1.1.1 Know relative sizes of measurement units within one system of units including standard units (in., ft, yd, mi; oz., lb; c, pt, qt, gal), metric units (cm, m, km; g, kg; mL, L), and time (sec, min, hr, day, wk, mo, yr). Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. **A table of equivalencies will be provided.** *Example 1: Know that 1 kg is 1,000 times as heavy as 1 g.* *Example 2: Express the length of a 4-foot snake as 48 in.*

M04.A-T.2.1.3 Divide up to four-digit dividends by one-digit divisors with answers written as whole-number quotients and remainders.

Common Core State Standards

4.NBT.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.

4.NBT.3. Use place value understanding to round multi-digit whole numbers to any place

4.NBT.6. Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear*

to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.

4.OA.4 Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.

4.OA.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

4.OA.2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.

4.OA.1. Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.

Vocabulary

composite number

dividend

divisor

fact family

factor pair

factors

false number sentences

function machine

input

multiplies

multiplication facts

number sentence

open sentence

output

parentheses

percent
prime number
products
quotient
remainder
rule
solution
solve
square numbers
true number sentence
turn-around facts
variable
"What's My Rule?"

Assessment(s)

Daily Assessments: TM page 148
Progress check unit 3: TM page 149
Core Assessment Resources: TM page 49

Duration

Lessons 3-1 to Lessons 3-11: 11 days, plus three extra days. Test: 1 day. Total: 15 days

- Units

Unit 4: Decimals and Their Uses

Concepts

Decimal place value, review of basic decimal concepts, comparing and ordering decimals, estimating with decimals, decimal addition and subtraction; decimals in money, thousandths, metric units of length, personal references for metric length, and measuring in millimeters.

PA Common Core Standards

2.3.4.A.2

Classify two-dimensional figures by properties of their lines and angles.

2.3.4.A.1

Draw lines and angles and identify these in two-dimensional figures.

2.4.4.A.1

Solve problems involving measurement and conversions from a larger unit to a smaller unit.

2.1.4.C.3

Connect decimal notation to fractions, and compare decimal fractions (base 10 denominator, e.g., $19/100$).

2.1.4.B.1

Apply place value concepts to show an understanding of multi-digit whole numbers.

2.2.4.A.1

Represent and solve problems involving the four operations.

PA Eligible Content

M04.B-O.2.1.1 Find all factor pairs for a whole number in the range 1 through 100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the interval 1 through 100 is a multiple of a given one-digit number. Determine whether a given whole number in the interval 1 through 100 is prime or composite.

M04.A-T.1.1.3 Compare two multi-digit numbers through 1,000,000 based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols.

M04.A-T.1.1.2 Read and write whole numbers in expanded, standard and word form through 1,000,000.

M04.A-F.3.1.2 Use decimal notation for fractions with denominators 10 or 100. Example: Rewrite 0.62 as $62/100$ and vice versa

M04.A-F.3.1.3

Compare two decimals to hundredths using the symbols $>$, $=$, or $<$, and justify the conclusions.

M04.D-M.1.1.1 Know relative sizes of measurement units within one system of units including standard units (in., ft, yd, mi; oz., lb; c, pt, qt, gal), metric units (cm, m, km; g, kg; mL, L), and time (sec, min, hr, day, wk, mo, yr). Within a single system of measurement, express measurements in a

larger unit in terms of a smaller unit. **A table of equivalencies will be provided.** *Example 1: Know that 1 kg is 1,000 times as heavy as 1 g. Example 2: Express the length of a 4-foot snake as 48 in.*

M04.D-M.1.1.2 Use the four operations to solve word problems involving distances, intervals of time (such as elapsed time), liquid volumes, masses of objects; 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.

M04.C-G.1.1.2 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.

M04.C-G.1.1.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

Common Core State Standards

4.OA.4

Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.

4.NBT.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.

4.NF.6.

Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*

4.NF.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.

4.MD.1

Know relative sizes of measurement units within one system of units including km, m, cm; 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. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4*

ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...

4.MD.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.

4.G.1

Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

4.G.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.

Vocabulary

billion, estimation, extended multiplication facts, exponent, lattice, lattice method (for multiplication), magnitude estimate, million, partial product, partial-products method, powers of 10, quadrillion, quintillion, rough estimate, round, rounding (to a certain place), scientific notation, sextillion, trillion

Assessment(s)

Daily Assessments: TM p. 230

Core Assessments & Progress Check Unit 4: TM p. 231

Duration

Lessons 4-1 to Lesson 4-10: 10 days, plus three extra days. Test: 1 day. Total: 14 days

- Units

Unit 5: Big Numbers, Estimation, and Computation

Concepts

Extended multiplication facts, estimating sums, estimating products, partial-products partial-products multiplication, lattice multiplication, big numbers in base-ten-place-value system, powers

of 10, rounding and reporting large numbers, and comparing data.

PA Common Core Standards

2.2.4.A.1 Represent and solve problems involving the four operations.

2.1.4.B.1 Apply place value concepts to show an understanding of multi-digit whole numbers.

2.1.4.B.2 Use place value understanding and properties of operations to perform multi-digit arithmetic.

2.4.4.A.1 Solve problems involving measurement and conversions from a larger unit to a smaller unit

PA Eligible Content

M04.B-O.1.1.1

Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations. *Example 1: Interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Example 2: Know that the statement 24 is 3 times as many as 8 can be represented by the equation $24 = 3 \times 8$ or $24 = 8 \times 3$.*

M04.B-O.1.1.2

Multiply or divide to solve word problems involving multiplicative comparison, distinguishing multiplicative comparison from additive comparison. *Example: Know that 3×4 can be used to represent that Student A has 4 objects and Student B has 3 times as many objects, and not just 3 more objects.*

M04.B-O.1.1.3

Solve multi-step word problems posed with whole numbers using the four operations. Answers will be either whole number or have remainders that must be interpreted yielding a final answer that is a whole number. Represent these problems using equations with a symbol or letter standing for the unknown quantity.

M04.A-T.1.1.1

Demonstrate an understanding that in a multi-digit whole number (through 1,000,000) a digit in one place represents ten times what it represents in the place to its right. *Example: Recognize that in the number 770, the 7 in the hundreds place is ten times the 7 in the tens place.*

M04.A-T.1.1.2

Read and write whole numbers in expanded, standard and word form through 1,000,000.

M04.A-T.1.1.3

Compare two multi-digit numbers through 1,000,000 based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols.

M04.A-T.1.1.4

Round multi-digit whole numbers (through 1,000,000) to any place.

M04.A-T.2.1.2

Multiply a whole number of up to four digits by a one-digit whole number, and multiply 2 two-digit numbers.

M04.D-M.1.1.1

Know relative sizes of measurement units within one system of units including standard units (in., ft, yd, mi; oz., lb; c, pt, qt, gal), metric units (cm, m, km; g, kg; mL, L), and time (sec, min, hr, day, wk, mo, yr). Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. **A table of equivalencies will be provided.** *Example 1: Know that 1 kg is 1,000 times as heavy as 1 g. Example 2: Express the length of a 4-foot snake as 48 in.*

Common Core State Standards

4.OA.1. Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.

4.OA.2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.

4.OA.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

4.NBT.1

Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division.*

4.NBT.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.

4.NBT.3.

Use place value understanding to round multi-digit whole numbers to any place.

4.NBT.5.

Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

4.MD.1

Know relative sizes of measurement units within one system of units including km, m, cm; 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. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*

4.MD.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.

4.G.1

Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

4.G.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.

Vocabulary

billion, estimation, extended multiplication facts, exponent, lattice, lattice method (for multiplication), magnitude estimate, million, partial product, partial-products method, powers of 10, quadrillion, quintillion, rough estimate, round, rounding (to a certain place), scientific notation, sextillion, trillion

Assessment(s)

Daily Assessments: TM p. 304

Core Assessments & Progress Check Unit 5: TM p. 305

Duration

Lessons 5-1 to 5-11: 11 days, plus three extra days. Test: 1 day. Total: 15 days

- Units

Unit 6: Division; Map Reference Frames; Measures of Angles

Concepts

Multiplication and division number stories, strategies for division, the partial-quotients division algorithm, expressing and interpreting remainders; rotations and angles; using a full-circle protractor, the half-circle protractor, rectangular coordinate grids for maps, and global coordinate grid system,.

PA Common Core Standards

2.4.4.A.1

Solve problems involving measurement and conversions from a larger unit to a smaller unit.

2.4.4.A.6

Measure angles and use properties of adjacent angles to solve problems.

2.1.4.B.1

Apply place value concepts to show an understanding of multi-digit whole numbers.

2.1.4.B.2

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

2.2.4.A.1

Represent and solve problems involving the four operations.

2.2.4.A.2

Develop and/or apply number theory concepts to find factors and multiples.

PA Eligible Content

M04.B-O.1.1.1

Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations. *Example 1: Interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Example 2: Know that the statement 24 is 3 times as many as 8 can be represented by the equation $24 = 3 \times 8$ or $24 = 8 \times 3$.*

M04.B-O.2.1.1

Find all factor pairs for a whole number in the range 1 through 100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the interval 1 through 100 is a

multiple of a given one-digit number. Determine whether a given whole number in the interval 1 through 100 is prime or composite.

M04.B-O.1.1.2

Multiply or divide to solve word problems involving multiplicative comparison, distinguishing multiplicative comparison from additive comparison. *Example: Know that 3×4 can be used to represent that Student A has 4 objects and Student B has 3 times as many objects, and not just 3 more objects.*

Common Core State Standards

4.OA.1. Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.

4.OA.2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.

4.OA.4 Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.

4.NBT.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.

4.NBT.3.

Use place value understanding to round multi-digit whole numbers to any place.

4.NBT.6.

Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

4.MD.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.

4.MD.6

Measure angles in whole-number degrees using a protractor. Sketch

angles of specified measure.

4.MD.5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: **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 $\frac{1}{360}$ of a circle is called a “one-degree angle,” and can be used to measure angles. **b.** An angle that turns through n one-degree angles is said to have an angle measure of n degrees.

4.MD.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.

Vocabulary

acute angle, angle, axis, base line, clockwise, clockwise rotation, counterclockwise rotation, degree, dividend, divisor, equal-groups notation, equator, full-circle protractor, half-circle protractor, hemisphere, index of locations, latitude (lines), map scale, meridian bar, mixed number, Multiplication/Division Diagram, North Pole, obtuse angle, ordered number pair, parallels, partial quotient, prime meridian, quotient, reflex angle, remainder, right angle, rotation, sides (of an angle), South Pole, sphere, straight angle, turn, vertex (of an angle)

Assessment(s)

Daily Assessments: TM p. 388

Core Assessments & Progress Check Unit 6: TM p. 389

Duration

Lessons 6-1 to 6-10: 10 days, 3 extra days, Unit 10 Test: 1 day, Total Days: 14 Days.

Units

Unit 7: Fractions and Their Uses; Chance and Probability

Concepts

Review of basic fraction concepts, fractions of sets, probabilities when outcomes are equally likely, pattern-block fractions, fraction and mixed-number addition and subtraction; many names for fractions, equivalent fractions, fractions and decimals; comparing fractions, the ONE for fractions, probability, fractions, and spinners; experimentation using probability, and multiplying fractions by whole numbers.

PA Common Core Standards

2.1.4.C.3 Connect decimal notation to fractions, and compare decimal fractions (base 10 denominator, e.g., $19/100$).

2.4.4.A.1 Solve problems involving measurement and conversions from a larger unit to a smaller unit.

2.4.4.A.4 Represent and interpret data involving fractions using information provided in a line plot

2.4.4.A.6 Measure angles and use properties of adjacent angles to solve problems.

2.1.4.C.2 Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

2.1.4.C.1 Extend the understanding of fractions to show equivalence and ordering.

2.2.4.A.2 Develop and/or apply number theory concepts to find factors and multiples.

PA Eligible Content

M04.B-O.2.1.1

Find all factor pairs for a whole number in the range 1 through 100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the interval 1 through 100 is a multiple of a given one-digit number. Determine whether a given whole number in the interval 1 through 100 is prime or composite.

M04.A-F.1.1.1

Recognize and generate equivalent fractions.

M04.A-F.1.1.2

Compare two fractions with different numerators and different denominators (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100) using the symbols $>$, $=$, or $<$, and justify the conclusions.

M04.A-F.2.1.2

Decompose a fraction or a mixed number into a sum of fractions with the same denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100), recording the decomposition by an equation. Justify decompositions (for example, by using a visual fraction model). *Example 1:* $3/8 = 1/8 + 1/8 + 1/8$ OR $3/8 = 1/8 + 2/8$ *Example 2:* $2\ 1/12 = 1 + 1 + 1/12 = 12/12 + 12/12 + 1/12$

M04.A-F.2.1.3

Add and subtract mixed numbers with a common denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; no regrouping with subtraction; fractions do not need to be reduced; no improper fractions as the final answers).

M04.A-F.2.1.4

Solve word problems involving addition and subtraction of fractions referring to the same whole or set and having like denominators (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100).

M04.A-F.2.1.5

Multiply a whole number by a unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; final answers need not be reduced or written as a mixed number). *Example:* $5 \times (1/4) = 5/4$.

M04.A-F.2.1.6

Multiply a whole number by a non-unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; final answers need not be reduced or written as a mixed number). *Example:* $3 \times (5/6) = 15/6$.

M04.A-F.3.1.1

Add two fractions with respective denominators 10 and 100. *Example:* Express $3/10$ as $30/100$, and add $3/10 + 4/100 = 30/100 + 4/100 = 34/100$.

M04.A-F.3.1.2

Use decimal notation for fractions with denominators 10 or 100. *Example: Rewrite 0.62 as 62/100 and vice versa*

M04.D-M.1.1.2

Use the four operations to solve word problems involving distances, intervals of time (such as elapsed time), liquid volumes, masses of objects; 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.

M04.D-M.2.1.1

Make a line plot to display a data set of measurements in fractions of a unit (e.g., intervals of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$).

M04.D-M.2.1.2

Solve problems involving addition and subtraction of fractions by using information presented in line plots (line plots must be labeled with common denominators, such as $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$).

M04.D-M.3.1.1

Measure angles in whole-number degrees using a protractor. With the aid of a protractor, sketch angles of specified measure.

M04.D-M.3.1.2

Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems. (Angles must be adjacent and non-overlapping.)

Common Core State Standards

4.OA.4

Find all factor pairs for a whole number in the range 1–100.

Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.

4.NF.1

Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ 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.

4.NF.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.

4.NF.3.

Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. **b.** Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples:* $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2 \frac{1}{8} = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.

4.NF.3.

Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. **c.** 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.

4.NBT.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.

4.NF.3.

Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.

d. 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.

4.NF.4.

Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. **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. *For example, if each person at a party will eat $3/8$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*

4.NF.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. *For example, express $3/10$ as $30/100$, and add $3/10 + 4/100 = 34/100$.*

4.NF.6.

Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as $62/100$; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*

4.MD.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.

4.MD.4

Make a line plot to display a data set of measurements in fractions of a unit ($1/2$, $1/4$, $1/8$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*

4.MD.6

Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

4.MD.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.

Vocabulary

denominator

equal chance

equally (more, less) likely

equation

equivalent fractions

Equivalent Fractions Rule

event

except

fair (die or spinner)

favorable outcome

mixed number

multiple

numerator

outcome

probability

“whole” box

Whole (or ONE or unit)

Assessment(s)

Daily Assessments: TM p. 560

Common core assessments & Progress Check unit 7: TM p. 561

Duration

Lessons 7-1 to 7-12a: 13 days plus 3 extra days. Unit 7 Test: 1 day. Total Days: 17 days

- Units

Unit 8: Perimeter and Area

Concepts

Perimeter: Application of, scale drawings, area, application of area, formula for area of rectangle, formula for area of a parallelogram, formula for area of triangle, and geographical area measurements.

PA Common Core Standards

2.2.4.A.1 Represent and solve problems involving the four operations.

2.1.4.C.1 Extend the understanding of fractions to show equivalence and ordering.

2.1.4.C.2 Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

2.1.4.C.3 Connect decimal notation to fractions, and compare decimal fractions (base 10 denominator, e.g., 19/100).

2.4.4.A.1 Solve problems involving measurement and conversions from a larger unit to a smaller unit.

2.4.4.A.4 Represent and interpret data involving fractions using information provided in a line plot

2.4.4.A.6 Measure angles and use properties of adjacent angles to solve problems.

2.3.4.A.1 Draw lines and angles and identify these in two-dimensional figures.

2.3.4.A.2 Classify two-dimensional figures by properties of their lines and angles.

PA Eligible Content

M04.B-O.1.1.1 Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations. *Example 1: Interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Example 2: Know that the statement 24 is 3 times as many as 8 can be represented by the equation $24 = 3 \times 8$ or $24 = 8 \times 3$.*

M04.B-O.1.1.2 Multiply or divide to solve word problems involving multiplicative comparison, distinguishing multiplicative comparison from additive comparison. *Example: Know that 3×4 can be used to represent that Student A has 4 objects and Student B has 3 times as many objects, and not just 3 more objects.*

M04.B-O.1.1.3 Solve multi-step word problems posed with whole numbers using the four operations. Answers will be either whole number or have remainders that must be interpreted yielding a final answer that is a whole number. Represent these problems using equations with a symbol or letter standing for the unknown quantity.

M04.A-F.1.1.1 Recognize and generate equivalent fractions.

M04.A-F.2.1.5 Multiply a whole number by a unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; final answers need not be reduced or written as a mixed number). *Example: $5 \times (1/4) = 5/4$.*

M04.A-F.2.1.6 Multiply a whole number by a non-unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; final answers need not be reduced or written as a mixed number). *Example: $3 \times (5/6) = 15/6$.*

M04.A-F.3.1.2 Use decimal notation for fractions with denominators 10 or 100. *Example: Rewrite 0.62 as 62/100 and vice versa.*

M04.D-M.1.1.1 Know relative sizes of measurement units within one system of units including standard units (in., ft, yd, mi; oz., lb; c, pt, qt, gal), metric units (cm, m, km; g, kg; mL, L), and time (sec, min, hr, day, wk, mo, yr). Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. **A table of equivalencies will be provided.** *Example 1: Know that 1 kg is 1,000 times as heavy as 1 g. Example 2: Express the length of a 4-foot snake as 48 in.*

M04.D-M.1.1.2 Use the four operations to solve word problems involving distances, intervals of time (such as elapsed time), liquid volumes, masses of objects; 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.

M04.D-M.1.1.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems (may include finding a missing side length). Whole numbers only. **The formulas will be provided.**

M04.D-M.2.1.1 Make a line plot to display a data set of measurements in fractions of a unit (e.g., intervals of $1/2$, $1/4$, $1/8$).

M04.D-M.2.1.2 Solve problems involving addition and subtraction of fractions by using information presented in line plots (line plots must be labeled with common denominators, such as $1/4$, $2/4$, $3/4$).

M04.D-M.3.1.2 Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems. (Angles must be adjacent and non-overlapping.)

M04.C-G.1.1.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

M04.C-G.1.1.2 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

Common Core State Standards

4.OA.1. Interpret a multiplication

equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.

4.OA.2.

Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.

4.OA.3.

Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

4.NF.1

Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ 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.

4.NF.4.

Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. **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. *For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.)*

4.NF.4.

Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. **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. *For example, if each person at a party will eat $3/8$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*

4.NF.6.

Use decimal notation for fractions with denominators 10 or 100. *For*

example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.

.MD.1

Know relative sizes of measurement units within one system of units including km, m, cm; 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. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*

4.MD.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.

4.MD.3.

Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*

4.MD.4

Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*

4.MD.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.

4.G.1

Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

4.G.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.

area

base

equilateral
triangle

formula

height

isosceles
triangle

length

perimeter

perpendicular

right
triangle

rough floor
plan

scale

scale
drawing

scalene
triangle

square units

time-and-motion study

variable

width

work
triangle

Assessment(s)

Daily Assessments: TM p. 648

Common Core Assessments & progress check unit 8: TM p. 649

Duration

Lessons 8-1 to 8-8: 8 days plus 3 extra days. Unit 8 Test: 1 day. Total Days: 12 days

- Units

Unit 9: Fractions, Decimals, and Percents

Concepts

Fractions, decimals, and percents; converting "easy" fractions to decimals and percents, using a calculator to convert fractions to decimals, using a calculator to rename fractions as percents, conversions among fractions, decimals, and percents; comparing the results of a survey, comparing population data, multiplication of decimals, and division of decimals.

PA Common Core Standards

2.2.4.A.1 Represent and solve problems involving the four operations.

2.1.4.C.1 Extend the understanding of fractions to show equivalence and ordering.

2.4.4.A.6 Measure angles and use properties of adjacent angles to solve problems.

2.3.4.A.1 Draw lines and angles and identify these in two-dimensional figures.

2.3.4.A.2 Classify two-dimensional figures by properties of their lines and angles.

PA Eligible Content

M04.B-O.1.1.3 Solve multi-step word problems posed with whole numbers using the four operations. Answers will be either whole number or have remainders that must be interpreted yielding a final answer that is a whole number. Represent these problems using equations with a symbol or letter standing for the unknown quantity.

M04.A-F.1.1.1 Recognize and generate equivalent fractions.

M04.A-F.2.1.5 Multiply a whole number by a unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; final answers need not be reduced or written as a mixed number). *Example:* $5 \times (1/4) = 5/4$.

M04.A-F.2.1.6 Multiply a whole number by a non-unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; final answers need not be reduced or written as a mixed number). *Example:* $3 \times (5/6) = 15/6$.

M04.A-F.3.1.2 Use decimal notation for fractions with denominators 10 or 100. *Example: Rewrite 0.62 as 62/100 and vice versa.*

M04.D-M.1.1.1 Know relative sizes of measurement units within one system of units including standard units (in., ft, yd, mi; oz., lb; c, pt, qt, gal), metric units (cm, m, km; g, kg; mL, L), and time (sec, min, hr, day, wk, mo, yr). Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. **A table of equivalencies will be provided.** *Example 1: Know that 1 kg is 1,000 times as heavy as 1 g. Example 2: Express the length of a 4-foot snake as 48 in.*

M04.D-M.1.1.2 Use the four operations to solve word problems involving distances, intervals of time (such as elapsed time), liquid volumes, masses of objects; 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.

M04.D-M.1.1.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems (may include finding a missing side length). Whole numbers only. **The formulas will be provided.**

M04.D-M.3.1.2 Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems. (Angles must be adjacent and non-overlapping.)

Common Core State Standards

4.OA.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

4.NF.1 Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ 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.

4.NF.4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. **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. *For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.)*

4.NF.4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. **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. *For example, if each person at a party will eat $3/8$ of a pound of*

roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?

4.MD.1 Know relative sizes of measurement

units within one system of units including km, m, cm; 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. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*

4.MD.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.

4.MD.3. Apply the area and perimeter formulas

for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*

4.MD.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.

4.G.1

Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

4.G.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.

Vocabulary

100% box, discount, discounted price, fraction of discount, life expectancy, list price, percent, percent of discount, life expectancy, list price, percent, percent of discount, rank regular price, repeating decimal, rural sale price, terminating decimal, urban

Assessment(s)

Daily Assessments: TM p. 714

Common core assessments & progress check unit 9: TM p. 715

Duration

Lessons 9-1 to 8-9: 9 days plus 3 extra days. Unit 9 Test: 1 day. Total Days: 13 days

- Units

Unit 10: Reflections and Symmetry

Concepts

Explorations with a transparent mirror, finding lines of reflection, properties of reflections, line symmetry, frieze patterns, and positive and negative numbers.

PA Common Core Standards

2.2.4.A.1 Represent and solve problems involving the four operations.

2.2.4.A.4 Generate and analyze patterns using one rule.

2.1.4.B.1 Apply place value concepts to show an understanding of multi-digit whole numbers.

2.1.4.C.1
Extend the understanding of fractions to show equivalence and ordering.

2.1.4.C.2 Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

2.1.4.C.3 Connect decimal notation to fractions, and compare decimal fractions (base 10 denominator, e.g., $19/100$).

2.4.4.A.6 Measure angles and use properties of adjacent angles to solve problems.

2.3.4.A.1 Draw lines and angles and identify these in two-dimensional figures.

2.3.4.A.2 Classify two-dimensional figures by properties of their lines and angles.

2.3.4.A.3 Recognize symmetric shapes and draw lines of symmetry.

PA Eligible Content

M04.B-O.1.1.3 Solve multi-step word problems posed with whole numbers using the four operations. Answers will be either whole number or have remainders that must be interpreted yielding a final answer that is a whole number. Represent these problems using equations with a symbol or letter standing for the unknown quantity.

M04.B-O.3.1.1 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *Example 1: Given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Example 2: Given the rule “increase the number of sides by 1” and starting with a triangle, observe that the tops of the shapes alternate between a side and a vertex.*

M04.A-T.1.1.4 Round multi-digit whole numbers (through 1,000,000) to any place.

M04.A-F.3.1.1 Add two fractions with respective denominators 10 and 100. *Example: Express $3/10$ as*

$30/100$, and
add $3/10 + 4/100 = 30/100 + 4/100 = 34/100$.

M04.A-F.2.1.6 Multiply a whole number by a non-unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; final answers need

not be reduced or written as a mixed number). *Example: $3 \times (5/6) = 15/6$.*

M04.D-M.1.1.1 Know relative sizes of measurement units within one system of units including standard units (in., ft, yd, mi; oz., lb; c, pt, qt, gal), metric units (cm, m, km; g, kg; mL, L), and time (sec, min, hr, day, wk, mo, yr). Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. **A table of equivalencies will be provided.** *Example 1: Know that 1 kg is 1,000 times as heavy as 1 g. Example 2: Express the length of a 4-foot snake as 48 in.*

M04.D-M.3.1.1 Measure angles in whole-number degrees using a protractor. With the aid of a protractor, sketch angles of specified measure

M04.C-G.1.1.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

M04.C-G.1.1.2 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

M04.C-G.1.1.3 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 mirroring parts. Identify line-symmetric figures and draw lines of symmetry (up to two lines of symmetry).

Common Core State Standards

4.OA.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

4.NBT.3. Use place value understanding to round multi-digit whole numbers to any place.

4.NF.4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. **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. *For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.)*

4.NF.4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. **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. *For example, if each person at a party will eat $3/8$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*

4.NF.6. Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as $62/100$; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*

4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm; 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. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*

4.MD.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

4.G.1

Draw points, lines, line segments, rays, angles (right, acute,

obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

4.G.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.

4.G.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.

Vocabulary

congruent, credit, debit, frieze pattern, image, line of reflection, line of symmetry, opposite (of a number), preimage, recessed, reflection, reflection (flip), rotation (turn), rotation (turn) symmetry, symmetric, translation (slide), transparent mirror

Assessment(s)

Daily Assessments: TM p. 784

Common Core Assessments & Progress Check Unit 10: TM p. 785

Duration

Lessons 10-1 to 10-6: 6 days plus 3 extra days. Unit 10 Test: 1 day. Total Days: 10 days

- Units

Unit 11: 3-D Shapes, Weight, Volume, and Capacity

Concepts

Weight, geometric solids, constructing geometric solids, volume exploration, formula for volume of a rectangular prisms, subtraction of positive and negative numbers; and capacity.

PA Common Core Standards

2.1.4.C.2 Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

2.4.4.A.1 Solve problems involving measurement and conversions from a larger unit to a smaller unit.

PA Eligible Content

M04.A-F.2.1.7 Solve word problems involving multiplication of a whole number by a fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100).

M04.D-M.1.1.1 Know relative sizes of measurement units within one system of units including standard units (in., ft, yd, mi; oz., lb; c, pt, qt, gal), metric units (cm, m, km; g, kg; mL, L), and time (sec, min, hr, day, wk, mo, yr). Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. **A table of equivalencies will be provided.** *Example 1: Know that 1 kg is 1,000 times as heavy as 1 g. Example 2: Express the length of a 4-foot snake as 48 in.*

M04.D-M.1.1.2 Use the four operations to solve word problems involving distances, intervals of time (such as elapsed time), liquid volumes, masses of objects; 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.

M04.D-M.1.1.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems (may include finding a missing side length). Whole numbers only. **The formulas will be provided.**

M04.D-M.1.1.4 Identify time (analog or digital) as the amount of minutes before or after the hour. *Example 1: 2:50 is the same as 10 minutes before 3:00. Example 2: Quarter past six is the same as 6:15).*

Common Core State Standards

4.NF.4.

Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. **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. *For example, if each person at a party will eat $\frac{3}{8}$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie*

4.MD.1

Know relative sizes of measurement units within one system of units including km, m, cm; 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. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*

4.MD.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.

4.MD.3.

Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*

Vocabulary

capacity, cone, congruent, cube, cubic units, cup, curved surface, cylinder, dimensions, dodecadhedron, edge, face, flat surface, formula, gallon, geometric solide, gram, liter, milliliter, ounce, pint, polyhedron, prism, pyramid, quart, rectangular prism, regular polyhedron, sphere, square pyramid, surface area, tetrahedron, triangular pyramid, vertex (vertices), volume

Assessment(s)

Daily Assessments: TM p. 838

Core Assessment Resources & Unit 11 Progress Check: TM p. 839

Duration

Lessons 11-1 to 11-7: 7 days plus 3 extra days. Unit 11 Test: 1 day. Total Days: 12 days

- Units

Unit 12: Rates

Concepts

Introduction of rates, solving rate problems, converting between rates, application of caclulating and comparing unit prices.

PA Common Core Standards

2.2.4.A.1 Represent and solve problems involving the four operations.

2.2.4.A.2 Develop and/or apply number theory concepts to find factors and multiples.

2.1.4.C.1 Extend the understanding of fractions to show equivalence and ordering.

2.1.4.C.3 Connect decimal notation to fractions, and compare decimal fractions (base 10 denominator, e.g., 19/100).

2.4.4.A.1 Solve problems involving measurement and conversions from a larger unit to a smaller unit.

PA Eligible Content

M04.B-O.1.1.3 Solve multi-step word problems posed with whole numbers using the four operations. Answers will be either whole number or have remainders that must be interpreted yielding a final answer that is a whole number. Represent these problems using equations with a symbol or letter standing for the unknown quantity.

M04.B-O.2.1.1 Find all factor pairs for a whole number in the range 1 through 100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the interval 1 through 100 is a multiple of a given one-digit number. Determine whether a given whole number in the interval 1 through 100 is prime or composite.

M04.A-F.1.1.2 Compare two fractions with different numerators and different denominators (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100) using the symbols $>$, $=$, or $<$, and justify the conclusions.

M04.A-F.3.1.1 Add two fractions with respective denominators 10 and 100. *Example: Express $3/10$ as $30/100$, and add $3/10 + 4/100 = 30/100 + 4/100 = 34/100$.*

M04.D-M.1.1.1 Know relative sizes of measurement units within one system of units including standard units (in., ft, yd, mi; oz., lb; c, pt, qt, gal), metric units (cm, m, km; g, kg; mL, L), and time (sec, min, hr, day, wk, mo, yr). Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. **A table of equivalencies will be provided.** *Example 1: Know that 1 kg is 1,000 times as heavy as 1 g. Example 2: Express the length of a 4-foot snake as 48 in.*

M04.D-M.1.1.2 Use the four operations to solve word problems involving distances, intervals of time (such as elapsed time), liquid volumes, masses of objects; 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.

Common Core State Standards

4.OA.3.

Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

4.OA.4

Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.

4.NF.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.

4.NF.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. *For example, express $3/10$ as $30/100$, and add $3/10 + 4/100 = 34/100$.*

4.MD.1

Know relative sizes of measurement units within one system of units including km, m, cm; 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. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*

4.MD.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.

Vocabulary

comparison shopping, consumer, per, products, rate, rate table, services, unit price, unit rate

Assessment(s)

Daily Assessments: TM p. 900

Core Assessment Resources & Unit 12 Progress Check: TM p. 901

Duration

Lessons 12-1 to 12-6: 6 days plus 3 extra days. Unit 12 Test: 1 day. Total Days: 10 days

Mathematics: Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.

3. Construct viable arguments and critique the reasoning of others.

4. Model and mathematics.

5. Use appropriate tools strategically.

6. Attend to precision.

7. Look for and make use of structure.

8. Look for and express regularity in repeated reasoning.