IXL Skill Plan

Virginia Standards of Learning (2023): Grade 3

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www.ixl.com/math/skill-plans/virginia-standards-of-learning-2023-grade-3

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3.NS | Number and Number Sense

3.NS.1 The student will use place value understanding to read, write, and determine the place and value of each digit in a whole number, up to six digits, with and without models.

3.NS.1.a: Read and write six-digit whole numbers in standard form, expanded form, and word form.

1. Convert between standard and expanded form: up to a million 5MJ
2. Word names for numbers up to one million Q9C

3.NS.1.b: Apply patterns within the base 10 system to determine and communicate, orally and in written form, the place and value of each digit in a six-digit whole number (e.g., in 165,724, the 5 represents 5 thousands and its value is 5,000).

1. Identify place value names up to hundred thousands SG6
2. Value of a digit up to hundred thousands 9A7

3.NS.1.c: Compose, decompose, and represent numbers up to 9,999 in multiple ways, according to place value (e.g., 256 can be 1 hundred, 14 tens, 16 ones, but also 25 tens, 6 ones), with and without models.

1. Place value models up to thousands DDS
2. Place value word problems 5TF
3. Convert to/from a number up to ten thousand PZZ
4. Convert between place values - up to thousands J85

3.NS.2 The student will demonstrate an understanding of the base 10 system to compare and order whole numbers up to 9,999.

3.NS.2.a: Compare two whole numbers, each 9,999 or less, using symbols (>, <, =, ≠) and/or words (*greater than*, *less than*, *equal to*, *not equal to*), with and without models.

1. Compare numbers up to 10,000 D2N

3.NS.2.b: Order up to three whole numbers, each 9,999 or less, represented with and without models, from least to greatest and greatest to least.

1. Greatest and least: numbers up to 10,000 ELP
2. Order numbers up to 10,000 M5T

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3.NS.3 The student will use mathematical reasoning and justification to represent and compare fractions (proper and improper) and mixed numbers with denominators of 2, 3, 4, 5, 6, 8, and 10), including those in context.

3.NS.3.a: Represent, name, and write a given fraction (proper or improper) or mixed number with denominators of 2, 3, 4, 5, 6, 8, and 10 using:

3.NS.3.a.i: region/area models (e.g., pie pieces, pattern blocks, geoboards);

Fractions

1. Make halves, thirds, and fourths HGP
2. Make sixths and eighths KTM
3. Make halves, thirds, fourths, sixths, and eighths JHE
4. Match fractions to models: halves, thirds, and fourths Y55
5. Understand fractions using area models: halves, thirds, fourths, fifths, sixths, eighths, and tenths SLP
6. Show fractions using area models: halves, thirds, fourths, fifths, sixths, eighths, and tenths ECQ
7. Match unit fractions to models: halves, thirds, fourths, fifths, sixths, eighths, and tenths V2X
8. Match fractions to models: halves, thirds, fourths, fifths, sixths, eighths, and tenths TH6

Mixed numbers

9. Match mixed numbers to models UWH

Word problems

10. Unit fractions: modeling word problems UV8
11. Fractions of a whole: modeling word problems 9PU

3.NS.3.a.ii: length models (e.g., paper fraction strips, fraction bars, rods, number lines); and

Fraction bars

1. Understand fractions using fraction bars: halves, thirds, fourths, fifths, sixths, eighths, and tenths 48W
2. Show fractions using fraction bars: halves, thirds, fourths, fifths, sixths, eighths, and tenths DB5

Fractions of number lines

3. Fractions of number lines: halves, fourths, and eighths LUA

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4. Unit fractions of number lines: halves, thirds, fourths, fifths, sixths, eighths, and tenths KLC
5. Fractions of number lines: halves, thirds, fourths, fifths, sixths, eighths, and tenths 6WN

Fractions on number lines

6. Identify unit fractions on number lines JVC
7. Graph fractions less than 1 on number lines HWJ
8. Identify fractions on number lines: halves, thirds, fourths, fifths, sixths, eighths, and tenths R7B
9. Graph unit fractions on number lines: halves, thirds, fourths, fifths, sixths, eighths, and tenths 2W7
10. Graph fractions on number lines: halves, thirds, fourths, fifths, sixths, eighths, and tenths 7SE

3.NS.3.a.iii: set models (e.g., chips, counters, cubes).

1. Fractions of a group: unit fractions SSY
2. Fractions of a group 5Z6

3.NS.3.b: Identify a fraction represented by a model as the sum of unit fractions.

1. Decompose fractions into unit fractions using models P75

3.NS.3.c: Use a model of a fraction greater than one to count the fractional parts to name and write it as an improper fraction and as a mixed number (e.g., $^1/_4$, $^2/_4$, $^3/_4$, $^4/_4$, $^5/_4 = 1\ ^1/_4$).

1. Match mixed numbers to models UWH

3.NS.3.d: Compose and decompose fractions (proper and improper) with denominators of 2, 3, 4, 5, 6, 8, and 10 in multiple ways (e.g., $^7/_4 = ^4/_4 + ^3/_4$ or $^4/_6 = ^3/_6 + ^1/_6 = ^2/_6 + ^2/_6$) with models.

1. Decompose fractions into unit fractions using models P75

3.NS.3.e: Compare a fraction, less than or equal to one, to the benchmarks of 0, $^1/_2$, and 1 using area/region models, length models, and without models.

1. Compare fractions using benchmarks L6V
2. Benchmark fractions EEU

3.NS.3.f: Compare two fractions (proper or improper) and/or mixed numbers with like numerators of 2, 3, 4, 5, 6, 8, and 10 (e.g., $^2/_3 > ^2/_8$) using words (*greater than*, *less than*, *equal to*) and/or symbols (>, <, =), using area/region models,

1. Compare fractions with like numerators using models RGM
2. Graph and compare fractions with like numerators on number lines ZPD
3. Compare fractions with like numerators 7LX

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length models, and without models.

3.NS.3.g: Compare two fractions (proper or improper) and/or mixed numbers with like denominators of 2, 3, 4, 5, 6, 8, and 10 (e.g., $^3/_6 < {}^4/_6$) using words (*greater than*, *less than*, *equal to*) and/or symbols (>, <, =), using area/region models, length models, and without models.

1. Compare fractions with like denominators using models TDE
2. Graph and compare fractions with like denominators on number lines 63U
3. Compare fractions with like denominators 8SU

3.NS.3.h: Represent equivalent fractions with denominators of 2, 3, 4, 5, 6, 8, or 10, using region/area models and length models.

Fraction strips

1. Find equivalent fractions using fraction strips LXP

Area models

2. Find equivalent fractions using area models: one model 6DY
3. Find equivalent fractions using two area models: halves, thirds, fourths, fifths, sixths, eighths, and tenths SG5

Number lines

4. Identify equivalent fractions on number lines HYM
5. Find equivalent fractions using number lines JL8
6. Graph equivalent fractions on number lines: halves, thirds, fourths, fifths, sixths, eighths, and tenths J5F

3.NS.4 The student will solve problems, including those in context, that involve counting, comparing, representing, and making change for money amounts up to $5.00.

3.NS.4.a: Determine the value of a collection of bills and coins whose total is $5.00 or less.

1. Count coins and bills - up to $5 bill 9RP
2. Count coins and bills word problems - up to $5 bill R6G

3.NS.4.b: Construct a set of bills and coins to total a given amount of money whose value is $5.00 or less.

1. Least number of coins Z6E

3.NS.4.c: Compare the values of two sets of coins or two sets of bills and coins, up to $5.00, with words (*greater than*, *less than*, *equal to*) and/or symbols (>, <, =) using concrete or pictorial models.

1. Which picture shows more? - up to $5 TVU

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3.NS.4.d: Solve contextual problems to make change from $5.00 or less by using counting on or counting back strategies with concrete or pictorial models.

1. Correct amount of change 8KD

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3.CE | Computation and Estimation

3.CE.1 The student will estimate, represent, solve, and justify solutions to single-step and multistep problems, including those in context, using addition and subtraction with whole numbers where addends and minuends do not exceed 1,000.

3.CE.1.a: Determine and justify whether an estimate or an exact answer is appropriate when solving single step and multistep contextual problems involving addition and subtraction, where addends and minuends do not exceed 1,000.

3.CE.1.b: Apply strategies (e.g., rounding to the nearest 10 or 100, using compatible numbers, using other number relationships) to estimate a solution for single-step or multistep addition or subtraction problems, including those in context, where addends or minuends do not exceed 1,000.

Rounding

1. Round to the nearest ten or hundred using a number line 6ST
2. Round to the nearest ten or hundred Q65
3. Round to the nearest ten or hundred in a table 6Y5
4. Rounding puzzles SFM

Addition

5. Estimate sums by rounding: up to 1,000 3Y9
6. Estimate sums using compatible numbers HRT
7. Estimate sums by rounding: word problems WB2

Subtraction

8. Estimate differences by rounding: up to 1,000 A47
9. Estimate differences using compatible numbers PVS
10. Estimate differences by rounding: word problems M42

Mixed operations

11. Estimate sums and differences by rounding: up to 1,000 MTL
12. Estimate sums and differences using compatible numbers TDT
13. Estimate sums and differences: word problems BU8

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14. Estimate to compare sums and differences NMD

3.CE.1.c: Apply strategies (e.g., place value, properties of addition, other number relationships) and algorithms, including the standard algorithm, to determine the sum or difference of two whole numbers where addends and minuends do not exceed 1,000.

Addition

1. Use compensation to add: up to three digits H7K
2. Use expanded form to add three-digit numbers RPC
3. Add two numbers up to three digits: without regrouping 96M
4. Add two numbers up to three digits: with regrouping 9NH
5. Add two numbers up to three digits E83
6. Addition up to three digits: fill in the missing digits LYB

Properties of addition

7. Properties of addition NY2
8. Complete the equation using properties of addition CGS
9. Add using properties KYA

Subtraction

10. Use number lines to subtract three-digit numbers QRQ
11. Use compensation to subtract: up to three digits WPW
12. Subtract numbers up to three digits: without regrouping QFE
13. Subtract three-digit numbers: with regrouping H7D
14. Subtract numbers up to three digits EHT
15. Subtract across zeros 93U
16. Subtraction up to three digits: fill in the missing digits 67M

Mixed operations

17. Use number lines to add three-digit numbers 8XG
18. Relate addition and subtraction sentences NYD
19. Use number lines to add and subtract three-digit numbers HGG
20. Use compensation to add or subtract: up to three digits HFG

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21. Add and subtract three-digit numbers 2TD

3.CE.1.d: Identify and use the appropriate symbol to distinguish between expressions that are equal and expressions that are not equal (e.g., 256 – 13 = 220 + 23; 457 + 100 ≠ 557 + 100).

3.CE.1.e: Represent, solve, and justify solutions to single-step and multistep contextual problems involving addition and subtraction with whole numbers where addends and minuends do not exceed 1,000.

Single-step word problems

1. Add two numbers up to three digits: word problems QU2
2. Subtract numbers up to three digits: word problems K88
3. Addition and subtraction word problems XSH
4. Add and subtract data from tables: up to three digits QLL

Two-step word problems

5. Add three numbers up to three digits each: word problems NPU
6. Two-step addition and subtraction word problems CBA

3.CE.2 The student will recall with automaticity multiplication and division facts through 10 × 10; and represent, solve, and justify solutions to single-step contextual problems using multiplication and division with whole numbers.

3.CE.2.a: Represent multiplication and division of whole numbers through 10 × 10, including in a contextual situation, using a variety of approaches and models (e.g., repeated addition/subtraction, equal-sized groups/sharing, arrays, equal jumps on a number line, using multiples to skip count).

Multiplication with equal groups

1. Count equal groups 9K7
2. Identify multiplication expressions for equal groups 9AE
3. Write multiplication sentences for equal groups V98
4. Relate addition and multiplication for equal groups GGC

Multiplication with arrays

5. Identify multiplication expressions for arrays HZL
6. Write multiplication sentences for arrays 5FZ
7. Make arrays to model multiplication PPR
8. Write two multiplication sentences for an array QLK
9. Multiply one-digit numbers using grids HXY

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Multiplication on number lines

10. Multiply using number lines XHY
11. Write multiplication sentences for number lines NTV

Division with equal groups

12. Divide by counting equal groups UYK
13. Write division sentences for groups FSX

Division with arrays

14. Write division sentences for arrays 8RW

Word problems

15. Use equal groups and arrays to solve multiplication word problems EBV
16. Multiplication word problems with factors up to 10 9TA
17. Use equal groups and arrays to solve division word problems LZT

3.CE.2.b: Use inverse relationships to write the related facts connected to a given model for multiplication and division of whole numbers through 10×10.

1. Relate multiplication and division for groups FTU
2. Relate multiplication and division for arrays XSK

3.CE.2.c: Apply strategies (e.g., place value, the properties of multiplication and/or addition) when multiplying and dividing whole numbers.

Properties of multiplication

1. Multiply by 0 or 1 with equal groups MZE
2. Properties of multiplication MPE
3. Solve using properties of multiplication YPF
4. Multiply by 0 or 1: complete the sentence RBK
5. Distributive property: find the missing factor 7VP
6. Multiply using the distributive property 6W7

Properties of division

7. Division sentences with 1 and 0 FYZ

Relate operations

8. Relate addition and multiplication P74
9. Relate multiplication and division 67L

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3.CE.2.d: Demonstrate fluency with multiplication facts through 10×10 by applying reasoning strategies (e.g., doubling, add-a-group, subtract-a-group, near squares, and inverse relationships).

Multiplication

1. Multiplication facts for 2, 3, 4, 5, and 10: find the missing factor ZEY
2. Multiplication facts for 6, 7, 8, and 9: find the missing factor X7N
3. Multiplication facts up to 10: find the missing factor FZA
4. Squares up to 10 x 10 GMM

Division

5. Division facts up to 10: find the missing number HE7

3.CE.2.e: Represent, solve, and justify solutions to single-step contextual problems that involve multiplication and division of whole numbers through 10×10.

Multiplication

1. Use strip models to solve multiplication word problems EYU
2. Multiplication word problems with factors up to 10 9TA
3. Multiplication word problems with factors up to 10: find the missing number F6C
4. Compare numbers using multiplication: word problems Z46

Division

5. Division word problems ECS

Mixed operations

6. Multiplication and division word problems 85K

3.CE.2.f: Recall with automaticity the multiplication facts through 10×10 and the corresponding division facts.

Multiplication skill builders

1. Multiply by 0 BGK
2. Multiply by 1 CRE
3. Multiply by 2 94M
4. Multiply by 3 38K
5. Multiply by 4 5U6
6. Multiply by 5 Y9E
7. Multiply by 6 SX6
8. Multiply by 7 9PT
9. Multiply by 8 SMR
10. Multiply by 9 SUH
11. Multiply by 10 6YD

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Multiplication facts for 2, 3, 4, 5, and 10

12. Multiplication facts for 2, 3, 4, 5, and 10 DW5
13. Multiplication facts for 2, 3, 4, 5, and 10: true or false? 87M
14. Multiplication facts for 2, 3, 4, 5, and 10: sorting REN

Multiplication facts for 6, 7, 8, and 9

15. Multiplication facts for 6, 7, 8, and 9 XT7
16. Multiplication facts for 6, 7, 8, and 9: true or false? EEY
17. Multiplication facts for 6, 7, 8, and 9: sorting TZ7

Multiplication facts up to 10

18. Multiplication facts up to 10 PNV
19. Multiplication facts up to 10: true or false? 3K8
20. Multiplication facts up to 10: sorting SUJ
21. Multiplication sentences up to 10: true or false? MTU

Division skill builders

22. Divide by 1 VTL
23. Divide by 2 ANU
24. Divide by 3 PCL
25. Divide by 4 QGT
26. Divide by 5 C9M
27. Divide by 6 97S
28. Divide by 7 D2F
29. Divide by 8 CVD
30. Divide by 9 RTB
31. Divide by 10 YRG

Division facts for 2, 3, 4, 5, and 10

32. Division facts for 2, 3, 4, 5, and 10 2JB
33. Division facts for 2, 3, 4, 5, and 10: true or false? YSD
34. Division facts for 2, 3, 4, 5, and 10: sorting XDN

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Division facts for 6, 7, 8, and 9

35. Division facts for 6, 7, 8, and 9 U2C
36. Division facts for 6, 7, 8, and 9: true or false? DBB
37. Division facts for 6, 7, 8, and 9: sorting KQR

Division facts up to 10

38. Division facts up to 10 M8T
39. Division facts up to 10: true or false? MPV
40. Division facts up to 10: sorting CYJ
41. Division sentences up to 10: true or false? GMU

Mixed operations

42. Multiplication and division facts up to 5: true or false? 6HS
43. Multiplication and division facts up to 10 VXX
44. Multiplication and division facts up to 10: true or false? WQT

3.CE.2.g: Create an equation to represent the mathematical relationship between equivalent expressions using multiplication and/or division facts through 10×10 (e.g., $4 \times 3 = 14 - 2$, $35 \div 5 = 1 \times 7$).

1. Multiplication sentences up to 10: true or false? MTU
2. Division sentences up to 10: true or false? GMU

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3.MG | Measurement and Geometry

3.MG.1 The student will reason mathematically using standard units (U.S. Customary and metric) with appropriate tools to estimate and measure objects by length, weight/mass, and liquid volume to the nearest half or whole unit.

3.MG.1.a: Justify whether an estimate or an exact measurement is needed for a contextual situation and choose an appropriate unit.

Customary units

1. Which customary unit of length is appropriate? WRB
2. Which customary unit of weight is appropriate? GK8
3. Which customary unit is appropriate? 54W
4. Which unit of volume is appropriate: ounces, cups, pints, quarts, or gallons? FMR

Metric units

5. Which metric unit of length is appropriate? YWR
6. Which metric unit of mass is appropriate? PTF
7. Which metric unit of volume is appropriate? LYS
8. Which metric unit is appropriate? FQ8

3.MG.1.b: Estimate and measure:

3.MG.1.b.i: length of an object to the nearest U.S. Customary unit (½ inch, inch, foot, yard) and metric unit (centimeter, meter);

1. Measure using an inch ruler: nearest 1/2 inch 6BG
2. Measure using a centimeter ruler MPX

3.MG.1.b.ii: weight/mass of an object to the nearest U.S. Customary unit (pound) and metric unit (kilogram); and

3.MG.1.b.iii: liquid volume to the nearest U.S. Customary unit (cup, pint, quart, gallon) and metric unit (liter).

3.MG.1.c: Compare estimates of length, weight/mass, or liquid volume with the actual measurements.

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3.MG.2 The student will use multiple representations to estimate and solve problems, including those in context, involving area and perimeter (in both U.S. Customary and metric units).

3.MG.2.a: Solve problems, including those in context, involving area:

3.MG.2.a.i: describe and give examples of area as a measurement in contextual situations; and

3.MG.2.a.ii: estimate and determine the area of a given surface by counting the number of square units, describe the measurement (using the number and unit) and justify the measurement.

Count square units

1. Find the area of figures made of unit squares FLQ
2. Select figures with a given area XR6
3. Select two figures with the same area 7GW
4. Find the area of rectangles with missing unit squares KTN

Create figures

5. Tile a rectangle and find the area EKK
6. Create figures with a given area Z2H
7. Create rectangles with a given area V73

3.MG.2.b: Solve problems, including those in context, involving perimeter:

3.MG.2.b.i: describe and give examples of perimeter as a measurement in contextual situations;

3.MG.2.b.ii: estimate and measure the distance around a polygon (with no more than six sides) to determine the perimeter and justify the measurement; and

3.MG.2.b.iii: given the lengths of all sides of a polygon (with no more than six sides), determine its perimeter and justify the measurement.

1. Perimeter of rectangles ZJT
2. Perimeter of quadrilaterals 77Y
3. Perimeter of polygons with up to 6 sides JKN
4. Find the perimeter: word problems PCZ

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3.MG.3 The student will demonstrate an understanding of the concept of time to the nearest minute and solve single-step contextual problems involving elapsed time in one-hour increments within a 12-hour period.	
3.MG.3.a: Tell and write time to the nearest minute, using analog and digital clocks.	1. Read clocks and write times 5ZQ
3.MG.3.b: Match a written time (e.g., 4:38, 7:09, 12:51) to the time shown on analog and digital clocks to the nearest minute.	1. Match clocks and times LPT 2. Match analog and digital clocks L5U
3.MG.3.c: Solve single-step contextual problems involving elapsed time in one-hour increments, within a 12-hour period (within a.m. or within p.m.) when given:	
3.MG.3.c.i: the starting time and the ending time, determine the amount of time that has elapsed;	
3.MG.3.c.ii: the starting time and amount of elapsed time in one-hour increments, determine the ending time; or	
3.MG.3.c.iii: the ending time and the amount of elapsed time in one-hour increments, determine the starting time.	
3.MG.4 The student will identify, describe, classify, compare, combine, and subdivide polygons.	
3.MG.4.a: Describe a polygon as a closed plane figure composed of at least three line segments that do not cross.	
3.MG.4.b: Classify figures as polygons or not polygons and justify reasoning.	1. Is it a polygon? C2P
3.MG.4.c: Identify and describe triangles, quadrilaterals, pentagons, hexagons, and octagons in various orientations, with and without contexts.	1. Identify polygons: up to 8 sides EVR
3.MG.4.d: Identify and name examples of polygons (triangles, quadrilaterals, pentagons, hexagons, octagons) in the environment.	1. Identify polygons: up to 8 sides EVR

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3.MG.4.e: Classify and compare polygons (triangles, quadrilaterals, pentagons, hexagons, octagons).	1. Count and compare sides and vertices GWA
3.MG.4.f: Combine no more than three polygons, where each has three or four sides, and name the resulting polygon (triangles, quadrilaterals, pentagons, hexagons, octagons).	
3.MG.4.g: Subdivide a three-sided or four-sided polygon into no more than three parts and name the resulting polygons.	

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3.PS | Probability and Statistics

3.PS.1 The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on pictographs and bar graphs.

3.PS.1.a: Formulate questions that require the collection or acquisition of data.	
3.PS.1.b: Determine the data needed to answer a formulated question and collect or acquire existing data (limited to 30 or fewer data points for no more than eight categories) using various methods (e.g., polls, observations, tallies).	1. Which tally chart is correct? R7K
3.PS.1.c: Organize and represent a data set using pictographs that include an appropriate title, labeled axes, and key. Each pictograph symbol should represent 1, 2, 5 or 10 data points.	1. Create scaled picture graphs AVG
3.PS.1.d: Organize and represent a data set using bar graphs with a title and labeled axes, with and without the use of technology tools. Determine and use an appropriate scale (increments limited to multiples of 1, 2, 5 or 10).	1. Create scaled bar graphs RPF
3.PS.1.e: Analyze data represented in pictographs and bar graphs, and communicate results orally and in writing:	
3.PS.1.e.i: describe the categories of data and the data as a whole (e.g., data were collected on preferred ways to cook or prepare eggs - scrambled, fried, hard boiled, and egg salad);	
3.PS.1.e.ii: identify parts of the data that have special characteristics, including categories with the greatest, the least, or the same (e.g., most students prefer scrambled eggs);	
3.PS.1.e.iii: make inferences about data represented in pictographs and bar graphs;	1. Interpret scaled bar graphs V54 2. Interpret scaled picture graphs Y5D

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3.PS.1.e.iv: use characteristics of the data to draw conclusions about the data and make predictions based on the data (e.g., it is unlikely that a third grader would like hard boiled eggs); and

3.PS.1.e.v: solve one- and two-step addition and subtraction problems using data from pictographs and bar graphs.

Bar graphs

1. Interpret scaled bar graphs V54
2. Use bar graphs to solve problems BCJ
3. Interpret bar graphs: two-step problems TLZ

Pictographs

4. Interpret scaled picture graphs Y5D

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3.PFA | Patterns, Functions, and Algebra

3.PFA.1 The student will identify, describe, extend, and create increasing and decreasing patterns (limited to addition and subtraction of whole numbers), including those in context, using various representations.

3.PFA.1.a: Identify and describe increasing and decreasing patterns using various representations (e.g., objects, pictures, numbers, number lines).	1. Growing patterns 5FN
3.PFA.1.b: Analyze an increasing or decreasing pattern and generalize the change to extend the pattern or identify missing terms using various representations.	1. Skip-counting sequences 5FD 2. Find the next row in a growing pattern 8SQ
3.PFA.1.c: Solve contextual problems that involve identifying, describing, and extending patterns.	1. Skip-counting puzzles 78C 2. Skip-counting with tables VA9
3.PFA.1.d: Create increasing and decreasing patterns using objects, pictures, numbers, and number lines.	1. Use a rule to complete a number pattern 25S
3.PFA.1.e: Investigate and explain the connection between two different representations of the same increasing or decreasing pattern.	

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IXL Skill Plan

Virginia Standards of Learning (2023): Grade 4

Use IXL's interactive skill plan to get up-to-date skill alignments, assign skills to your students, and track progress.

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4.NS | Number and Number Sense

4.NS.1 The student will use place value understanding to read, write, and identify the place and value of each digit in a nine-digit whole number.

4.NS.1.a: Read nine-digit whole numbers, presented in standard form, and represent the same number in written form.

1. Spell word names for numbers up to one million 2PZ
2. Writing numbers up to one billion in words: convert digits to words XGX

4.NS.1.b: Write nine-digit whole numbers in standard form when the numbers are presented orally or in written form.

1. Writing numbers up to one billion: convert words to digits GBX

4.NS.1.c: Apply patterns within the base 10 system to determine and communicate, orally and in written form, the place and value of each digit in a nine-digit whole number (e.g., in 568,165,724, the 8 represents 8 millions and its value is 8,000,000).

Understand place value

1. Place value names Y7Q
2. Relationship between place values 9DJ
3. Value of a digit: up to one billion YZ6
4. Place value review: up to one billion 7VZ

Convert numbers

5. Convert between standard and expanded form: up to one billion SJP
6. Convert between place values: up to billions WVU

4.NS.2 The student will demonstrate an understanding of the base 10 system to compare and order whole numbers up to seven digits.

4.NS.2.a: Compare two whole numbers up to seven digits each, using words (*greater than*, *less than*, *equal to*, or *not equal to*) and/or using symbols (>, <, =, ≠).

1. Compare numbers in tables EFV
2. Compare numbers up to millions F8A

4.NS.2.b: Order up to four whole numbers up to seven digits each, from least to greatest or greatest to least.

1. Order numbers up to one million 94E

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4.NS.3 The student will use mathematical reasoning and justification to represent, compare, and order fractions (proper, improper, and mixed numbers with denominators 12 or less), with and without models.

4.NS.3.a: Compare and order no more than four fractions (proper or improper), and/or mixed numbers, with like denominators by comparing the number of parts (numerators) using fractions with denominators of 12 or less (e.g., $^1/_5 < {}^3/_5$). Justify comparisons orally, in writing, or with a model.

Compare fractions

1. Compare fractions with like numerators or denominators using models Q87
2. Compare fractions with like denominators F67
3. Graph and compare fractions with like denominators using number lines JG9

Order fractions

4. Order fractions with like denominators K7Z

4.NS.3.b: Compare and order no more than four fractions (proper or improper), and/or mixed numbers, with like numerators and unlike denominators by comparing the size of the parts using fractions with denominators of 12 or less (e.g., $^3/_8 < {}^3/_5$). Justify comparisons orally, in writing, or with a model.

Compare fractions

1. Compare fractions with like numerators or denominators using models Q87
2. Compare fractions with like numerators KX5

Order fractions

3. Order fractions with like numerators ZU5

4.NS.3.c: Use benchmarks (e.g., 0, ½, or 1) to compare and order no more than four fractions (proper or improper), and/or mixed numbers, with like and unlike denominators of 12 or less. Justify comparisons orally, in writing, or with a model.

1. Benchmark fractions LUS
2. Compare fractions using benchmarks EHJ
3. Compare fractions using benchmarks: find the missing numerator UKZ

4.NS.3.d: Compare two fractions (proper or improper) and/or mixed numbers using fractions with denominators of 12 or less, using the symbols >, <, and = (e.g., $^2/_3 > {}^1/_7$). Justify comparisons orally, in writing, or with a model.

1. Compare fractions using models 7XF
2. Compare fractions 99U
3. Compare fractions: find the missing numerator or denominator KPU
4. Compare fractions in recipes U2K
5. Compare mixed numbers 5TV
6. Compare mixed numbers and improper fractions ER6

4.NS.3.e: Represent equivalent fractions with denominators of 12 or less, with and without models.

1. Find equivalent fractions using area models HYC
2. Identify equivalent fractions using number lines CLW
3. Graph equivalent fractions on number lines WQL
4. Identify equivalent fractions GSG

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	5. Equivalent fractions: find the missing numerator or denominator 7CY
4.NS.3.f: Compose and decompose fractions (proper and improper) and/or mixed numbers with denominators of 12 or less, in multiple ways, with and without models.	1. Decompose fractions into unit fractions using models QG2 2. Decompose fractions into unit fractions XHG 3. Decompose fractions N2Z 4. Decompose fractions multiple ways UEW
4.NS.3.g: Represent the division of two whole numbers as a fraction given a contextual situation and a model (e.g., $^3/_5$ means the same as 3 divided by 5 or $^3/_5$ represents the amount of muffin each of five children will receive when sharing three muffins equally).	1. Fractions of a whole: word problems XSB 2. Relate division and fractions 6QV 3. Understand fractions as division: word problems EWD

4.NS.4 The student will use mathematical reasoning and justification to represent, compare, and order decimals through thousandths, with and without models.

4.NS.4.a: Investigate and describe the ten-to-one place value relationship for decimals through thousandths, using concrete models (e.g., place value mats/charts, decimal squares, base 10 blocks).	1. Relationship between decimal place values U9H
4.NS.4.b: Represent and identify decimals expressed through thousandths, using concrete, pictorial, and numerical representations.	1. What decimal number is illustrated? B7E 2. Graph decimals on number lines N93 3. Place value models for decimal numbers 52Y
4.NS.4.c: Read and write decimals expressed through thousandths, using concrete, pictorial, and numerical representations.	1. Understanding decimals expressed in words LUL 2. Convert decimals between standard and expanded form 5QD
4.NS.4.d: Identify and communicate, both orally and in written form, the place and value of each digit in a decimal through thousandths (e.g., given 0.385, the 8 is in the hundredths place and has a value of 0.08).	1. Relate decimals and money NSC 2. Place values in decimal numbers up to thousandths 5P3
4.NS.4.e: Compare using symbols (<, >, =) and/or words (*greater than*, *less than*, *equal to*) and order (least to greatest and greatest to least), a set of no more than four decimals expressed through thousandths, using multiple strategies (e.g.,	1. Compare decimals using models CV7 2. Compare decimals on number lines T2W 3. Compare decimal numbers DY5 4. Compare and order decimals K2F

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benchmarks, place value, number lines). Justify comparisons with a model, orally, and in writing.

4.NS.5 The student will reason about the relationship between fractions and decimals (limited to halves, fourths, fifths, tenths, and hundredths) to identify and represent equivalencies.

4.NS.5.a: Represent fractions (proper or improper) and/or mixed numbers as decimals through hundredths, using multiple representations, limited to halves, fourths, fifths, tenths, and hundredths.	1. Convert fractions and mixed numbers to decimals - denominators of 10 and 100 6P7 2. Convert decimals to fractions and mixed numbers DBF 3. Convert fractions and mixed numbers to decimals 8EA
4.NS.5.b: Identify and model equivalent relationships between fractions (proper or improper) and/or mixed numbers and decimals, using halves, fourths, fifths, tenths, and hundredths.	1. Model decimals and fractions TPV 2. Graph fractions as decimals on number lines 2N9
4.NS.5.c: Write the decimal and fraction equivalent for a given model (e.g., $^1/_4 = 0.25$ or $0.25 = {}^1/_4$; $1.25 = {}^5/_4$ or $1\,{}^1/_4$; $1.02 = {}^{102}/_{100}$ or $1\,{}^2/_{100}$).	

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4.CE | Computation and Estimation

4.CE.1 The student will estimate, represent, solve, and justify solutions to single-step and multistep problems, including those in context, using addition and subtraction with whole numbers.

4.CE.1.a: Determine and justify whether an estimate or an exact answer is appropriate when solving contextual problems involving addition and subtraction with whole numbers. Refine estimates by adjusting the final amount, using terms such as *closer to*, *between*, and *a little more than*.

4.CE.1.b: Apply strategies (e.g., rounding to the nearest 100 or 1,000, using compatible numbers, other number relationships) to estimate a solution for single-step or multistep addition or subtraction problems with whole numbers, where addends or minuends do not exceed 10,000.

1. Rounding: up to thousands place Z7U
2. Estimate sums and differences: word problems PRJ

4.CE.1.c: Apply strategies (e.g., place value, properties of addition, other number relationships) and algorithms, including the standard algorithm, to determine the sum or difference of two whole numbers, where addends and minuends do not exceed 10,000.

1. Properties of addition D9R
2. Estimate sums and differences: round to hundreds or thousands 7NQ

4.CE.1.d: Estimate, represent, solve, and justify solutions to single-step and multistep contextual problems involving addition and subtraction with whole numbers where addends and minuends do not exceed 1,000,000.

Estimate sums

1. Estimate sums VMD
2. Estimate sums: word problems SB9

Estimate differences

3. Estimate differences QJY
4. Estimate differences: word problems GWS

Addition

5. Add two multi-digit numbers RG2
6. Add two multi-digit numbers: word problems ZPY

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Subtraction

7. Subtract two multi-digit numbers VP2
8. Subtract two multi-digit numbers: word problems R9N

Mixed operations

9. Comparison word problems with addition and subtraction RJJ
10. Use equations to solve addition and subtraction word problems F5H
11. Multi-step addition and subtraction word problems CZM

4.CE.2 The student will estimate, represent, solve, and justify solutions to single-step and multistep problems, including those in context, using multiplication with whole numbers, and single-step problems, including those in context, using division with whole numbers; and recall with automaticity the multiplication facts through 12 × 12 and the corresponding division facts.

4.CE.2.a: Determine and justify whether an estimate or an exact answer is appropriate when solving contextual problems involving multiplication and division of whole numbers. Refine estimates by adjusting the final amount, using terms such as *closer to*, *between*, and *a little more than*.

1. Multi-step word problems: identify reasonable answers K6X

4.CE.2.b: Recall with automaticity the multiplication facts through 12 × 12 and the corresponding division facts.

Multiplication

1. Multiplication facts to 12 FW9
2. Multiplication facts to 12: find the missing factor 76F
3. Choose numbers with a particular product U9N

Division

4. Division facts to 12 R95
5. Choose numbers with a particular quotient MYU

4.CE.2.c: Create an equation using addition, subtraction, multiplication, and division to represent the relationship between equivalent mathematical expressions (e.g., 4 × 3 = 2 × 6; 10 + 8 = 36 ÷ 2; 12 × 4 = 60 – 12).

1. Balance addition equations NZS
2. Balance subtraction equations DCB

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4.CE.2.d: Identify and use the appropriate symbol to distinguish between expressions that are equal and expressions that are not equal, using addition, subtraction, multiplication, and division (e.g., $4 \times 12 = 8 \times 6$ and $64 \div 8 \neq 8 \times 8$).	1. Multiplication and division sentences up to 12: true or false? KXZ 2. Mixed operation sentences: true or false? YGA
4.CE.2.e: Determine all factor pairs for a whole number 1 to 100, using concrete, pictorial, and numerical representations.	1. Understand factors and factor pairs 8ZV 2. Identify factors 2S9 3. Find all the factor pairs of a number URL
4.CE.2.f: Determine common factors and the greatest common factor of no more than three numbers.	1. Greatest common factors: up to three numbers 9ZJ
4.CE.2.g: Apply strategies (e.g., rounding, place value, properties of multiplication and/or addition) and algorithms, including the standard algorithm, to estimate and determine the product of two whole numbers when given:	
4.CE.2.g.i: a two-digit factor and a one-digit factor;	1. Multiply 1-digit numbers by 2-digit numbers: choose the area model VCM 2. Multiply 1-digit numbers by 2-digit numbers using area models HZX 3. Multiply 1-digit numbers by 2-digit numbers GDW 4. Estimate products: multiply 1-digit numbers by 2-digit numbers 6C7
4.CE.2.g.ii: a three-digit factor and a one-digit factor; or	1. Estimate products: multiply by 1-digit numbers WDG 2. Multiply 1-digit numbers by 3-digit numbers using area models I 2J9 3. Multiply 1-digit numbers by 3-digit numbers using area models II MTR 4. Multiply 1-digit numbers by 3-digit numbers using partial products 9N2 5. Multiply 1-digit numbers by 3-digit numbers W9X
4.CE.2.g.iii: a two-digit factor and a two-digit factor.	1. Estimate products: multiply by 2-digit numbers 2TR

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2. Multiply 2-digit numbers by 2-digit numbers using partial products XLZ
3. Multiply a 2-digit number by a 2-digit number: complete the missing steps XQ8
4. Multiply a 2-digit number by a 2-digit number MLC

4.CE.2.h: Estimate, represent, solve, and justify solutions to single-step and multistep contextual problems that involve multiplication with whole numbers.

Estimation

1. Estimate products word problems: identify reasonable answers KLA
2. Estimate products: word problems WGL

Single-step problems

3. Multiply 1-digit numbers by 2-digit numbers: word problems UR9
4. Multiply a 2-digit number by a 2-digit number: word problems GZG
5. Multiply 1-digit by 3-digit numbers: word problems 98A

Multi-step problems

6. Multiply 1-digit numbers by 2-digit numbers: multi-step word problems TFH
7. Multiply a 2-digit number by a 2-digit number: multi-step word problems RM5

4.CE.2.i: Apply strategies (e.g., rounding, compatible numbers, place value) and algorithms, including the standard algorithm, to estimate and determine the quotient of two whole numbers, given a one-digit divisor and a two- or three-digit dividend, with and without remainders.

Estimate quotients

1. Estimate quotients using compatible numbers: 1-digit divisors CWE

Divide 2-digit numbers

2. Divide 2-digit numbers by 1-digit numbers using arrays M49
3. Divide 2-digit numbers by 1-digit numbers using area models 7LG
4. Divide 2-digit numbers by 1-digit numbers 4T7
5. Divide 2-digit numbers by 1-digit numbers: interpret remainders 5WV

Divide 3-digit numbers

6. Divide 3-digit numbers by 1-digit numbers using area models 6UL
7. Divide using partial quotients YQL

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8. Divide 3-digit numbers using partial quotients with remainders T5M
9. Divide 3-digit numbers by 1-digit numbers TJS

4.CE.2.j: Estimate, represent, solve, and justify solutions to single-step contextual problems involving division with whole numbers.

1. Divide 2-digit and 3-digit numbers by 1-digit numbers: pick the better estimate RER

4.CE.2.k: Interpret the quotient and remainder when solving a contextual problem.

1. Divide 2-digit numbers by 1-digit numbers: interpret remainders 5WV
2. Divide 2-digit numbers by 1-digit numbers: word problems QMT
3. Divide 3-digit numbers by 1-digit numbers: word problems X52
4. Divide by 1-digit numbers: interpret remainders E8K

4.CE.3 The student will estimate, represent, solve, and justify solutions to single-step problems, including those in context, using addition and subtraction of fractions (proper, improper, and mixed numbers with like denominators of 2, 3, 4, 5, 6, 8, 10, and 12), with and without models; and solve single-step contextual problems involving multiplication of a whole number (12 or less) and a unit fraction, with models.

4.CE.3.a: Estimate and determine the sum or difference of two fractions (proper or improper) and/or mixed numbers, having like denominators limited to 2, 3, 4, 5, 6, 8, 10, and 12 (e.g., $^3/_8 + {}^3/_8$, $2^1/_5 + {}^4/_5$, $^7/_4 - {}^5/_4$) and simplify the resulting fraction. Addition and subtraction with fractions may include regrouping.

Add fractions using models

1. Add fractions with like denominators using area models Y5W
2. Add fractions with like denominators using strip models Z63
3. Add fractions with like denominators using number lines 6QH

Subtract fractions using models

4. Subtract fractions with like denominators using area models P99
5. Subtract fractions with like denominators using strip models QAS
6. Subtract fractions with like denominators using number lines MJX

Add and subtract fractions

7. Add and subtract fractions with like denominators using number lines GAK
8. Add fractions with like denominators PDU
9. Subtract fractions with like denominators AVF

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10. Add and subtract fractions with like denominators FXD

Add and subtract mixed numbers

11. Add mixed numbers with like denominators L9M
12. Subtract mixed numbers with like denominators SLQ
13. Add and subtract mixed numbers with like denominators 9AS

4.CE.3.b: Estimate, represent, solve, and justify solutions to single-step contextual problems using addition and subtraction with fractions (proper or improper) and/or mixed numbers, having like denominators limited to 2, 3, 4, 5, 6, 8, 10, and 12, and simplify the resulting fraction. Addition and subtraction with fractions may include regrouping.

1. Add and subtract fractions with like denominators: word problems XBR
2. Add and subtract fractions with like denominators in recipes LYR
3. Add and subtract mixed numbers with like denominators: word problems 6KM

4.CE.3.c: Solve single-step contextual problems involving multiplication of a whole number, limited to 12 or less, and a unit fraction (e.g., $6 \times {}^{1}/_{3}$, ${}^{1}/_{5} \times 8$, $2 \times {}^{1}/_{10}$), with models.

1. Multiply unit fractions by whole numbers: word problems DSB

4.CE.3.d: Apply the inverse property of multiplication in models (e.g., use a visual fraction model to represent ${}^{4}/_{4}$ or 1 as the product of $4 \times {}^{1}/_{4}$).

Multiply with models

1. Multiply unit fractions by whole numbers using models 8J3
2. Multiply unit fractions by whole numbers using number lines XKJ

Multiply without models

3. Multiples of unit fractions: find the missing numbers VYG
4. Multiply unit fractions by whole numbers: sorting VGC
5. Multiply unit fractions by whole numbers EXQ

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4.CE.4 The student will estimate, represent, solve, and justify solutions to single-step and multistep problems, including those in context, using addition and subtraction of decimals through the thousandths, with and without models.

4.CE.4.a: Apply strategies (e.g., rounding to the nearest whole number, using compatible numbers) and algorithms, including the standard algorithm, to estimate and determine the sum or difference of two decimals through the thousandths, with and without models, in which:

4.CE.4.a.i: decimals do not exceed the thousandths; and	1. Estimate sums and differences of decimals 2GK 2. Round decimals to the nearest whole number WYP 3. Round to the nearest dollar QHH
4.CE.4.a.ii: addends, subtrahends, and minuends are limited to four digits.	1. Add decimals using blocks 6TF 2. Subtract decimals using blocks JRX 3. Add decimal numbers: up to thousandths LSX 4. Subtract decimal numbers: up to thousandths G5N 5. Add and subtract decimal numbers: up to thousandths K5Y
4.CE.4.b: Estimate, represent, solve, and justify solutions to single-step and multistep contextual problems using addition and subtraction of decimals through the thousandths.	1. Solve decimal problems using diagrams WCK 2. Multi-step word problems with money: addition and subtraction only UGK 3. Add and subtract decimal numbers: word problems BC2

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4.MG | Measurement and Geometry

4.MG.1 The student will reason mathematically to solve problems, including those in context, that involve length, weight/mass, and liquid volume using U.S. Customary and metric units.

4.MG.1.a: Determine an appropriate unit of measure to use when measuring:

4.MG.1.a.i: length in both U.S. Customary (inch, foot, yard, mile) and metric units (millimeter, centimeter, meter);

1. Which customary unit of length is appropriate? LUQ
2. Which metric unit of length is appropriate? LN7

4.MG.1.a.ii: weight/mass in both U.S. Customary (ounce, pound) and metric units (gram, kilogram); and

1. Which customary unit of weight is appropriate? NM6
2. Which metric unit of mass is appropriate? 4W9

4.MG.1.a.iii: liquid volume in both U.S. Customary (cup, pint, quart, gallon) and metric units (milliliter, liter).

1. Which metric unit of volume is appropriate? UJW
2. Which customary unit of volume is appropriate: cups or gallons? NSZ

4.MG.1.b: Estimate and measure:

4.MG.1.b.i: length of an object to the nearest U.S. Customary unit ($^1/_2$ inch, $^1/_4$ inch, $^1/_8$ inch, foot, yard) and nearest metric unit (millimeter, centimeter, or meter);

Units of measurement

1. Which customary unit of length is appropriate? LUQ
2. Which metric unit of length is appropriate? LN7

Measure

3. Measure using an inch ruler: nearest 1/8 inch EPE
4. Measuring using a centimeter ruler K5W

4.MG.1.b.ii: weight/mass of an object to the nearest U.S. Customary unit (ounce, pound) and nearest metric unit (gram, kilogram); and

1. Which customary unit of weight is appropriate? EES
2. Which metric unit of mass is appropriate? 4W9

4.MG.1.b.iii: liquid volume to the nearest U.S. Customary unit (cup, pint, quart, gallon) and nearest metric unit (milliliter, liter).

1. Which metric unit of volume is appropriate? UJW
2. Which customary unit of volume is appropriate? GPW

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4.MG.1.c: Compare estimates of length, weight/mass, or liquid volume with the actual measurements.	
4.MG.1.d: Given the equivalent measure of one unit, solve problems, including those in context, by determining the equivalent measures within the U.S. Customary system for:	
4.MG.1.d.i: length (inches and feet, feet and yards, inches and yards);	1. Compare and convert customary units of length HTF
4.MG.1.d.ii: weight/mass (ounces and pounds); and	1. Compare and convert customary units of weight: ounces and pounds VVY
4.MG.1.d.iii: liquid volume (cups, pints, quarts, and gallons).	1. Convert and compare customary units of volume GAA

4.MG.2 The student will solve single-step and multistep contextual problems involving elapsed time (limited to hours and minutes within a 12-hour period).

4.MG.2.a: Solve single-step and multistep contextual problems involving elapsed time in hours and minutes, within a 12-hour period (within a.m., within p.m., and across a.m. and p.m.) when given:	
4.MG.2.a.i: the starting time and the ending time, determine the amount of time that has elapsed in hours and minutes;	1. Elapsed time TUH 2. Elapsed time: word problems VCC
4.MG.2.a.ii: the starting time and amount of elapsed time in hours and minutes, determine the ending time; or	1. Find end times: word problems ZJU
4.MG.2.a.iii: the ending time and the amount of elapsed time in hours and minutes, determine the starting time.	1. Find start and end times: multi-step word problems ZQP 2. Time word problems: find the start, end, or elapsed time MJC

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4.MG.3 The student will use multiple representations to develop and use formulas to solve problems, including those in context, involving area and perimeter limited to rectangles and squares (in both U.S. Customary and metric units).

4.MG.3.a: Use concrete materials and pictorial models to develop a formula for the area and perimeter of a rectangle (including a square).

4.MG.3.b: Determine the area and perimeter of a rectangle when given the measure of two adjacent sides (in whole number units), with and without models.

1. Find the perimeter of rectangles using formulas KGJ
2. Find the area of rectangles using formulas JBF

4.MG.3.c: Determine the area and perimeter of a square when given the measure of one side (in whole number units), with and without models.

1. Find the perimeter of rectangles using formulas KGJ
2. Find the area of rectangles using formulas JBF

4.MG.3.d: Use concrete materials and pictorial models to explore the relationship between area and perimeter of rectangles.

1. Compare area and perimeter of rectangles and squares S7Y
2. Relationship between area and perimeter SKK
3. Relationship between area and perimeter: find the area GKM
4. Relationship between area and perimeter: find the perimeter EX6

4.MG.3.e: Identify and represent rectangles with the same perimeter and different areas or with the same area and different perimeters.

1. Relationship between area and perimeter SKK
2. Rectangles: relationship between perimeter and area word problems S9M

4.MG.3.f: Solve contextual problems involving area and perimeter of rectangles and squares.

1. Perimeter: word problems GBE
2. Area: word problems JW7
3. Area and perimeter: word problems LTP

4.MG.4 The student will identify, describe, and draw points, rays, line segments, angles, and lines, including intersecting, parallel, and perpendicular lines.

4.MG.4.a: Identify and describe points, lines, line segments, rays, and angles, including endpoints and vertices.

1. Identify points, lines, segments, and rays F2V

4.MG.4.b: Describe endpoints and vertices in relation to lines, line segments, rays, and angles.

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4.MG.4.c: Draw representations of points, line segments, rays, angles, and lines, using a ruler or straightedge.	
4.MG.4.d: Identify parallel, perpendicular, and intersecting lines and line segments in plane and solid figures, including those in context.	1. Parallel sides in quadrilaterals 58M
4.MG.4.e: Use symbolic notation to name points, lines, line segments, rays, angles, and to describe parallel and perpendicular lines.	1. Points, lines, line segments, rays, and angles 9MK 2. Parallel, perpendicular, and intersecting lines 8VQ 3. Identify parallel, perpendicular, and intersecting lines DSU

4.MG.5 The student will classify and describe quadrilaterals (parallelograms, rectangles, squares, rhombi, and/or trapezoids) using specific properties and attributes.

4.MG.5.a: Develop definitions for parallelograms, rectangles, squares, rhombi, and trapezoids through the exploration of properties and attributes.	
4.MG.5.b: Identify and describe points, line segments, angles, and vertices in quadrilaterals.	1. Sides and angles of quadrilaterals PTK
4.MG.5.c: Identify and describe parallel, intersecting, perpendicular, and congruent sides in quadrilaterals.	1. Parallel sides in quadrilaterals 58M
4.MG.5.d: Compare, contrast, and classify quadrilaterals (parallelograms, rectangles, squares, rhombi, and/or trapezoids) based on the following properties and attributes:	
4.MG.5.d.i: parallel sides;	1. Identify parallelograms DJ9 2. Identify trapezoids 9MJ 3. Identify rectangles GHH 4. Identify rhombuses KUU 5. Classify quadrilaterals A6V 6. Pick all the names for a quadrilateral 6CT
4.MG.5.d.ii: perpendicular sides;	1. Identify parallelograms DJ9 2. Identify trapezoids 9MJ

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	3. Identify rectangles GHH 4. Identify rhombuses KUU 5. Classify quadrilaterals A6V 6. Pick all the names for a quadrilateral 6CT
4.MG.5.d.iii: congruence of sides; and	1. Identify parallelograms DJ9 2. Identify trapezoids 9MJ 3. Identify rectangles GHH 4. Identify rhombuses KUU 5. Classify quadrilaterals A6V 6. Pick all the names for a quadrilateral 6CT
4.MG.5.d.iv: number of right angles.	1. Identify parallelograms DJ9 2. Identify trapezoids 9MJ 3. Identify rectangles GHH 4. Identify rhombuses KUU 5. Classify quadrilaterals A6V 6. Pick all the names for a quadrilateral 6CT
4.MG.5.e: Denote properties of quadrilaterals and identify parallel sides, congruent sides, and right angles by using geometric markings.	1. Pick all the names for a quadrilateral 6CT
4.MG.5.f: Use symbolic notation to name line segments and angles in quadrilaterals.	
4.MG.6 The student will identify, describe, compare, and contrast plane and solid figures according to their characteristics (number of angles, vertices, edges, and the number and shape of faces), with and without models.	
4.MG.6.a: Identify concrete models and pictorial representations of solid figures (cube, rectangular prism, square pyramid, sphere, cone, and cylinder).	1. Identify three-dimensional figures 42H
4.MG.6.b: Identify and describe solid figures (cube, rectangular prism, square pyramid, and sphere) according to their characteristics (number of angles, vertices, edges, and by the number and shape of faces).	1. Properties of three-dimensional figures BNJ

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4.MG.6.c: Compare and contrast plane and solid figures (limited to circles, squares, triangles, rectangles, spheres, cubes, square pyramids, and rectangular prisms) according to their characteristics (number of sides, angles, vertices, edges, and the number and shape of faces).

1. Count vertices, edges, and faces of cubes and rectangular prisms YZF

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4.PS | Probability and Statistics

4.PS.1 The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on line graphs.	
4.PS.1.a: Formulate questions that require the collection or acquisition of data.	
4.PS.1.b: Determine the data needed to answer a formulated question and collect or acquire existing data (limited to 10 or fewer data points) using various methods (e.g., observations, measurements, experiments).	
4.PS.1.c: Organize and represent a data set using line graphs with a title and labeled axes with whole number increments, with and without the use of technology tools.	1. Create line graphs QX2
4.PS.1.d: Analyze data represented in line graphs and communicate results orally and in writing:	
4.PS.1.d.i: describe the characteristics of the data represented in a line graph and the data as a whole (e.g., the time period when the temperature increased the most);	
4.PS.1.d.ii: identify parts of the data that have special characteristics and explain the meaning of the greatest, the least, or the same (e.g., the highest temperature shows the warmest day);	
4.PS.1.d.iii: make inferences about data represented in line graphs;	1. Interpret line graphs 36B
4.PS.1.d.iv: draw conclusions about the data and make predictions based on the data to answer questions; and	1. Interpret line graphs 36B
4.PS.1.d.v: solve single-step and multistep addition and subtraction problems using data	1. Interpret line graphs 36B

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from line graphs.

4.PS.2 The student will model and determine the probability of an outcome of a simple event.

4.PS.2.a: Describe probability as the degree of likelihood of an outcome occurring using terms such as *impossible*, *unlikely*, *equally likely*, *likely*, and *certain*.	1. Understanding probability SDF
4.PS.2.b: Model and determine all possible outcomes of a given simple event where there are no more than 24 possible outcomes, using a variety of manipulatives (e.g., coins, two-sided counters, number cubes, spinners).	
4.PS.2.c: Write the probability of a given simple event as a fraction between 0 and 1, where there are no more than 24 possible outcomes.	1. Find probability 5MY
4.PS.2.d: Determine the likelihood of an event occurring and relate it to its whole number or fractional representation (e.g., impossible or zero; equally likely; certain or one).	
4.PS.2.e: Create a model or contextual problem to represent a given probability.	

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4.PFA | Patterns, Functions, and Algebra

4.PFA.1 The student will identify, describe, extend, and create increasing and decreasing patterns (limited to addition, subtraction, and multiplication of whole numbers), including those in context, using various representations.

4.PFA.1.a: Identify, describe, extend, and create increasing and decreasing patterns using various representations (e.g., objects, pictures, numbers, number lines, input/output tables, and function machines).

Shape patterns

1. Extend growing shape patterns NVV
2. Find the next row in a growing pattern of shapes JZP

Number patterns

3. Complete an increasing number pattern QHB
4. Number patterns: mixed review E77
5. Patterns of equivalent fractions 7LH

4.PFA.1.b: Analyze an increasing or decreasing single-operation numerical pattern found in lists, input/output tables, or function machines and generalize the change to identify the rule, extend the pattern, or identify missing terms.

Addition and subtraction

1. Complete an increasing number pattern QHB
2. Addition input/output tables: find the rule QVV
3. Subtraction input/output tables: up to three digits JDD

Multiplication

4. Complete a multiplication number pattern SZJ
5. Multiplication input/output tables BEP
6. Multiplication input/output tables: find the rule KQG

Mixed operations

7. Input/output tables with addition, subtraction, multiplication, and division HDS

4.PFA.1.c: Given a rule, create increasing and decreasing patterns using numbers and input/output tables (including function machines).

1. Use a rule to complete a number pattern 5P2
2. Use a rule to complete an input/output table DP8

4.PFA.1.d: Solve contextual problems that involve identifying, describing, and extending increasing and decreasing patterns using single-operation input and output rules.

1. Number patterns: word problems C62

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5.NS | Number and Number Sense

5.NS.1 The student will use reasoning and justification to identify and represent equivalency between fractions (with denominators that are thirds, eighths, and factors of 100) and decimals; and compare and order sets of fractions (proper, improper, and/or mixed numbers having denominators of 12 or less) and decimals (through thousandths).

5.NS.1.a: Use concrete and pictorial models to represent fractions with denominators that are thirds, eighths, and factors of 100 in their equivalent decimal form.

1. Convert fractions to decimals 6QG
2. Convert mixed numbers to decimals 99M

5.NS.1.b: Use concrete and pictorial models to represent decimals in their equivalent fraction form (thirds, eighths, and factors of 100).

1. Convert decimals to fractions MN5
2. Convert decimals to mixed numbers TBV

5.NS.1.c: Identify equivalent relationships between decimals and fractions with denominators that are thirds, eighths, and factors of 100 in their equivalent decimal form, with and without models.

1. Model decimals and fractions ZKL

5.NS.1.d: Compare (using symbols <, >, =) and order (least to greatest and greatest to least) a set of no more than four decimals and fractions (proper, improper) and/or mixed numbers using multiple strategies (e.g., benchmarks, place value, number lines). Justify solutions orally, in writing, or with a model.

Decimals

1. Compare decimals using grids QTG
2. Compare decimals on number lines CUF
3. Compare decimal numbers NSG
4. Compare, order, and round decimals: word problems 2MV
5. Put decimals in order EBF

Fractions

6. Graph and compare fractions on number lines RGV
7. Compare fractions using benchmarks MJZ
8. Compare fractions and mixed numbers U8J
9. Put fractions in order T76

Decimals and fractions

10. Compare decimals and fractions on number lines DKV
11. Compare decimals and fractions ZEH

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12. Put a mix of decimals and fractions in order BKL
13. Put a mix of decimals, fractions, and mixed numbers in order SR7

5.NS.2 The student will demonstrate an understanding of prime and composite numbers, and determine the prime factorization of a whole number up to 100.

5.NS.2.a: Given a whole number up to 100, create a concrete or pictorial representation to demonstrate whether the number is prime or composite, and justify reasoning.	
5.NS.2.b: Classify, compare, and contrast whole numbers up to 100 using the characteristics prime and composite.	1. Prime and composite numbers 8PL
5.NS.2.c: Determine the prime factorization for a whole number up to 100.	1. Prime factorization YL2

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5.CE | Computation and Estimation

5.CE.1 The student will estimate, represent, solve, and justify solutions to single-step and multistep contextual problems using addition, subtraction, multiplication, and division with whole numbers.

5.CE.1.a: Estimate the sum, difference, product, and quotient of whole numbers in contextual problems.

Addition and subtraction

1. Estimate sums and differences of whole numbers 9RM
2. Estimate sums and differences: word problems KTA

Multiplication

3. Estimate products TKD
4. Estimate products: word problems 9JW

Division

5. Estimate quotients: 2-digit divisors EFW
6. Estimate quotients V8H
7. Estimate quotients: word problems U46

5.CE.1.b: Represent, solve, and justify solutions to single-step and multistep contextual problems by applying strategies (e.g., estimation, properties of addition and multiplication) and algorithms, including the standard algorithm, involving addition, subtraction, multiplication, and division of whole numbers, with and without remainders, in which:

5.CE.1.b.i: sums, differences, and products do not exceed five digits;

Properties of addition

1. Properties of addition LFE
2. Add using properties RZR

Properties of multiplication

3. Properties of multiplication LUE
4. Multiply using properties 6PN

Addition and subtraction

5. Add and subtract numbers up to five digits WCC

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6. Add and subtract whole numbers up to 5 digits: word problems LMU

Multiplication

7. Multiply 2-digit numbers by 2-digit numbers LLJ
8. Multiply 2-digit numbers by 3-digit numbers JHB
9. Multiply by 2-digit numbers: word problems 4K9
10. Multiply multi-digit numbers P76

5.CE.1.b.ii: factors do not exceed two digits by three digits;

1. Multiply 2-digit numbers by 2-digit numbers LLJ
2. Multiply 2-digit numbers by 3-digit numbers JHB
3. Multiply by 2-digit numbers: word problems 4K9
4. Multiply multi-digit numbers P76

5.CE.1.b.iii: divisors do not exceed two digits; or

Division

1. Divide multi-digit numbers by 1-digit numbers: word problems 5DE
2. Divide 2-digit and 3-digit numbers by 2-digit numbers HMA
3. Divide 2-digit and 3-digit numbers by 2-digit numbers: word problems AJW

Division strategies

4. Divide numbers ending in zeros J8Y
5. Divide numbers ending in zeros: word problems G66
6. Divide by 2-digit numbers using models AJA
7. Divide by 2-digit numbers using partial quotients ASM
8. Relate multiplication and division VA6

5.CE.1.b.iv: dividends do not exceed four digits.

1. Divide 4-digit numbers by 2-digit numbers 35K
2. Divide 4-digit numbers by 2-digit numbers: word problems J8L
3. Choose numbers with a particular quotient FBX
4. Multi-step word problems: multiplicative comparison V59

5.CE.1.c: Interpret the quotient and remainder when solving a contextual problem.

1. Divide by 1-digit numbers: interpret remainders 72W
2. Divide 3-digit by 2-digit numbers: interpret remainders 87G

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5.CE.2 The student will estimate, represent, solve, and justify solutions to single-step and multistep problems, including those in context, using addition and subtraction of fractions with like and unlike denominators (with and without models), and solve single-step contextual problems involving multiplication of a whole number and a proper fraction, with models.

5.CE.2.a: Determine the least common multiple of two numbers to find the least common denominator for two fractions.

1. Least common multiple BMQ
2. Least common denominator R7P

5.CE.2.b: Estimate and determine the sum or difference of two fractions (proper or improper) and/or mixed numbers, having like and unlike denominators limited to 2, 3, 4, 5, 6, 8, 10, and 12 (e.g., $^{5}/_{8} + {}^{1}/_{4}$, $^{4}/_{5} - {}^{2}/_{3}$, $3^{3}/_{4} + 2^{5}/_{12}$), and simplify the resulting fraction.

Estimation

1. Estimate sums and differences of fractions using benchmarks 9JR
2. Estimate sums and differences of mixed numbers 7A6

Add fractions

3. Add fractions with like denominators using number lines YUS
4. Add fractions with unlike denominators using models YKV
5. Add fractions with like denominators C5X
6. Add fractions with unlike denominators MRN

Subtract fractions

7. Subtract fractions with like denominators using number lines DSN
8. Subtract fractions with like denominators Y56
9. Subtract fractions with unlike denominators using models QA6
10. Subtract fractions with unlike denominators KU6

Add and subtract fractions

11. Add and subtract fractions with like denominators JCA
12. Add and subtract fractions with unlike denominators FNX

Add mixed numbers

13. Add mixed numbers with unlike denominators PMK
14. Add mixed numbers with like denominators RCZ

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Subtract mixed numbers

15. Subtract mixed numbers with unlike denominators RPN
16. Subtract mixed numbers with like denominators AEY

Add and subtract mixed numbers

17. Add and subtract mixed numbers with unlike denominators RZC

5.CE.2.c: Estimate and solve single-step and multistep contextual problems involving addition and subtraction with fractions (proper or improper) and/or mixed numbers having like and unlike denominators, with and without models. Denominators should be limited to 2, 3, 4, 5, 6, 8, 10, and 12. Answers should be expressed in simplest form.

1. Add and subtract mixed numbers: word problems 6BH
2. Add and subtract fractions and mixed numbers in recipes W9K
3. Add and subtract fractions with like denominators: word problems T8D
4. Add and subtract fractions with unlike denominators: word problems 9M4

5.CE.2.d: Solve single-step contextual problems involving multiplication of a whole number, limited to 12 or less, and a proper fraction (e.g., $9 \times {}^{2}/_{3}$, $8 \times {}^{3}/_{4}$), with models. The denominator will be a factor of the whole number and answers should be expressed in simplest form.

Multiply with models

1. Multiply fractions by whole numbers: choose the model NKU
2. Multiply fractions by whole numbers using number lines DRU
3. Fractions of a number: model and multiply 77G

Multiply without models

4. Multiply fractions and whole numbers: sorting K69
5. Multiply fractions and whole numbers LKE

5.CE.3 The student will estimate, represent, solve, and justify solutions to single-step and multistep problems, including those in context, using addition, subtraction, multiplication, and division with decimal numbers.

5.CE.3.a: Apply estimation strategies (e.g., rounding to the nearest whole number, tenth or hundredth; compatible numbers, place value) to determine a reasonable solution for single-step and multistep contextual problems involving addition, subtraction, and multiplication of decimals, and single-step contextual problems involving division of decimals.

Estimate sums and differences

1. Estimate sums and differences of decimals using benchmarks CHE
2. Estimate sums and differences of decimals using rounding Y8R

Estimate products and quotients

3. Round decimals MPB

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4. Estimate products of whole numbers and decimals Q6D
5. Estimate products of decimals SL7
6. Estimate decimal quotients CZ9

5.CE.3.b: Estimate and determine the product of two numbers using strategies and algorithms, including the standard algorithm, when given:

5.CE.3.b.i: a two-digit factor and a one-digit factor (e.g., 2.3 × 4; 0.08 × 0.9; .16 × 5);

1. Multiply a decimal by a one-digit whole number: tenths or hundredths 2TZ
2. Multiply a decimal by a one-digit whole number using blocks U5Q
3. Multiply a decimal by a one-digit whole number using the distributive property 9BA
4. Multiply decimals using grids 66Z
5. Multiply two decimals: where does the decimal point go? 6FA
6. Multiply a decimal up to 2 places by a one-digit whole number 7EU

5.CE.3.b.ii: a three-digit factor and a one-digit factor (e.g., 0.156 × 4, 3.28 × 7, 8.09 × 0.2); and

1. Multiply a decimal up to 3 places by a one-digit whole number YBW

5.CE.3.b.iii: a two-digit factor and a two-digit factor (e.g., 0.85 × 3.7, 14 × 1.6, 9.2 × 3.5).

1. Multiply decimals using area models RH8
2. Multiply two decimals: products up to thousandths TDG

5.CE.3.c: Estimate and determine the quotient of two numbers using strategies and algorithms, including the standard algorithm, in which:

5.CE.3.c.i: quotients do not exceed four digits with or without a decimal point;

1. Divide decimals by whole numbers without adding zeros XDZ
2. Divide by decimals without adding zeros RTS

5.CE.3.c.ii: quotients may include whole numbers, tenths, hundredths, or thousandths;

1. Division with decimal quotients J9Z

5.CE.3.c.iii: divisors are limited to a single digit whole number or a decimal expressed as tenths; and

1. Divide by decimals NWS

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5.CE.3.c.iv: no more than one additional zero will need to be annexed.

1. Divide decimals by two-digit whole numbers 9PY

5.CE.3.d: Solve single-step and multistep contextual problems involving addition, subtraction, and multiplication of decimals by applying strategies (e.g., estimation, modeling) and algorithms, including the standard algorithm.

Addition and subtraction

1. Add decimal numbers using blocks NWJ
2. Add decimal numbers BDX
3. Subtract decimal numbers using blocks V5T
4. Subtract decimal numbers SC8
5. Add and subtract decimal numbers 7VJ
6. Choose decimals with a particular sum or difference ARW
7. Add and subtract money amounts A8R

Addition and subtraction word problems

8. Add and subtract decimals: word problems 35U
9. Add and subtract money: word problems DLC

Multiplication word problems

10. Multiply decimals and whole numbers: word problems 9XH

5.CE.3.e: Solve single-step contextual problems involving division with decimals by applying strategies (e.g., estimation, modeling) and algorithms, including the standard algorithm.

1. Division with decimal quotients: word problems Z2X
2. Divide whole numbers and decimals by one-digit whole numbers: word problems K7S

5.CE.4 The student will simplify numerical expressions with whole numbers using the order of operations.

5.CE.4.a: Use order of operations to simplify numerical expressions with whole numbers, limited to addition, subtraction, multiplication, and division in which:

5.CE.4.a.i: expressions may contain no more than one set of parentheses;

1. Evaluate numerical expressions WJH

5.CE.4.a.ii: simplification will be limited to five whole numbers and four operations in any combination of addition, subtraction, multiplication, or division;

1. Order of operations: 3 or 4 terms P8H

5.CE.4.a.iii: whole numbers will be limited to two

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digits or less; and	1. Evaluate numerical expressions with parentheses HGW
5.CE.4.a.iv: expressions should not include braces, brackets, or fraction bars.	1. Evaluate numerical expressions Z5N
5.CE.4.b: Given a whole number numerical expression involving more than one operation, describe which operation is completed first, which is second, and which is third.	1. Identify mistakes involving the order of operations JLJ 2. Evaluate numerical expressions with parentheses in different places 9F5 3. Missing operators 8TJ 4. Equations with mixed operations: true or false QR9

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5.MG | Measurement and Geometry

5.MG.1 The student will reason mathematically to solve problems, including those in context, that involve length, mass, and liquid volume using metric units.

5.MG.1.a: Determine the most appropriate unit of measure to use in a contextual problem that involves metric units:	
5.MG.1.a.i: length (millimeters, centimeters, meters, and kilometers);	1. Which metric unit of length is appropriate? NA8
5.MG.1.a.ii: mass (grams and kilograms); and	1. Which metric unit of mass is appropriate? 6GS
5.MG.1.a.iii: liquid volume (milliliters and liters).	1. Which metric unit of volume is appropriate? TQB
5.MG.1.b: Estimate and measure to solve contextual problems that involve metric units:	
5.MG.1.b.i: length (millimeters, centimeters, and meters);	1. Measure using a centimeter ruler XLK
5.MG.1.b.ii: mass (grams and kilograms); and	
5.MG.1.b.iii: liquid volume (milliliters and liters).	
5.MG.1.c: Given the equivalent metric measure of one unit, in a contextual problem, determine the equivalent measurement within the metric system:	
5.MG.1.c.i: length (millimeters, centimeters, meters, and kilometers);	1. Compare and convert metric units of length 8MZ
5.MG.1.c.ii: mass (grams and kilograms); and	1. Compare and convert metric units of mass X9C
5.MG.1.c.iii: liquid volume (milliliters and liters).	1. Compare and convert metric units of volume 27C

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5.MG.2 The student will use multiple representations to solve problems, including those in context, involving perimeter, area, and volume.

5.MG.2.a: Investigate and develop a formula for determining the area of a right triangle.	1. Understanding area of a right triangle XDX
5.MG.2.b: Estimate and determine the area of a right triangle, with diagrams, when the base and the height are given in whole number units, in metric or U.S. Customary units, and record the solution with the appropriate unit of measure (e.g., 16 square inches).	1. Area of right triangles S9Z
5.MG.2.c: Describe volume as a measure of capacity and give examples of volume as a measurement in contextual situations.	1. Volume of rectangular prisms made of unit cubes WG8
5.MG.2.d: Investigate and develop a formula for determining the volume of rectangular prisms using concrete objects.	1. Volume of rectangular prisms made of unit cubes: expressions Q84
5.MG.2.e: Solve problems, including those in context, to estimate and determine the volume of a rectangular prism using concrete objects, diagrams, and formulas when the length, width, and height are given in whole number units. Record the solution with the appropriate unit of measure (e.g., 12 cubic inches).	1. Volume of rectangular prisms made of unit cubes: word problems QMA 2. Volume of rectangular prisms CVR 3. Volume of cubes and rectangular prisms: description given SR8
5.MG.2.f: Identify whether the application of the concept of perimeter, area, or volume is appropriate for a given situation.	
5.MG.2.g: Solve contextual problems that involve perimeter, area, and volume in standard units of measure.	1. Area, perimeter, and volume: word problems W2S

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5.MG.3 The student will classify and measure angles and triangles, and solve problems, including those in context.

5.MG.3.a: Classify angles as right, acute, obtuse, or straight and justify reasoning.	1. Types of angles RGW
5.MG.3.b: Classify triangles as right, acute, or obtuse and equilateral, scalene, or isosceles and justify reasoning.	1. Acute, obtuse, and right triangles N77 2. Scalene, isosceles, and equilateral triangles R94 3. Classify triangles C64
5.MG.3.c: Identify congruent sides and right angles using geometric markings to denote properties of triangles.	
5.MG.3.d: Compare and contrast the properties of triangles.	
5.MG.3.e: Identify the appropriate tools (e.g., protractor, straightedge, angle ruler, available technology) to measure and draw angles.	
5.MG.3.f: Measure right, acute, obtuse, and straight angles, using appropriate tools, and identify measures in degrees.	1. Measure angles with a protractor GSJ 2. Draw and measure angles with a protractor TWM
5.MG.3.g: Use models to prove that the sum of the interior angles of a triangle is 180 degrees and use the relationship to determine an unknown angle measure in a triangle.	1. Find missing angles in triangles H6Z
5.MG.3.h: Solve addition and subtraction contextual problems to determine unknown angle measures on a diagram.	

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5.PS | Probability and Statistics

5.PS.1 The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on line plots (dot plots) and stem-and-leaf plots.

5.PS.1.a: Formulate questions that require the collection or acquisition of data.

5.PS.1.b: Determine the data needed to answer a formulated question and collect or acquire existing data (limited to 30 or fewer data points) using various methods (e.g., polls, observations, measurements, experiments).

5.PS.1.c: Organize and represent a data set using a line plot (dot plot) with a title, labeled axes, and a key, with and without the use of technology tools. Lines plots (dot plots) may contain whole numbers, fractions, or decimals.

1. Create line plots with fractions (Fifth grade) ZBV
2. Create line plots with fractions (Fifth grade) JEC

5.PS.1.d: Organize and represent numerical data using a stem-and-leaf plot with a title and key, where the stems are listed in ascending order and the leaves are in ascending order, with or without commas between the leaves.

1. Create stem-and-leaf plots FJZ

5.PS.1.e: Analyze data represented in line plots (dot plots) and stem-and-leaf plots and communicate results orally and in writing:

5.PS.1.e.i: describe the characteristics of the data represented in a line plot (dot plot) and stem-and-leaf plot as a whole (e.g., the shape and spread of the data);

1. Describe distributions in line plots KYG

5.PS.1.e.ii: make inferences about data represented in line plots (dot plots) and stem-and-leaf plots (e.g., based on a line plot (dot plot) of the number of books students in a bus line have in their backpack, every student will have from two

1. Interpret line plots with whole numbers 79C
2. Create and interpret line plots with fractions XBS
3. Interpret stem-and-leaf plots BZL

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to four books in their backpack);	
5.PS.1.e.iii: identify parts of the data that have special characteristics and explain the meaning of the greatest, the least, or the same (e.g., the stem-and-leaf plot shows that the same number of students scored in the 90s as scored in the 70s);	
5.PS.1.e.iv: draw conclusions about the data and make predictions based on the data to answer questions; and	
5.PS.1.e.v: solve single-step and multistep addition and subtraction problems using data from line plots (dot plots) and stem-and-leaf plots.	

5.PS.2 The student will solve contextual problems using measures of center and the range.

5.PS.2.a: Describe mean as fair share.	
5.PS.2.b: Describe and determine the mean of a set of data values representing data from a given context as a measure of center.	1. Find the mean AAP 2. Interpret charts and graphs to find the mean VBL
5.PS.2.c: Describe and determine the median of a set of data values representing data from a given context as a measure of center.	1. Find the median GDA 2. Interpret charts and graphs to find the median XWN
5.PS.2.d: Describe and determine the mode of a set of data values representing data from a given context as a measure of center.	1. Find the mode LNT 2. Interpret charts and graphs to find the mode AMK
5.PS.2.e: Describe and determine the range of a set of data values representing data from a given context as a measure of spread.	1. Find the range 2T8 2. Interpret charts and graphs to find the range UNM 3. Calculate mean, median, mode, and range: word problems ZJF

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5.PS.3 The student will determine the probability of an outcome by constructing a model of a sample space and using the Fundamental (Basic) Counting Principle.

5.PS.3.a: Determine the probability of an outcome by constructing a sample space (with a total of 24 or fewer equally likely possible outcomes), using a tree diagram, list, or chart to represent and determine all possible outcomes.	1. Understanding probability RKS 2. Find the probability C79
5.PS.3.b: Determine the number of possible outcomes by using the Fundamental (Basic) Counting Principle.	1. Combinations XNM

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5.PFA | Patterns, Functions, and Algebra

5.PFA.1 The student will identify, describe, extend, and create increasing and decreasing patterns with whole numbers, fractions, and decimals, including those in context, using various representations.

5.PFA.1.a: Identify, describe, extend, and create increasing and decreasing patterns using various representations (e.g., objects, pictures, numbers, number lines, input/output tables, function machines).

Tables

1. Multiplication input/output tables STJ
2. Complete a table for a two-variable relationship NEK
3. Multiply fractions by whole numbers: input/output tables 2KU
4. Complete an input/output table K2K

Number patterns

5. Number sequences involving decimals H73
6. Complete an increasing number pattern GZW
7. Complete a multiplication number pattern X8Q
8. Number patterns: mixed review GM2

Place value

9. Multiplication patterns over increasing place values BCK
10. Division patterns over increasing place values 8Z6

Fractions

11. Addition and subtraction patterns with fractions MMR
12. Patterns of equivalent fractions BC6

5.PFA.1.b: Analyze an increasing or decreasing single-operation numerical pattern found in lists, input/output tables, and function machines, and generalize the change to identify the rule, extend the pattern, or identify missing terms. (Patterns will be limited to addition, subtraction, multiplication, and division of whole numbers; addition and subtraction of fractions with like denominators of 12 or less; and addition and subtraction of decimals expressed in tenths or hundredths).

1. Multiplication input/output tables: find the rule ZXB
2. Use a rule to complete a number pattern RPP
3. Find the rule from a table: word problems PN6

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5.PFA.1.c: Solve contextual problems that involve identifying, describing, and extending increasing and decreasing patterns using single-operation input and output rules (limited to addition, subtraction, multiplication, and division of whole numbers; addition and subtraction of fractions with like denominators of 12 or less; and addition and subtraction of decimals expressed in tenths or hundredths).	1. Number patterns: word problems R6C 2. Complete an input/output table: word problems WWC

5.PFA.2 The student will investigate and use variables in contextual problems.

5.PFA.2.a: Describe the concept of a variable (presented as a box, letter, or other symbol) as a representation of an unknown quantity.	
5.PFA.2.b: Write an equation (with a single variable that represents an unknown quantity and one operation) from a contextual situation, using addition, subtraction, multiplication, or division.	1. Write variable equations: word problems TVB
5.PFA.2.c: Use an expression with a variable to represent a given verbal expression involving one operation (e.g., "5 more than a number" can be represented by $y + 5$).	1. Write variable expressions UZZ 2. Write variable expressions: word problems E2M
5.PFA.2.d: Create and write a word problem to match a given equation with a single variable and one operation.	1. Which word problem matches the one-step equation? VF9

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6.NS | Number and Number Sense

6.NS.1 The student will reason and use multiple strategies to express equivalency, compare, and order numbers written as fractions, mixed numbers, decimals, and percents.

6.NS.1.a: Estimate and determine the percent represented by a given model (e.g., number line, picture, verbal description), including percents greater than 100% and less than 1%.

1. What percentage is illustrated? RHG
2. Understanding percents: strip models 5JV

6.NS.1.b: Represent and determine equivalencies among decimals (through the thousandths place) and percents incorporating the use of number lines, and concrete and pictorial models.

1. Convert between percents and decimals QSV

6.NS.1.c: Represent and determine equivalencies among fractions (proper or improper) and mixed numbers that have denominators that are 12 or less or factors of 100 and percents incorporating the use of number lines, and concrete and pictorial models.

1. Convert fractions to percents using grid models ZDZ

6.NS.1.d: Represent and determine equivalencies among decimals, percents, fractions (proper or improper), and mixed numbers that have denominators that are 12 or less or factors of 100 incorporating the use of number lines, and concrete and pictorial models.

Equivalent fractions

1. Write fractions in lowest terms 5EW
2. Convert between improper fractions and mixed numbers P9A
3. Equivalent fractions review 9P3

Convert between fractions and decimals

4. Convert decimals to fractions HQF
5. Convert between fractions and repeating decimals JVE
6. Convert fractions to decimals UC7
7. Convert between decimals and fractions NUH
8. Convert between decimals and mixed numbers C8V

Convert between percents, fractions, and decimals

9. Convert between percents, fractions, and decimals ZAV

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	10. Convert between percents, fractions, and decimals: word problems 7CZ
6.NS.1.e: Use multiple strategies (e.g., benchmarks, number line, equivalency) to compare and order no more than four positive rational numbers expressed as fractions (proper or improper), mixed numbers, decimals, and percents (decimals through thousandths, fractions with denominators of 12 or less or factors of 100) with and without models. Justify solutions orally, in writing or with a model. Ordering may be in ascending or descending order.	1. Put a mix of decimals and fractions in order MSR 2. Put a mix of decimals, fractions, and mixed numbers in order AWV 3. Compare percents to each other and to fractions GBY 4. Compare percents and fractions: word problems 9C8 5. Compare percents to fractions and decimals 5WY
6.NS.2 The student will reason and use multiple strategies to represent, compare, and order integers.	
6.NS.2.a: Represent integers (e.g., number lines, concrete materials, pictorial models), including models derived from contextual situations, and identify an integer represented by a point on a number line.	1. Understanding integers 8EP 2. Integers on number lines K6J 3. Graph integers on horizontal and vertical number lines 36C 4. Understanding opposite integers X8L
6.NS.2.b: Compare and order integers using a number line.	1. Compare integers 4G6 2. Put integers in order CMQ
6.NS.2.c: Compare integers, using mathematical symbols (<, >, =).	1. Compare integers 4G6
6.NS.2.d: Identify and describe the absolute value of an integer as the distance from zero on the number line.	1. Understanding absolute value TLR 2. Absolute value 2YZ 3. Absolute value and integers: word problems 9CW
6.NS.3 The student will recognize and represent patterns with whole number exponents and perfect squares.	
6.NS.3.a: Recognize and represent patterns with bases and exponents that are whole numbers.	1. Write multiplication expressions using exponents TY5
6.NS.3.b: Recognize and represent patterns of perfect squares not to exceed 20^2, by using concrete and pictorial models.	

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6.NS.3.c: Justify if a number between 0 and 400 is a perfect square through modeling or mathematical reasoning.	1. Square numbers 7JR
6.NS.3.d: Recognize and represent powers of 10 with whole number exponents by examining patterns in place value.	1. Write powers of ten with exponents DLL

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6.CE | Computation and Estimation

6.CE.1 The student will estimate, demonstrate, solve, and justify solutions to problems using operations with fractions and mixed numbers, including those in context.

6.CE.1.a: Demonstrate/model multiplication and division of fractions (proper or improper) and mixed numbers using multiple representations.

Multiplication

1. Multiply a mixed number by a whole number using a model 2YQ
2. Multiply with mixed numbers using area models LGS
3. Multiply two fractions using models B7P

Division

4. Divide unit fractions and whole numbers using area models 65E
5. Divide whole numbers by unit fractions using models DXW
6. Divide whole numbers and fractions using models SKR
7. Divide fractions using models E6R
8. Divide fractions and mixed numbers using models SGD
9. Divide fractions and mixed numbers using models: word problems LKG

6.CE.1.b: Multiply and divide fractions (proper or improper) and mixed numbers that include denominators of 12 or less. Answers are expressed in simplest form.

Multiply whole numbers by fractions

1. Multiply fractions and whole numbers C7G
2. Estimate products of fractions and whole numbers EFY
3. Fractions of a number: word problems GT7

Multiply fractions by fractions

4. Multiply two fractions E5C
5. Multiply three or more fractions and whole numbers MCL

Multiply by mixed numbers

6. Multiply mixed numbers C7B
7. Estimate products of mixed numbers 59P
8. Multiply a mixed number by a whole number WPV

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9. Multiply three or more mixed numbers, fractions, and/or whole numbers 7FB

Divide fractions

10. Divide whole numbers and unit fractions DPA
11. Divide fractions ABT
12. Divide fractions and mixed numbers K6K
13. Divide fractions and whole numbers 9GY

6.CE.1.c: Investigate and explain the effect of multiplying or dividing a fraction, whole number, or mixed number by a number between zero and one.

1. Scaling whole numbers by fractions: justify your answer 9YZ
2. Scaling by fractions and mixed numbers H2T

6.CE.1.d: Estimate, determine, and justify the solution to single-step and multistep problems in context that involve addition and subtraction with fractions (proper or improper) and mixed numbers, with and without regrouping, that include like and unlike denominators of 12 or less. Answers are expressed in simplest form.

1. Add and subtract fractions with like denominators: word problems VRU
2. Maps with fractional distances X8Y
3. Add, subtract, multiply, or divide two fractions: word problems 67U
4. Add and subtract fractions and mixed numbers: word problems CP2
5. Add, subtract, multiply, or divide fractions in recipes 83M

6.CE.1.e: Estimate, determine, and justify the solution to single-step and multistep problems in context that involve multiplication and division with fractions (proper or improper) and mixed numbers that include denominators of 12 or less. Answers are expressed in simplest form.

Multiplication

1. Multiply fractions and whole numbers: word problems 55X
2. Multiply fractions: word problems L73
3. Multiply mixed numbers: word problems EEQ

Division

4. Divide fractions by whole numbers in recipes HL9
5. Divide fractions and mixed numbers using models: word problems LKG
6. Divide fractions and mixed numbers: word problems MTS

Mixed operations

7. Add, subtract, multiply, or divide two fractions: word problems 67U
8. Add, subtract, multiply, or divide fractions in recipes 83M

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6.CE.2 The student will estimate, demonstrate, solve, and justify solutions to problems using operations with integers, including those in context.

6.CE.2.a: Demonstrate/model addition, subtraction, multiplication, and division of integers using pictorial representations or concrete manipulatives.

Addition and subtraction

1. Add integers using counters 4J9
2. Add integers using number lines L95
3. Subtract integers using counters NYM
4. Subtract integers using number lines EW2

Multiplication

5. Understand multiplying by a negative integer using a number line EPM

6.CE.2.b: Add, subtract, multiply, and divide two integers.

Addition and subtraction

1. Add integers ZM6
2. Subtract integers WQ6
3. Add and subtract integers: find the sign HBD
4. Add and subtract integers: input/output tables FLP

Multiplication and division

5. Understand multiplying by a negative integer using a number line EPM
6. Multiply integers: find the sign DKA
7. Multiply integers J6V
8. Divide integers: find the sign Q6T
9. Divide integers JZC

Mixed operations

10. Add, subtract, multiply, or divide two integers VMW

6.CE.2.c: Simplify an expression that contains absolute value bars | | and an operation with two integers (e.g., $-|5 - 8|$ or $^{|-12|}/_{8}$) and represent the result on a number line.

6.CE.2.d: Estimate, determine, and justify the solution to one and two-step contextual problems, involving addition, subtraction, multiplication, and division with integers.

1. Add and subtract integers: word problems MP9

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6.MG | Measurement and Geometry

6.MG.1 The student will identify the characteristics of circles and solve problems, including those in context, involving circumference and area.

6.MG.1.a: Identify and describe chord, diameter, radius, circumference, and area of a circle.

1. Parts of a circle UYR

6.MG.1.b: Investigate and describe the relationship between:

6.MG.1.b.i: diameter and radius;

6.MG.1.b.ii: radius and circumference; and

6.MG.1.b.iii: diameter and circumference.

6.MG.1.c: Develop an approximation for pi (3.14) by gathering data and comparing the circumference to the diameter of various circles, using concrete manipulatives or technological models.

6.MG.1.d: Develop the formula for circumference using the relationship between diameter, radius, and pi.

6.MG.1.e: Solve problems, including those in context, involving circumference and area of a circle when given the length of the diameter or radius.

1. Circumference of circles N6W
2. Area of circles 4S5
3. Circles: word problems YTG
4. Area between two circles WHE

6.MG.2 The student will reason mathematically to solve problems, including those in context, that involve the area and perimeter of triangles and parallelograms.

6.MG.2.a: Develop the formula for determining the area of parallelograms and triangles using pictorial representations and concrete manipulatives (e.g., two-dimensional diagrams, grid paper).

1. Understanding area of a parallelogram QMU
2. Understanding area of a triangle PLL

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6.MG.2.b: Solve problems, including those in context, involving the perimeter and area of triangles and parallelograms.	**Perimeter** 1. Perimeter of triangles and parallelograms J9V **Area of triangles** 2. Area of triangles C8S 3. Area between two triangles 8RG **Area of parallelograms** 4. Area of parallelograms Y8K **Word problems** 5. Area and perimeter of rectangles and squares: word problems TSR 6. Area of squares, rectangles, and triangles: word problems 5Q7

6.MG.3 The student will describe the characteristics of the coordinate plane and graph ordered pairs.

6.MG.3.a: Identify and label the axes, origin, and quadrants of a coordinate plane.	1. Describe the coordinate plane KU7
6.MG.3.b: Identify and describe the location (quadrant or the axis) of a point given as an ordered pair. Ordered pairs will be limited to coordinates expressed as integers.	1. Describe the coordinate plane KU7 2. Quadrants F5T
6.MG.3.c: Graph ordered pairs in the four quadrants and on the axes of a coordinate plane. Ordered pairs will be limited to coordinates expressed as integers.	1. Graph points on a coordinate plane: integers only 2QN
6.MG.3.d: Identify ordered pairs represented by points in the four quadrants and on the axes of the coordinate plane. Ordered pairs will be limited to coordinates expressed as integers.	1. Objects on a coordinate plane 27V
6.MG.3.e: Relate the coordinates of a point to the distance from each axis and relate the coordinates of a single point to another point on the same horizontal or vertical line. Ordered pairs will be limited to coordinates expressed as integers.	1. Coordinate planes as maps N96 2. Distance between two points: integers only YQ2

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6.MG.3.f: Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to determine the length of a side joining points with the same first coordinate or the same second coordinate. Ordered pairs will be limited to coordinates expressed as integers. Apply these techniques in the context of solving contextual and mathematical problems.	1. Graph triangles and quadrilaterals E55

6.MG.4 The student will determine congruence of segments, angles, and polygons.

6.MG.4.a: Identify regular polygons.	1. Identify and classify polygons YLC
6.MG.4.b: Draw lines of symmetry to divide regular polygons into two congruent parts.	1. Line symmetry PDS
6.MG.4.c: Determine the congruence of segments, angles, and polygons given their properties.	
6.MG.4.d: Determine whether polygons are congruent or noncongruent according to the measures of their sides and angles.	1. Identify congruent figures US5

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6.PS | Probability and Statistics

6.PS.1 The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on circle graphs.

6.PS.1.a: Formulate questions that require the collection or acquisition of data with a focus on circle graphs.	
6.PS.1.b: Determine the data needed to answer a formulated question and collect the data (or acquire existing data) using various methods (e.g., observations, measurement, surveys, experiments).	
6.PS.1.c: Determine the factors that will ensure that the data collected is a sample that is representative of a larger population.	
6.PS.1.d: Organize and represent data using circle graphs, with and without the use of technology tools. The number of data values should be limited to allow for comparisons that have denominators of 12 or less or those that are factors of 100 (e.g., in a class of 20 students, 7 choose apples as a favorite fruit, so the comparison is 7 out of 20, $^{7}/_{20}$, or 35%).	
6.PS.1.e: Analyze data represented in a circle graph by making observations and drawing conclusions.	1. Interpret circle graphs 8KT
6.PS.1.f: Compare data represented in a circle graph with the same data represented in other graphs, including but not limited to bar graphs, pictographs, and line plots (dot plots), and justify which graphical representation best represents the data.	

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6.PS.2 The student will represent the mean as a balance point and determine the effect on statistical measures when a data point is added, removed, or changed.

6.PS.2.a: Represent the mean of a set of data graphically as the balance point represented in a line plot (dot plot).	1. Calculate mean BK7
6.PS.2.b: Determine the effect on measures of center when a single value of a data set is added, removed, or changed.	1. Changes in mean, median, and mode RDC
6.PS.2.c: Observe patterns in data to identify outliers and determine their effect on mean, median, mode, or range.	1. Identify an outlier 86B 2. Identify an outlier and describe the effect of removing it 8Q5

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6.PFA | Patterns, Functions, and Algebra

6.PFA.1 The student will use ratios to represent relationships between quantities, including those in context.

6.PFA.1.a: Represent a relationship between two quantities using ratios.

1. Write a ratio 83K
2. Write a ratio using a fraction XZ2
3. Which model represents the ratio? 66V

6.PFA.1.b: Represent a relationship in context that makes a comparison by using the notations $^{a}/_{b}$, *a*:*b*, and *a* to *b*.

1. Write a ratio: word problems W98

6.PFA.1.c: Represent different comparisons within the same quantity or between different quantities (e.g., part to part, part to whole, whole to whole).

6.PFA.1.d: Create a relationship in words for a given ratio expressed symbolically.

6.PFA.1.e: Create a table of equivalent ratios to represent a proportional relationship between two quantities, when given a ratio.

1. Identify equivalent ratios 2LM
2. Write an equivalent ratio NEA

6.PFA.1.f: Create a table of equivalent ratios to represent a proportional relationship between two quantities, when given a contextual situation.

1. Equivalent ratios: word problems RLZ
2. Equivalent rates 9AF

6.PFA.2 The student will identify and represent proportional relationships between two quantities, including those in context (unit rates are limited to positive values).

6.PFA.2.a: Identify the unit rate of a proportional relationship represented by a table of values, a contextual situation, or a graph.

1. Unit rates JSZ

6.PFA.2.b: Determine a missing value in a ratio table that represents a proportional relationship between two quantities using a unit rate.

1. Ratio tables PPF

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6.PFA.2.c: Determine whether a proportional relationship exists between two quantities, when given a table of values, context, or graph.	1. Do the ratios form a proportion? LVW 2. Identify proportional relationships from graphs 48M 3. Identify proportional relationships from tables YRR
6.PFA.2.d: When given a contextual situation representing a proportional relationship, find the unit rate and create a table of values or a graph.	
6.PFA.2.e: Make connections between and among multiple representations of the same proportional relationship using verbal descriptions, ratio tables, and graphs.	1. Ratios and rates: complete a table and make a graph 6Z2 2. Identify proportional relationships by graphing 8VR 3. Interpret graphs of proportional relationships ZWG

6.PFA.3 The student will write and solve one-step linear equations in one variable, including contextual problems that require the solution of a one-step linear equation in one variable.

6.PFA.3.a: Identify and develop examples of the following algebraic vocabulary: equation, variable, expression, term, and coefficient.	1. Identify terms and coefficients 9KE 2. Identify expressions and equations GCQ
6.PFA.3.b: Represent and solve one-step linear equations in one variable, using a variety of concrete manipulatives and pictorial representations (e.g., colored chips, algebra tiles, weights on a balance scale).	1. Model and solve equations using algebra tiles G6Z 2. Model and solve equations using diagrams 82C 3. Write and solve equations that represent diagrams FSQ
6.PFA.3.c: Apply properties of real numbers and properties of equality to solve a one-step equation in one variable. Coefficients are limited to integers and unit fractions. Numeric terms are limited to integers.	1. Solve one-step addition and subtraction equations with whole numbers JXM 2. Solve one-step multiplication and division equations with whole numbers JUA 3. Solve one-step equations with whole numbers WLR 4. Solve one-step equations involving integers 7JV
6.PFA.3.d: Confirm solutions to one-step linear equations in one variable using a variety of concrete manipulatives and pictorial representations (e.g., colored chips, algebra tiles, weights on a balance scale).	1. Does x satisfy an equation? VMB 2. Which x satisfies an equation? VG8

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6.PFA.3.e: Write a one-step linear equation in one variable to represent a verbal situation, including those in context.	1. Write an equation from words AN8 2. Solve one-step addition and subtraction equations: word problems 35Q 3. Solve one-step multiplication and division equations: word problems GMV 4. Write a one-step equation: word problems YVX 5. Solve one-step equations: word problems BXY
6.PFA.3.f: Create a verbal situation in context given a one-step linear equation in one variable.	1. Which word problem matches the one-step equation? WYQ
6.PFA.4 The student will represent a contextual situation using a linear inequality in one variable with symbols and graphs on a number line.	
6.PFA.4.a: Given the graph of a linear inequality in one variable on a number line, represent the inequality in two equivalent ways (e.g., $x < -5$ or $-5 > x$) using symbols. Symbols include $<$, $>$, $\leq$, $\geq$.	1. Write inequalities from number lines N99
6.PFA.4.b: Write a linear inequality in one variable to represent a given constraint or condition in context or given a graph on a number line.	1. Write inequalities from number lines N99 2. Write and graph inequalities: word problems AGB
6.PFA.4.c: Given a linear inequality in one variable, create a corresponding contextual situation or create a number line graph.	1. Graph inequalities on number lines CXX 2. Write and graph inequalities: word problems AGB
6.PFA.4.d: Use substitution or a number line graph to justify whether a given number in a specified set makes a linear inequality in one variable true.	1. Solutions to inequalities P9N
6.PFA.4.e: Identify a numerical value(s) that is part of the solution set of a given inequality in one variable.	1. Solutions to inequalities P9N

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7.NS | Number and Number Sense

7.NS.1 The student will investigate and describe the concept of exponents for powers of ten and compare and order numbers greater than zero written in scientific notation.

7.NS.1.a: Investigate and describe powers of 10 with negative exponents by examining patterns.

7.NS.1.b: Represent a power of 10 with a negative exponent in fraction and decimal form.

1. Powers of ten with negative exponents ULA

7.NS.1.c: Convert between numbers greater than 0 written in scientific notation and decimals.

1. Scientific notation 3S7

7.NS.1.d: Compare and order no more than four numbers greater than 0 written in scientific notation. Ordering may be in ascending or descending order.

1. Compare numbers written in scientific notation G9C

7.NS.2 The student will reason and use multiple strategies to compare and order rational numbers.

7.NS.2.a: Use multiple strategies (e.g., benchmarks, number line, equivalency) to compare (using symbols <, >, =) and order (a set of no more than four) rational numbers expressed as integers, fractions (proper or improper), mixed numbers, decimals, and percents. Fractions and mixed numbers may be positive or negative. Decimals may be positive or negative and are limited to the thousandths place. Ordering may be in ascending or descending order. Justify solutions orally, in writing or with a model.

1. Compare and order rational numbers using number lines 4D5
2. Compare and order rational numbers: word problems 57J
3. Compare rational numbers JVR
4. Put rational numbers in order 28Y
5. Compare percents to fractions and decimals JAE

7.NS.3 The student will recognize and describe the relationship between square roots and perfect squares.

7.NS.3.a: Determine the positive square root of a perfect square from 0 to 400.

1. Square roots of perfect squares WRT

7.NS.3.b: Describe the relationship between square roots and perfect squares.

1. Square numbers GNL

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7.CE | Computation and Estimation

7.CE.1 The student will estimate, solve, and justify solutions to multistep contextual problems involving operations with rational numbers.

7.CE.1.a: Estimate, solve, and justify solutions to contextual problems involving addition, subtraction, multiplication, and division with rational numbers expressed as integers, fractions (proper or improper), mixed numbers, and decimals. Fractions may be positive or negative. Decimals may be positive or negative and are limited to the thousandths place.

Addition and subtraction

1. Add and subtract integers: word problems 2DD
2. Add and subtract decimals: word problems RKZ
3. Maps with decimal distances WT7
4. Maps with fractional distances KXP
5. Add and subtract fractions and mixed numbers: word problems AQA

Multiplication and division

6. Multiply decimals and whole numbers: word problems VZN
7. Divide decimals by whole numbers: word problems TUU
8. Multiply fractions and mixed numbers: word problems HM6
9. Divide fractions and mixed numbers: word problems B64

Mixed operations

10. Add, subtract, multiply, and divide decimals: word problems TGN
11. Add, subtract, multiply, or divide two fractions: word problems B8Z
12. Multi-step word problems with positive rational numbers JVU
13. Add, subtract, multiply, and divide money amounts: word problems HGN
14. Price lists CVW

Estimation

15. Estimate sums, differences, and products of decimals EGF
16. Estimate sums and differences of mixed numbers 7HR
17. Estimate products and quotients of fractions and mixed numbers JKK

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7.CE.2 The student will solve problems, including those in context, involving proportional relationships.

7.CE.2.a: Given a proportional relationship between two quantities, create and use a ratio table to determine missing values.

7.CE.2.b: Write and solve a proportion that represents a proportional relationship between two quantities to find a missing value, including problems in context.

Proportions

1. Do the ratios form a proportion? MJQ
2. Do the ratios form a proportion: word problems SHV
3. Solve proportions TDA
4. Solve proportions: word problems WB7
5. Estimate population size using proportions 3C9

Unit prices

6. Unit prices N7G
7. Unit prices with unit conversions KJ8
8. Unit prices: find the total price ENH

Scale drawings

9. Scale drawings of polygons WEA
10. Scale drawings: word problems 84H
11. Scale drawings: scale factor word problems KCM

7.CE.2.c: Apply proportional reasoning to solve problems in context, including converting units of measurement, when given the conversion factor.

1. Convert customary and metric units using proportions DPY
2. Compare and convert customary units 4B8
3. Compare and convert metric units HW2
4. Convert between customary and metric systems E8Z
5. Convert metric and customary units using tables KUV

7.CE.2.d: Estimate and determine the percentage of a given whole number, including but not limited to the use of benchmark percentages.

1. Estimate percents of numbers 29D
2. Solve percent problems using strip models 9XC
3. Percents of numbers and money amounts 93K
4. Percents of numbers: word problems EXE
5. Estimate tips Y5R
6. Percent of a number: tax, tip, discount, and more BFL

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7.MG | Measurement and Geometry

7.MG.1 The student will investigate and determine the volume formula for right cylinders and the surface area formulas for rectangular prisms and right cylinders and apply the formulas in context.

7.MG.1.a: Develop the formulas for determining the volume of right cylinders and solve problems, including those in contextual situations, using concrete objects, diagrams, and formulas.

1. Volume of cylinders FHC

7.MG.1.b: Develop the formulas for determining the surface area of rectangular prisms and right cylinders and solve problems, including those in contextual situations, using concrete objects, two-dimensional diagrams, nets, and formulas.

1. Surface area of cylinders CYQ
2. Surface area of rectangular prisms 7WR

7.MG.1.c: Determine if a problem in context, involving a rectangular prism or right cylinder, represents the application of volume or surface area.

7.MG.1.d: Describe how the volume of a rectangular prism is affected when one measured attribute is multiplied by a factor of $^1/_4$, $^1/_3$, $^1/_2$, 2, 3, or 4, including those in contextual situations.

1. Volume: changes in scale 7QX

7.MG.1.e: Describe how the surface area of a rectangular prism is affected when one measured attribute is multiplied by a factor of ½ or 2, including those in contextual situations.

7.MG.2 The student will solve problems and justify relationships of similarity using proportional reasoning.

7.MG.2.a: Identify corresponding congruent angles of similar quadrilaterals and triangles, through the use of geometric markings.

1. Similar and congruent figures DVS
2. Congruence statements and corresponding parts KTR
3. Side lengths and angle measures of congruent figures 8UC

7.MG.2.b: Identify corresponding sides of similar quadrilaterals and triangles.

1. Similar and congruent figures DVS

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7.MG.2.c: Given two similar quadrilaterals or triangles, write similarity statements using symbols.	1. Similarity statements AZ2
7.MG.2.d: Write proportions to express the relationships between the lengths of corresponding sides of similar quadrilaterals and triangles.	1. Scale drawings of polygons WEA 2. Side lengths and angle measures of similar figures JA5 3. Similar figures and indirect measurement 8VJ
7.MG.2.e: Recognize and justify if two quadrilaterals or triangles are similar using the ratios of corresponding side lengths.	1. Similar and congruent figures DVS
7.MG.2.f: Solve a proportion to determine a missing side length of similar quadrilaterals or triangles.	1. Scale drawings of polygons WEA 2. Side lengths and angle measures of similar figures JA5 3. Similar figures and indirect measurement 8VJ
7.MG.2.g: Given angle measures in a quadrilateral or triangle, determine unknown angle measures in a similar quadrilateral or triangle.	1. Side lengths and angle measures of similar figures JA5
7.MG.2.h: Apply proportional reasoning to solve problems in context including scale drawings. Scale factors shall have denominators no greater than 12 and decimals no less than tenths.	1. Scale drawings: word problems 84H 2. Scale drawings: scale factor word problems KCM

7.MG.3 The student will compare and contrast quadrilaterals based on their properties and determine unknown side lengths and angle measures of quadrilaterals.

7.MG.3.a: Compare and contrast properties of the following quadrilaterals: parallelogram, rectangle, square, rhombus, and trapezoid:	
7.MG.3.a.i: parallel/perpendicular sides and diagonals;	
7.MG.3.a.ii: congruence of angle measures, side, and diagonal lengths; and	1. Identify trapezoids 7EH 2. Classify quadrilaterals I CDR
7.MG.3.a.iii: lines of symmetry.	1. Classify quadrilaterals I CDR

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7.MG.3.b: Sort and classify quadrilaterals as parallelograms, rectangles, trapezoids, rhombi, and/or squares based on their properties:	
7.MG.3.b.i: parallel/perpendicular sides and diagonals;	1. Identify trapezoids 7EH 2. Classify quadrilaterals I CDR 3. Classify quadrilaterals II 52C
7.MG.3.b.ii: congruence of angle measures, side, and diagonal lengths; and	1. Identify trapezoids 7EH 2. Classify quadrilaterals I CDR 3. Classify quadrilaterals II 52C
7.MG.3.b.iii: lines of symmetry.	1. Identify trapezoids 7EH 2. Classify quadrilaterals I CDR 3. Classify quadrilaterals II 52C
7.MG.3.c: Given a diagram, determine an unknown angle measure in a quadrilateral, using properties of quadrilaterals.	1. Find missing angles in quadrilaterals I CXP 2. Find missing angles in quadrilaterals II JPY
7.MG.3.d: Given a diagram, determine an unknown side length in a quadrilateral using properties of quadrilaterals.	
7.MG.4 The student will apply dilations of polygons in the coordinate plane.	
7.MG.4.a: Given a preimage in the coordinate plane, identify the coordinates of the image of a polygon that has been dilated. Scale factors are limited to ¼, ½, 2, 3, or 4. The center of the dilation will be the origin.	1. Dilations: find the coordinates XYY
7.MG.4.b: Sketch the image of a dilation of a polygon limited to a scale factor of ¼, ½, 2, 3, or 4. The center of the dilation will be the origin.	1. Dilations: graph the image 8V9
7.MG.4.c: Identify and describe dilations in context including, but not limited to, scale drawings and graphic design.	1. Scale drawings: word problems 84H 2. Scale drawings: scale factor word problems KCM 3. Dilations: find the scale factor G64

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7.PS | Probability and Statistics

7.PS.1 The student will use statistical investigation to determine the probability of an event and investigate and describe the difference between the experimental and theoretical probability.	
7.PS.1.a: Determine the theoretical probability of an event.	1. Probability of simple events ZZB
7.PS.1.b: Given the results of a statistical investigation, determine the experimental probability of an event.	1. Experimental probability 9AA 2. Use collected data to find probabilities DNQ
7.PS.1.c: Describe changes in the experimental probability as the number of trials increases.	
7.PS.1.d: Investigate and describe the difference between the probability of an event found through experiment or simulation versus the theoretical probability of that same event.	
7.PS.2 The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on histograms.	
7.PS.2.a: Formulate questions that require the collection or acquisition of data with a focus on histograms.	
7.PS.2.b: Determine the data needed to answer a formulated question and collect the data (or acquire existing data) using various methods (e.g., observations, measurement, surveys, experiments).	
7.PS.2.c: Determine how sample size and randomness will ensure that the data collected is a sample that is representative of a larger population.	
7.PS.2.d: Organize and represent numerical data using histograms with and without the use of technology.	1. Create histograms LGG

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7.PS.2.e: Investigate and explain how using different intervals could impact the representation of the data in a histogram.	
7.PS.2.f: Compare data represented in histograms with the same data represented in other graphs, including but not limited to line plots (dot plots), circle graphs, and stem-and-leaf plots, and justify which graphical representation best represents the data.	
7.PS.2.g: Analyze data represented in histograms by making observations and drawing conclusions. Determine how histograms reveal patterns in data that cannot be easily seen by looking at the corresponding given data set.	1. Interpret histograms XMF

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7.PFA | Patterns, Functions, and Algebra

7.PFA.1 The student will investigate and analyze proportional relationships between two quantities using verbal descriptions, tables, equations in $y = mx$ form, and graphs, including problems in context.

7.PFA.1.a: Determine the slope, *m*, as the rate of change in a proportional relationship between two quantities given a table of values, graph, or contextual situation and write an equation in the form $y = mx$ to represent the direct variation relationship. Slope may include positive or negative values (slope will be limited to positive values in a contextual situation).

Constant of proportionality

1. Find the constant of proportionality from a table LKZ
2. Find the constant of proportionality from a graph ZUT

Write equations

3. Write equations for proportional relationships from tables 6GU
4. Write equations for proportional relationships from graphs JKH

7.PFA.1.b: Identify and describe a line with a slope that is positive, negative, or zero (0), given a graph.

7.PFA.1.c: Graph a line representing a proportional relationship, between two quantities given an ordered pair on the line and the slope, *m*, as rate of change. Slope may include positive or negative values.

7.PFA.1.d: Graph a line representing a proportional relationship between two quantities given the equation of the line in the form $y = mx$, where *m* represents the slope as rate of change. Slope may include positive or negative values.

1. Complete a table and graph a proportional relationship 5DR
2. Graph proportional relationships from equations AG2

7.PFA.1.e: Make connections between and among representations of a proportional relationship between two quantities using problems in context, tables, equations, and graphs. Slope may include positive or negative values (slope will be limited to positive values in a contextual situation).

1. Write equations for proportional relationships from tables 6GU
2. Write equations for proportional relationships from graphs JKH
3. Graph a proportional relationship: word problems FJW
4. Interpret graphs of proportional relationships RMH

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7.PFA.2 The student will simplify numerical expressions, simplify and generate equivalent algebraic expressions in one variable, and evaluate algebraic expressions for given replacement values of the variables.

7.PFA.2.a: Use the order of operations and apply the properties of real numbers to simplify numerical expressions. Exponents are limited to 1, 2, 3, or 4 and bases are limited to positive integers. Expressions should not include braces { } but may include brackets [ ] and absolute value bars | |. Square roots are limited to perfect squares.

1. Evaluate numerical expressions involving exponents D7P

7.PFA.2.b: Represent equivalent algebraic expressions in one variable using concrete manipulatives and pictorial representations (e.g., colored chips, algebra tiles).

1. Simplify expressions by combining like terms: with algebra tiles PCU

7.PFA.2.c: Simplify and generate equivalent algebraic expressions in one variable by applying the order of operations and properties of real numbers. Expressions may require combining like terms to simplify. Expressions will include only linear and numeric terms. Coefficients and numeric terms may be positive or negative rational numbers.

1. Simplify expressions by combining like terms JJG
2. Simplify expressions using properties AH7

7.PFA.2.d: Use the order of operations and apply the properties of real numbers to evaluate algebraic expressions for given replacement values of the variables. Exponents are limited to 1, 2, 3, or 4 and bases are limited to positive integers. Expressions should not include braces { } but may include brackets [ ] and absolute value bars | |. Square roots are limited to perfect squares. Limit the number of replacements to no more than three per expression. Replacement values may be positive or negative rational numbers.

1. Evaluate linear expressions UG6
2. Evaluate multi-variable expressions T56
3. Evaluate absolute value expressions YL5
4. Evaluate variable expressions LKM

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7.PFA.3 The student will write and solve two-step linear equations in one variable, including problems in context, that require the solution of a two-step linear equation in one variable.

7.PFA.3.a: Represent and solve two-step linear equations in one variable using a variety of concrete materials and pictorial representations.

1. Model and solve equations using algebra tiles EGK
2. Write and solve equations that represent diagrams FVH

7.PFA.3.b: Apply properties of real numbers and properties of equality to solve two-step linear equations in one variable. Coefficients and numeric terms will be rational.

1. Solve two-step equations without parentheses CMX
2. Solve two-step equations: complete the solution X2L
3. Solve equations of the form $px + q = r$ with fractions Y6Q

7.PFA.3.c: Confirm algebraic solutions to linear equations in one variable.

1. Which x satisfies a two-step equation? MQV

7.PFA.3.d: Write a two-step linear equation in one variable to represent a verbal situation, including those in context.

1. Choose two-step equations: word problems ZFP

7.PFA.3.e: Create a verbal situation in context given a two-step linear equation in one variable.

7.PFA.3.f: Solve problems in context that require the solution of a two-step linear equation.

1. Solve two-step equations: word problems QPG

7.PFA.4 The student will write and solve one- and two-step linear inequalities in one variable, including problems in context, that require the solution of a one- and two-step linear inequality in one variable.

7.PFA.4.a: Apply properties of real numbers and the addition, subtraction, multiplication, and division properties of inequality to solve one- and two-step inequalities in one variable. Coefficients and numeric terms will be rational.

1. Solve one-step inequalities QWH
2. Solve two-step inequalities XGQ

7.PFA.4.b: Investigate and explain how the solution set of a linear inequality is affected by multiplying or dividing both sides of the inequality statement by a rational number less than zero.

7.PFA.4.c: Represent solutions to one- or two-step linear inequalities in one variable algebraically and graphically using a number line.

1. Graph solutions to one-step inequalities TFK
2. Graph solutions to two-step inequalities 6TT

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7.PFA.4.d: Write one- or two-step linear inequalities in one variable to represent a verbal situation, including those in context.	
7.PFA.4.e: Create a verbal situation in context given a one or two-step linear inequality in one variable.	
7.PFA.4.f: Solve problems in context that require the solution of a one- or two-step inequality.	1. One-step inequalities: word problems 6HD
7.PFA.4.g: Identify a numerical value(s) that is part of the solution set of as given one- or two-step linear inequality in one variable.	1. Solutions to inequalities 8BA
7.PFA.4.h: Describe the differences and similarities between solving linear inequalities in one variable and linear equations in one variable.	

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8.NS | Number and Number Sense

8.NS.1 The student will compare and order real numbers and determine the relationships between real numbers.

8.NS.1.a: Estimate and identify the two consecutive natural numbers between which the positive square root of a given number lies and justify which natural number is the better approximation. Numbers are limited to natural numbers from 1 to 400.

1. Estimate positive square roots XWJ

8.NS.1.b: Use rational approximations (to the nearest hundredth) of irrational numbers to compare, order, and locate values on a number line. Radicals may include both positive and negative square roots of values from 0 to 400 yielding an irrational number.

1. Estimate positive and negative square roots 96T
2. Irrational numbers on number lines U7A

8.NS.1.c: Use multiple strategies (e.g., benchmarks, number line, equivalency) to compare and order no more than five real numbers expressed as integers, fractions (proper or improper), decimals, mixed numbers, percents, numbers written in scientific notation, radicals, and Π. Radicals may include both positive and negative square roots of values from 0 to 400. Ordering may be in ascending or descending order. Justify solutions orally, in writing or with a model.

Compare and order rational numbers

1. Compare and order integers T2M
2. Compare rational numbers MUK
3. Put rational numbers in order QP5
4. Compare percents to fractions and decimals 22V

Compare numbers in scientific notation

5. Compare numbers written in scientific notation RHT

Checkpoint opportunity

1. Checkpoint: Compare and order real numbers SCD

8.NS.2 The student will investigate and describe the relationship between the subsets of the real number system.

8.NS.2.a: Describe and illustrate the relationships among the subsets of the real number system by using representations (e.g., graphic organizers, number lines). Subsets include rational numbers, irrational numbers, integers, whole numbers, and natural numbers.

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8.NS.2.b: Classify and explain why a given number is a member of a particular subset or subsets of the real number system.	1. Classify numbers VR7
8.NS.2.c: Describe each subset of the set of real numbers and include examples and non-examples.	1. Identify rational and irrational square roots UGE 2. Identify rational and irrational numbers NV6
Checkpoint opportunity	1. Checkpoint: Classify real numbers 7K8

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8.CE | Computation and Estimation

8.CE.1 The student will estimate and apply proportional reasoning and computational procedures to solve contextual problems.	
8.CE.1.a: Estimate and solve contextual problems that require the computation of one discount or markup and the resulting sale price.	1. Percent of a number: tax, discount, and more KZZ
8.CE.1.b: Estimate and solve contextual problems that require the computation of the sales tax, tip and resulting total.	1. Percent of a number: tax, discount, and more KZZ 2. Find the percent: tax, discount, and more KCF 3. Multi-step problems with percents XXP 4. Estimate tips S6X
8.CE.1.c: Estimate and solve contextual problems that require the computation of the percent increase or decrease.	1. Percent of change: word problems YHP

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8.MG | Measurement and Geometry

8.MG.1 The student will use the relationships among pairs of angles that are vertical angles, adjacent angles, supplementary angles, and complementary angles to determine the measure of unknown angles.

8.MG.1.a: Identify and describe the relationship between pairs of angles that are vertical, adjacent, supplementary, and complementary.

1. Identify complementary, supplementary, vertical, adjacent, and congruent angles HGV

8.MG.1.b: Use the relationships among supplementary, complementary, vertical, and adjacent angles to solve problems, including those in context, involving the measure of unknown angles.

1. Find measures of complementary, supplementary, vertical, and adjacent angles R2B
2. Write and solve equations using angle relationships DBV

8.MG.2 The student will investigate and determine the surface area of square-based pyramids and the volume of cones and square-based pyramids.

8.MG.2.a: Determine the surface area of square-based pyramids by using concrete objects, nets, diagrams, and formulas.

1. Surface area of rectangular pyramids 2DG

8.MG.2.b: Determine the volume of cones and square-based pyramids, using concrete objects, diagrams, and formulas.

1. Volume of cones RAU
2. Volume of rectangular pyramids TX9

8.MG.2.c: Examine and explain the relationship between the volume of cones and cylinders, and the volume of rectangular prisms and square based pyramids.

8.MG.2.d: Solve problems in context involving volume of cones and square-based pyramids and the surface area of square-based pyramids.

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8.MG.3 The student will apply translations and reflections to polygons in the coordinate plane.

8.MG.3.a: Given a preimage in the coordinate plane, identify the coordinates of the image of a polygon that has been translated vertically, horizontally, or a combination of both.	1. Translations: find the coordinates RUP
8.MG.3.b: Given a preimage in the coordinate plane, identify the coordinates of the image of a polygon that has been reflected over the *x*- or *y*-axis.	1. Reflections over the x- and y-axes: find the coordinates 5UM
8.MG.3.c: Given a preimage in the coordinate plane, identify the coordinates of the image of a polygon that has been translated and reflected over the *x*- or *y*-axis or reflected over the *x*- or *y*-axis and then translated.	
8.MG.3.d: Sketch the image of a polygon that has been translated vertically, horizontally, or a combination of both.	1. Translations: graph the image XUS
8.MG.3.e: Sketch the image of a polygon that has been reflected over the *x*- or *y*-axis.	1. Reflections over the x- and y-axes: graph the image 74Z
8.MG.3.f: Sketch the image of a polygon that has been translated and reflected over the *x*- or *y*-axis, or reflected over the *x*- or *y*-axis and then translated.	1. Sequences of transformations: translations and reflections RNN
8.MG.3.g: Identify and describe transformations in context (e.g., tiling, fabric, wallpaper designs, art).	1. Identify reflections and translations TZ8

8.MG.4 The student will apply the Pythagorean Theorem to solve problems involving right triangles, including those in context.

8.MG.4.a: Verify the Pythagorean Theorem using diagrams, concrete materials, and measurement.	
8.MG.4.b: Determine whether a triangle is a right triangle given the measures of its three sides.	1. Converse of the Pythagorean theorem: is it a right triangle? EQZ
8.MG.4.c: Identify the parts of a right triangle (the hypotenuse and the legs) given figures in various orientations.	

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8.MG.4.d: Determine the measure of a side of a right triangle, given the measures of the other two sides.	1. Pythagorean theorem: find the length of the hypotenuse 7ZL 2. Pythagorean theorem: find the missing leg length Y9C 3. Pythagorean theorem: find the missing leg or hypotenuse length MTM
8.MG.4.e: Apply the Pythagorean Theorem, and its converse, to solve problems involving right triangles in context.	1. Pythagorean theorem: find the perimeter VGE 2. Pythagorean theorem: word problems 87U
Checkpoint opportunity	1. Checkpoint: The Pythagorean theorem 99F

8.MG.5 The student will solve area and perimeter problems involving composite plane figures, including those in context.

8.MG.5.a: Subdivide a plane figure into triangles, rectangles, squares, trapezoids, parallelograms, circles, and semicircles. Determine the area of subdivisions and combine to determine the area of the composite plane figure.	1. Area of parallelograms AD8 2. Area of trapezoids 2YU 3. Area of composite figures TJU
8.MG.5.b: Subdivide a plane figure into triangles, rectangles, squares, trapezoids, parallelograms, and semicircles. Use the attributes of the subdivisions to determine the perimeter of the composite plane figure.	1. Perimeter of parallelograms and trapezoids T2E
8.MG.5.c: Apply perimeter, circumference, and area formulas to solve contextual problems involving composite plane figures.	1. Semicircles: calculate area, perimeter, radius, and diameter M73

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8.PS | Probability and Statistics

8.PS.1 The student will use statistical investigation to determine the probability of independent and dependent events, including those in context.	
8.PS.1.a: Determine whether two events are independent or dependent and explain how replacement impacts the probability.	1. Identify independent and dependent events SRF
8.PS.1.b: Compare and contrast the probability of independent and dependent events.	
8.PS.1.c: Determine the probability of two independent events.	1. Probability of independent and dependent events SAS
8.PS.1.d: Determine the probability of two dependent events.	1. Probability of independent and dependent events SAS
8.PS.2 The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on boxplots.	
8.PS.2.a: Formulate questions that require the collection or acquisition of data with a focus on boxplots.	
8.PS.2.b: Determine the data needed to answer a formulated question and collect the data (or acquire existing data) using various methods (e.g., observations, measurement, surveys, experiments).	
8.PS.2.c: Determine how statistical bias might affect whether the data collected from the sample is representative of the larger population.	1. Identify representative, random, and biased samples CSR
8.PS.2.d: Organize and represent a numeric data set of no more than 20 items, using boxplots, with and without the use of technology.	1. Box plots YVZ
8.PS.2.e: Identify and describe the lower extreme (minimum), upper extreme (maximum), median, upper quartile, lower quartile, range, and interquartile range given a data set, represented by	1. Calculate quartiles and interquartile range 9RU

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a boxplot.	
8.PS.2.f: Describe how the presence of an extreme data point (outlier) affects the shape and spread of the data distribution of a boxplot.	1. Identify an outlier G95
8.PS.2.g: Analyze data represented in a boxplot by making observations and drawing conclusions.	1. Box plots YVZ
8.PS.2.h: Compare and analyze two data sets represented in boxplots.	1. Compare populations using box plots QJC
8.PS.2.i: Given a contextual situation, justify which graphical representation (e.g., pictographs, bar graphs, line graphs, line plots/dot plots, stem-and-leaf plots, circle graphs, histograms, and boxplots) best represents the data.	1. Choose the best type of graph 5XX
8.PS.2.j: Identify components of graphical displays that can be misleading.	
8.PS.3 The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on scatterplots.	
8.PS.3.a: Formulate questions that require the collection or acquisition of data with a focus on scatterplots.	
8.PS.3.b: Determine the data needed to answer a formulated question and collect the data (or acquire existing data) of no more than 20 items using various methods (e.g., observations, measurement, surveys, experiments).	
8.PS.3.c: Organize and represent numeric bivariate data using scatterplots with and without the use of technology.	1. Create scatter plots AVL
8.PS.3.d: Make observations about a set of data points in a scatterplot as having a positive linear relationship, a negative linear relationship, or no relationship.	1. Identify trends with scatter plots GZE

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8.PS.3.e: Analyze and justify the relationship of the quantitative bivariate data represented in scatterplots.	1. Interpret scatter plots 66P 2. Make predictions with scatter plots CM7 3. Outliers in scatter plots RP8
8.PS.3.f: Sketch the line of best fit for data represented in a scatterplot.	1. Identify lines of best fit BG7 2. Write equations for lines of best fit ZQ6
Checkpoint opportunity	1. Checkpoint: Scatter plots and lines of best fit 37M

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8.PFA | Patterns, Functions, and Algebra

8.PFA.1 The student will represent, simplify, and generate equivalent algebraic expressions in one variable.

8.PFA.1.a: Represent algebraic expressions using concrete manipulatives or pictorial representations (e.g., colored chips, algebra tiles), including expressions that apply the distributive property.

1. Simplify expressions by combining like terms: with algebra tiles L5X
2. Multiply using the distributive property: area models 8P3
3. Identify equivalent linear expressions using algebra tiles MPU

8.PFA.1.b: Simplify and generate equivalent algebraic expressions in one variable by applying the order of operations and properties of real numbers. Expressions may need to be expanded (using the distributive property) or require combining like terms to simplify. Expressions will include only linear and numeric terms. Coefficients and numeric terms may be rational.

Simplify expressions

1. Simplify expressions by combining like terms HN2
2. Multiply using the distributive property U7T
3. Write equivalent expressions using properties QFJ
4. Add and subtract linear expressions QCY

Identify equivalent linear expressions

5. Identify equivalent linear expressions I RUK
6. Identify equivalent linear expressions II YP8
7. Identify equivalent linear expressions: word problems 7YG

8.PFA.2 The student will determine whether a given relation is a function and determine the domain and range of a function.

8.PFA.2.a: Determine whether a relation, represented by a set of ordered pairs, a table, or a graph of discrete points is a function. Sets are limited to no more than 10 ordered pairs.

1. Identify functions ELJ

8.PFA.2.b: Identify the domain and range of a function represented as a set of ordered pairs, a table, or a graph of discrete points.

1. Domain and range of functions JZD

Checkpoint opportunity

1. Checkpoint: Understand functions QLR

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8.PFA.3 The student will represent and solve problems, including those in context, by using linear functions and analyzing their key characteristics (the value of the *y*-intercept (*b*) and the coordinates of the ordered pairs in graphs will be limited to integers).

8.PFA.3.a: Determine how adding a constant (*b*) to the equation of a proportional relationship $y = mx$ will translate the line on a graph.

8.PFA.3.b: Describe key characteristics of linear functions including slope (*m*), *y*-intercept (*b*), and independent and dependent variables.

Independent and dependent variables

1. Identify independent and dependent variables FSF

Characteristics of linear functions

2. Find the slope from a graph D7M
3. Find the slope from two points ZAC
4. Find the slope from a table GSB
5. Slope-intercept form: find the slope and y-intercept U55
6. Interpret the slope and y-intercept of a linear function H5B

8.PFA.3.c: Graph a linear function given a table, equation, or a situation in context.

1. Graph a line from an equation in slope-intercept form W5E

8.PFA.3.d: Create a table of values for a linear function given a graph, equation in the form of $y = mx + b$, or context.

1. Complete a table for a linear function D9B
2. Complete a table and graph a linear function DC2
3. Complete a table for the graph of a line HDK

8.PFA.3.e: Write an equation of a linear function in the form $y = mx + b$, given a graph, table, or a situation in context.

1. Write a linear equation from a slope and y-intercept WHP
2. Write a linear equation from a graph WHM
3. Write a linear function from a table UYY
4. Write linear functions: word problems YK6

8.PFA.3.f: Create a context for a linear function given a graph, table, or equation in the form $y = mx + b$.

Checkpoint opportunity

1. Checkpoint: Construct, interpret, and graph linear functions UPX
2. Checkpoint: Interpret slopes and y-intercepts 6F7

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8.PFA.4 The student will write and solve multistep linear equations in one variable, including problems in context that require the solution of a multistep linear equation in one variable.

8.PFA.4.a: Represent and solve multistep linear equations in one variable with the variable on one or both sides of the equation (up to four steps) using a variety of concrete materials and pictorial representations.

1. Model and solve equations using algebra tiles D45
2. Write and solve equations that represent diagrams G6N

8.PFA.4.b: Apply properties of real numbers and properties of equality to solve multistep linear equations in one variable (up to four steps). Coefficients and numeric terms will be rational. Equations may contain expressions that need to be expanded (using the distributive property) or require combining like terms to solve.

Properties of equality

1. Properties of equality 7WL
2. Identify equivalent equations J48

Two-step equations

3. Solve two-step equations JXD
4. Solve two-step equations: complete the solution GK7
5. Solve equations involving like terms Q2B

Multi-step equations

6. Solve equations with variables on both sides ZYL
7. Solve equations with variables on both sides: fractional coefficients UEM
8. Solve equations with the distributive property 8RP
9. Solve multi-step equations 55K
10. Solve multi-step equations with fractional coefficients 2AZ
11. Solve equations: mixed review HZZ
12. Solve multi-step equations: complete the solution PGH

8.PFA.4.c: Write a multistep linear equation in one variable to represent a verbal situation, including those in context.

8.PFA.4.d: Create a verbal situation in context given a multistep linear equation in one variable.

8.PFA.4.e: Solve problems in context that require the solution of a multistep linear equation.

1. Solve two-step equations: word problems XYM
2. Solve equations with variables on both sides: word problems BRX

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8.PFA.4.f: Interpret algebraic solutions in context to linear equations in one variable.	
8.PFA.4.g: Confirm algebraic solutions to linear equations in one variable.	1. Which x satisfies an equation? BVQ
Checkpoint opportunity	1. Checkpoint: Solve linear equations 6JQ

8.PFA.5 The student will write and solve multistep linear inequalities in one variable, including problems in context that require the solution of a multistep linear inequality in one variable.

8.PFA.5.a: Apply properties of real numbers and properties of inequality to solve multistep linear inequalities (up to four steps) in one variable with the variable on one or both sides of the inequality. Coefficients and numeric terms will be rational. Inequalities may contain expressions that need to be expanded (using the distributive property) or require combining like terms to solve.	1. Solve multi-step inequalities 6AZ 2. Solve inequalities with integers: variables on both sides JM5 3. Solve inequalities with decimals: variables on both sides NBK
8.PFA.5.b: Represent solutions to inequalities algebraically and graphically using a number line.	1. Graph solutions to multi-step inequalities HKW
8.PFA.5.c: Write multistep linear inequalities in one variable to represent a verbal situation, including those in context.	
8.PFA.5.d: Create a verbal situation in context given a multistep linear inequality in one variable.	
8.PFA.5.e: Solve problems in context that require the solution of a multistep linear inequality in one variable.	
8.PFA.5.f: Identify a numerical value(s) that is part of the solution set of a given inequality.	1. Solutions to inequalities G2U
8.PFA.5.g: Interpret algebraic solutions in context to linear inequalities in one variable.	
Checkpoint opportunity	1. Checkpoint: Solve multi-step inequalities Z7V

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