

LEVELS**K****Kindergarten****A****Grade 1****B****Grade 2****C****Grade 3****D****Grade 4****E****Grade 5****F****Grade 6****G****Grade 7****H****Grade 8**

Levels A-H correspond to grades 1 to 8 in the Common Core State Standards. During transition to CCSS, some topics may be taught in earlier or later grade levels.

OPERATIONS & ALGEBRAIC THINKING**Level K**

K.A1 Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

Level A

A.A1 Represent and solve problems involving addition and subtraction.
A.A2 Understand and apply properties of operations and the relationship between addition and subtraction.
A.A3 Add and subtract within 20. [Be fluent within 10.]
A.A4 Work with addition and subtraction equations.

Level B

B.A1 Represent and solve problems involving addition and subtraction.
B.A2 Add and subtract [fluently] within 20.
B.A3 Work with equal groups of objects to gain foundations for multiplication.

Level C

C.A1 Represent and solve problems involving multiplication and division.
C.A2 Understand properties of multiplication and the relationship between multiplication and division.
C.A3 Multiply and divide within 100.
C.A4 Solve problems involving the four operations, and identify and explain patterns in arithmetic.

Level D

D.A1 Use the four operations with whole numbers to solve problems.
D.A2 Gain familiarity with factors and multiples.
D.A3 Generate and analyze patterns.

Level E

E.A1 Write and interpret numerical expressions.
E.A2 Analyze patterns and relationships.

EXPRESSIONS & EQUATIONS**Level F**

F.E1 Apply and extend previous understandings of arithmetic to algebraic expressions.
F.E2 Reason about and solve one-variable equations and inequalities.
F.E3 Represent and analyze quantitative relationships between dependent and independent variables.

Level G

G.E1 Use properties of operations to generate equivalent expressions.
G.E2 Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Level H (Includes Functions Domain)

H.E1 Work with radicals and integer exponents.
H.E2 Understand the connections between proportional relationships, lines, and linear equations.
H.E3 Analyze and solve linear equations and pairs of simultaneous linear equations.
H.E4 Define, evaluate, and compare functions.
H.E5 Use functions to model relationships between quantities.

NUMBER & OPERATIONS IN BASE TEN**Level K**

K.B1 Work with numbers 11-19 to gain foundations for place value.

Level A

A.B1 Extend the counting sequence [to 120].
A.B2 Understand place value [to 100].
A.B3 Use place value understanding and properties of operations to add and subtract [within 100].

Level B

B.B1 Understand place value [to 1000].
B.B2 Use place value understanding and properties of operations to add and subtract [within 1000, fluently within 100].

Level C

C.B1 Use place value and properties of operations to perform multi-digit arithmetic. [Add & subtract fluently within 1000. Multiply 10s by 1-digit numbers.]

Level D

D.B1 Generalize place value understanding for multi-digit whole numbers [to 1,000,000].
D.B2 Use place value understanding and properties of operations to perform multi-digit arithmetic. [Add & subtract fluently. Multiply & divide numbers up to 4-digits by 1-digit, and multiply two 2-digit numbers.]

Level E

E.B1 Understand the place value system.
E.B2* Perform operations with multi-digit whole numbers. [Divide by 2-digit numbers. Fluently add, subtract, multiply.]
E.B3* Perform operations with decimals to hundredths.

THE NUMBER SYSTEM**Level F**

F.N1 Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
F.N2 Compute fluently [all operations] with multi-digit numbers and find common factors and multiples.
F.N3 Apply and extend previous understandings of numbers to the system of rational numbers.

Level G

G.N1* Apply and extend previous understandings of operations with fractions to add and subtract rational numbers.
G.N2* Apply and extend previous understandings of operations with fractions to multiply and divide rational numbers.

Level H

H.N1 Know that there are numbers that are not rational, and approximate them by rational numbers.

CONTENT CODES**Common Core State Standards****MATH K-8**

This chart shows all cluster overview statements from CCSS by strands, along with content codes for practice and assessment items. Content in brackets is for clarification purposes only.

COUNTING & CARDINALITY**Level K**

K.C1 Know number names and the count sequence.
K.C2 Count to tell the number of objects.
K.C3 Compare numbers.

NUMBER & OPERATIONS WITH FRACTIONS**Level C**

C.F1 Develop understanding of fractions as numbers. [Use denominators of 2, 3, 4, 6, and 8.]

Level D

D.F1 Extend understanding of fraction equivalence and ordering.
D.F2 Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
D.F3 Understand decimal notation for fractions, and compare decimal fractions.

Level E

E.F1 Use equivalent fractions as a strategy to add and subtract fractions.
E.F2 Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

RATIOS & PROPORTIONAL RELATIONSHIPS**Level F**

F.R1 Understand ratio concepts and use ratio reasoning [and percents] to solve problems.

Level G

G.R1* Analyze proportional relationships and use them to solve real-world and mathematical problems.
G.R2* Solve multistep percent problems.

GEOMETRY**Level K**

K.G1 Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).
K.G2 Analyze, compare, create, and compose shapes.

Level A

A.G1 Reason with shapes and their attributes. [Partition circles & rectangles into 2 or 4 equal parts.]

Level B

B.G1 Reason with shapes and their attributes. [Identify shapes by the number of sides.]

Level C

C.G1 Reason with shapes and their attributes. [Identify types of quadrilaterals.]

Level D

D.G1 Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

Level E

E.G1 Graph points on the coordinate plane to solve real-world and mathematical problems.
E.G2 Classify two-dimensional figures into categories based on their properties.

Level F

F.G1 Solve real-world and mathematical problems involving area, surface area, and volume.

Level G

G.G1 Draw, construct, and describe geometrical figures and describe the relationships between them.
G.G2 Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Level H

H.G1 Understand congruence and similarity using physical models, transparencies, or geometry software.
H.G2 Understand and apply the Pythagorean Theorem.
H.G3 Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.

MEASUREMENT & DATA**Level K**

K.M1 Describe and compare measurable attributes.
K.M2 Classify objects and count the number of objects in each category.

Level A

A.M1 Measure lengths indirectly and by iterating length units.
A.M2 Tell and write time.
A.M3 Represent and interpret data.

Level B

B.M1 Measure and estimate lengths in standard units.
B.M2 Relate addition and subtraction to length.
B.M3 Work with time and money.
B.M4 Represent and interpret data.

Level C

C.M1 Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.
C.M2 Represent and interpret data.
C.M3 Understand concepts of area and relate area to multiplication and to addition.
C.M4 Recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

Level D

D.M1 Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
D.M2 Represent and interpret data.
D.M3 Understand concepts of angle and measure angles.

Level E

E.M1 Convert like measurement units within a given measurement system.
E.M2 Represent and interpret data.
E.M3 Understand concepts of volume and relate volume to multiplication and to addition.

STATISTICS & PROBABILITY**Level F**

F.S1 Develop understanding of statistical variability.
F.S2 Summarize and describe distributions.

Level G

G.S1 Use random sampling to draw inferences about a population.
G.S2 Draw informal comparative inferences about two populations.
G.S3 Investigate chance processes & develop, use, and evaluate probability models.

Level H

H.S1 Investigate patterns of association in bivariate data.

Checklist of Problem Types

MATH Level K

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NAME _____

DATE _____

COUNTING & CARDINALITY

K.C1 Know number names and the count sequence.

- ___ 1 Count to 100 by ones and by tens.
- ___ 2 Count forward in known range beginning from any number.
- ___ 3 Write numerals from 0 to 9.
- ___ 4 Write a stated number 0 to 20 when given verbal name.

K.C2 Count to tell the number of objects.

- ___ 1 Count objects accurately by saying one number for each object.
- ___ 2 Write the number of objects that have been counted.
- ___ 3 Given a row of objects and the number, write the number for a row that has one more.
- ___ 4 Write the number for up to 10 objects in any configuration.
- ___ 5 Write the number for up to 20 objects in a line.
- ___ 6 Write the number for up to 20 objects in a circle.
- ___ 7 Write the number for up to 20 objects in an array.

K.C3 Compare numbers.

- ___ 1 Compare two groups of up to 10 objects by one-to-one matching.
- ___ 2 Compare two groups of up to 10 objects by counting.
- ___ 3 Compare two numbers between 1 and 10 presented as written numerals.

OPERATIONS & ALGEBRAIC THINKING

K.A1 Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

- ___ 1 Represent addition and subtraction with objects, fingers, or claps.
- ___ 2 Represent addition and subtraction with drawings.
- ___ 3 Represent addition and subtraction with equations.
- ___ 4 Add within 10 by using objects or drawings.
- ___ 5 Subtract within 10 by using objects or drawings.
- ___ 6 Decompose numbers to 10 into pairs in more than one way.
- ___ 7 Find missing addends to make 10 by using objects or drawings.
- ___ 8 Fluently add and subtract within 5.

NUMBER & OPERATIONS IN BASE TEN

K.B1 Work with numbers 11–19 to gain foundations for place value.

- ___ 1 Combine a group of 10 objects with a group of up to 9 objects and write the number sentence.
- ___ 2 Separate a group of 11 to 19 objects into 10 and ones, and write the number sentence.
- ___ 3 Write the missing number in a sentence that represents composition or decomposition of 11-19. (i.e. $10 + \underline{\quad} = 14$)

GEOMETRY

K.G1 Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).

- ___ 1 Identify squares, circles, triangles, rectangles, and hexagons.
- ___ 2 Identify cubes, cones, cylinders, and spheres.
- ___ 3 Describe relative positions of shapes using terms such as above, below, beside, in front of, behind, and next to.
- ___ 4 Understand that a shape can have any orientation or size.
- ___ 5 Identify shapes as flat or solid.

K.G2 Analyze, compare, create, and compose shapes.

- ___ 1 Analyze and compare two-dimensional shapes.
- ___ 2 Analyze and compare three-dimensional shapes.
- ___ 3 Build simple models of flat shapes.
- ___ 4 Draw simple two-dimensional shapes.
- ___ 5 Build simple models of solid shapes.
- ___ 6 Put simple flat shapes together to form larger shapes.

MEASUREMENT & DATA

K.M1 Describe and compare measurable attributes.

- ___ 1 Describe measurable attributes of objects, such as length or weight.
- ___ 2 Directly compare objects to see which is taller/shorter.
- ___ 3 Directly compare objects to see which is longer/shorter.
- ___ 4 Directly compare objects to see which is heavier/lighter.

K.M2 Classify objects and count the number of objects in each category.

- ___ 1 Given a group of mixed objects, classify objects into given categories.
- ___ 2 For a group of mixed objects, count objects in a given category.
- ___ 3 Tell which category has the most/least objects.
- ___ 4 Given a group of mixed objects, sort the categories by count.

Checklist of Problem Types

MATH Level A

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NAME _____

DATE _____

OPERATIONS & ALGEBRAIC THINKING

A.A1 Represent and solve problems involving addition and subtraction.

- ___ 1 Add and subtract within 20 to solve word problems about combining or separating.
- ___ 2 Add and subtract within 20 to solve word problems about comparing.
- ___ 3 Use objects or drawings to represent word problems.
- ___ 4 Use equations to represent word problems.
- ___ 5 Add three numbers with sums to 20 to solve word problems.

A.A2 Understand and apply properties of operations and the relationship between addition and subtraction.

- ___ 1 Apply the commutative property for addition.
- ___ 2 Apply the associative property when adding three numbers.
- ___ 3 Relate subtraction to finding a missing addend.

A.A3 Add and subtract within 20.

- ___ 1 Relate counting on or back to adding or subtracting 1 or 2.
- ___ 2 Relate counting on or back to adding or subtracting 3.
- ___ 3 Add fluently within 10.
- ___ 4 Subtract fluently within 10.
- ___ 5 Find sums greater than 10 by decomposing to make 10.
- ___ 6 Subtract from numbers greater than 10 by decomposing to make 10.
- ___ 7 Subtract by recalling addition facts.
- ___ 8 Add within 20 (using various strategies).
- ___ 9 Subtract within 20 (using various strategies).

A.A4 Work with addition and subtraction equations.

- ___ 1 Determine if equations involving addition and/or subtraction are true or false.
- ___ 2 Find a missing number in an addition equation.
- ___ 3 Find a missing number in a subtraction equation.

NUMBER & OPERATIONS IN BASE TEN

A.B1 Extend the counting sequence.

- ___ 1 Count to 120, starting at any number less than 120.
- ___ 2 Read and write numbers to 120.
- ___ 3 Represent a number of objects to 120 with a written numeral.

A.B2 Understand place value.

- ___ 1 Understand that the two digits of a two-digit number represent amounts of tens and ones.
- ___ 2 Understand how to represent numbers from 11 to 19 as a 10 and ones.
- ___ 3 Understand that 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to tens with no ones.
- ___ 4 Compare numbers to 20 using the symbols $>$, $=$, and $<$.
- ___ 5 Compare two 2-digit numbers using the symbols $>$, $=$, and $<$.

A.B3 Use place value understanding and properties of operations to add and subtract.

- ___ 1 Add within 100 using models or drawings.
- ___ 2 Add a two-digit number and a one-digit number.
- ___ 3 Add a two-digit number and a multiple of 10.
- ___ 4 Add two two-digit numbers, with or without composing a ten.
- ___ 5 Mentally find 10 more or 10 less than any two-digit number.
- ___ 6 Subtract with multiples of 10 using models or drawings.
- ___ 7 Subtract with multiples of 10 using place value.
- ___ 8 Subtract with multiples of 10 by relating to addition.

GEOMETRY

A.G1 Reason with shapes and their attributes.

- ___ 1 Sort shapes by a defining attribute such as the number of sides.
- ___ 2 Draw shapes with a given defining attribute.
- ___ 3 Combine two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) to create a composite shape.
- ___ 4 Combine three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape.
- ___ 5 Partition circles and rectangles into two and four equal shares.
- ___ 6 Describe shares of wholes using the words halves, fourths, and quarters.

MEASUREMENT & DATA

A.M1 Measure lengths indirectly and by iterating length units.

- ___ 1 Order three objects by length.
- ___ 2 Compare the lengths of two objects indirectly by using a third object.
- ___ 3 Repeat a short object end-to-end to measure a longer object.
- ___ 4 When measuring, know that there cannot be gaps or overlaps.

A.M2 Tell and write time.

- ___ 1 Tell and write time in hours using analog clocks.
- ___ 2 Tell and write time in half-hours using analog clocks.
- ___ 3 Tell and write time in hours and half-hours using digital clocks.

A.M3 Represent and interpret data.

- ___ 1 Organize and represent data with up to three categories.
- ___ 2 Interpret data with up to three categories.

Checklist of Problem Types

MATH Level B

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NAME _____

DATE _____

OPERATIONS & ALGEBRAIC THINKING

B.A1 Represent and solve problems involving addition and subtraction.

- ___ 1 Add and subtract within 100 to solve word problems about combining or separating.
- ___ 2 Add and subtract within 100 to solve word problems about comparing.
- ___ 3 Use objects or drawings to represent word problems.
- ___ 4 Use equations to represent word problems.

B.A2 Add and subtract within 20.

- ___ 1 Fluently add within 20 using mental strategies.
- ___ 2 Fluently subtract within 20 using mental strategies.
- ___ 3 Know from memory all sums of two one-digit numbers.

B.A3 Work with equal groups of objects to gain foundations for multiplication.

- ___ 1 Find out if a group of up to 20 objects is even or odd.
- ___ 2 Express an even number as a sum of two equal addends.
- ___ 3 Add to find the number shown by an array with up to 5 rows and 5 columns.
- ___ 4 Write an equation for an array as a sum of equal addends.

NUMBER & OPERATIONS IN BASE TEN

B.B1 Understand place value.

- ___ 1 Understand that a three-digit number represents hundreds, tens, and ones.
- ___ 2 Understand that a hundred is 10 tens.
- ___ 3 Understand that 100, 200, and so on refer to hundreds with 0 tens and 0 ones.
- ___ 4 Count by 5s, 10s, and 100s within 1000.
- ___ 5 Read and write numbers to 1000.
- ___ 6 Represent numbers to 1000 as written numerals.
- ___ 7 Write numbers to 1000 in expanded form.
- ___ 8 Compare two 3-digit numbers using the symbols $>$, $=$, and $<$.

B.B2 Use place value understanding and properties of operations to add and subtract.

- ___ 1 Fluently add within 100 using various strategies.
- ___ 2 Fluently subtract within 100 using various strategies.
- ___ 3 Add up to four 2-digit numbers using various strategies.
- ___ 4 Add within 1000 using models or drawings.
- ___ 5 Add within 1000 using place value strategies.
- ___ 6 Subtract within 1000 using models or drawings.
- ___ 7 Subtract within 1000 using place value strategies.
- ___ 8 Mentally find 10 or 100 more or less than any three-digit number.
- ___ 9 Explain why addition and subtraction strategies work.

GEOMETRY

B.G1 Reason with shapes and their attributes.

- ___ 1 Draw shapes having a given number of angles or sides.
- ___ 2 Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
- ___ 3 Partition a rectangle into squares and count the squares.
- ___ 4 Partition circles and rectangles into two, three, or four equal shares.
- ___ 5 Describe shares using the words halves, thirds, half of, a third of, etc.
- ___ 6 Recognize that equal shares need not have the same shape.

MEASUREMENT & DATA

B.M1 Measure and estimate lengths in standard units.

- ___ 1 Measure in inches, feet, centimeters, and meters.
- ___ 2 Measure an object with two units and relate the measurements to the unit size.
- ___ 3 Estimate lengths in inches, feet, centimeters, and meters.
- ___ 4 Measure to find out how much longer one object is than another.

B.M2 Relate addition and subtraction to length.

- ___ 1 Use drawings and equations to solve word problems involving lengths.
- ___ 2 Represent sums and differences within 100 on a number line diagram.

B.M3 Work with time and money.

- ___ 1 Tell and write time to the nearest five minutes.
- ___ 2 Write times using a.m. and p.m.
- ___ 3 Solve word problems involving dollar bills and coins, using \$ and ¢ symbols.

B.M4 Represent and interpret data.

- ___ 1 Make a line plot of measurement data, measured to nearest whole unit.
- ___ 2 Draw a bar graph with up to four categories.
- ___ 3 Draw a picture graph with up to four categories.
- ___ 4 Add or subtract to solve problems about data presented in a bar graph.

Checklist of Problem Types

MATH Level C

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OPERATIONS & ALGEBRAIC THINKING

C.A1 Represent and solve problems involving multiplication and division.

- ___ 1 Interpret multiplication as the total of equal groups.
- ___ 2 Interpret division as sharing equally or making equal shares.
- ___ 3 Use multiplication and division to solve word problems.
- ___ 4 Find the missing number in a multiplication or division equation.

C.A2 Understand properties of multiplication and the relationship between multiplication and division.

- ___ 1 Apply the commutative and associative properties for multiplication.
- ___ 2 Apply the distributive property when learning basic facts.
- ___ 3 Relate division to finding a missing factor.

C.A3 Multiply and divide within 100.

- ___ 1 Fluently multiply to find products of two one-digit numbers.
- ___ 2 Fluently divide numbers to 100 by one-digit numbers.

C.A4 Solve problems involving the four operations, and identify and explain patterns in arithmetic.

- ___ 1 Represent and solve two-step word problems using addition and/or subtraction.
- ___ 2 Represent and solve two-step word problems using multiplication and/or division.
- ___ 3 Represent and solve two-step word problems using any two operations.
- ___ 4 Identify and explain arithmetic patterns.

NUMBER & OPERATIONS IN BASE TEN

C.B1 Use place value understanding and properties of operations to perform multi-digit arithmetic.

- ___ 1 Round numbers to the nearest 10 or 100.
- ___ 2 Fluently add numbers with sums to 1000.
- ___ 3 Fluently subtract from numbers to 1000.
- ___ 4 Subtract by relating to addition.
- ___ 5 Multiply one-digit numbers by multiples of 10 up to 90.

NUMBER & OPERATIONS WITH FRACTIONS

C.F1 Develop understanding of fractions as numbers. [Use denominators of 2, 3, 4, 6, and 8.]

- ___ 1 Write a fraction to represent one or more equal parts of a whole unit.
- ___ 2 Write fractions to represent lengths of intervals on a number line.
- ___ 3 Write fractions to represent locations on a number line.
- ___ 4 Recognize that equivalent fractions are the same size.
- ___ 5 Recognize and generate simple equivalent fractions.
- ___ 6 Recognize fractions equivalent to whole numbers.
- ___ 7 Compare two fractions with the same numerator or denominator.

GEOMETRY

C.G1 Reason with shapes and their attributes.

- ___ 1 Categorize quadrilaterals including rhombuses, rectangles, and squares by their attributes.
- ___ 2 Partition shapes into parts with equal areas to represent unit fractions.

NAME _____

DATE _____

MEASUREMENT & DATA

C.M1 Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

- ___ 1 Write time to the nearest minute.
- ___ 2 Measure time intervals in minutes.
- ___ 3 Solve word problems involving time intervals.
- ___ 4 Measure and estimate liquid volume in liters.
- ___ 5 Solve word problems involving liquid volume.
- ___ 6 Measure and estimate mass in grams and kilograms.
- ___ 7 Solve word problems involving mass.

C.M2 Represent and interpret data.

- ___ 1 Draw a bar graph using an appropriate scale.
- ___ 2 Solve problems using information from graphs.
- ___ 3 Make line plots of data measured using rulers to 1/4 inch.

C.M3 Understand concepts of area and relate area to multiplication and to addition.

- ___ 1 Understand that area is measured in square units.
- ___ 2 Count unit squares to measure area.
- ___ 3 Relate area of a rectangle to multiplication.
- ___ 4 Solve real-world problems involving area.
- ___ 5 Represent products as rectangular areas.
- ___ 6 Use area models to represent the distributive property.
- ___ 7 Find areas by decomposing figures to make rectangles.

C.M4 Recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

- ___ 1 Find the perimeter of a polygon.
- ___ 2 Find an unknown side length in a polygon.
- ___ 3 Compare perimeters of two rectangles with the same area.
- ___ 4 Compare areas of two rectangles with the same perimeter.

Checklist of Problem Types

MATH Level D

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NUMBER & OPERATIONS IN BASE TEN

D.B1 Generalize place value understanding for multi-digit whole numbers.

- ___ 1 Relate place value to multiplication and division by 10.
- ___ 2 Read and write numbers to 1 million.
- ___ 3 Convert between standard and expanded forms of whole numbers.
- ___ 4 Compare whole numbers up to 1 million.
- ___ 5 Round multi-digit whole numbers to any place.
- ___ 6 Add and subtract whole numbers using place-value concepts.

D.B2 Use place value understanding and properties of operations to perform multi-digit arithmetic.

- ___ 1 Add multi-digit numbers using the standard algorithm.
- ___ 2 Subtract multi-digit number using the standard algorithm.
- ___ 3 Multiply 2-digit by 1-digit numbers using place value and/or models.
- ___ 4 Multiply 3- and 4-digit by 1-digit numbers using place value and/or models.
- ___ 5 Multiply 2-digit by 2-digit numbers using place value and/or models.
- ___ 6 Relate division and multiplication.
- ___ 7 Divide 2-digit dividends by 1-digit divisors using place value and/or models.
- ___ 8 Divide 3- and 4-digit dividends by 1-digit divisors using place value and/or models.

GEOMETRY

D.G1 Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

- ___ 1 Identify and draw points, lines, and line segments.
- ___ 2 Identify and draw parallel and perpendicular lines.
- ___ 3 Identify and draw rays and acute, right, and obtuse angles.
- ___ 4 Classify and identify triangles by angles.
- ___ 5 Identify and draw lines of symmetry.

NUMBER & OPERATIONS WITH FRACTIONS

D.F1 Extend understanding of fraction equivalence and ordering.

- ___ 1 Identify equivalent fractions using models.
- ___ 2 Write fractions equivalent to a given fraction.
- ___ 3 Compare fractions by rewriting them with a common denominator.
- ___ 4 Compare fractions by using models.
- ___ 5 Compare fractions by comparing to benchmarks.

D.F2 Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

- ___ 1 Decompose fractions and mixed numbers, and write as equations.
- ___ 2 Add and subtract fractions with like denominators.
- ___ 3 Add and subtract mixed numbers with like denominators.
- ___ 4 Add and subtract fractions to solve word problems.
- ___ 5 Decompose a non-unit fraction as a whole number times a unit fraction.
- ___ 6 Multiply fractions by whole numbers.

D.F3 Understand decimal notation for fractions, and compare decimal fractions.

- ___ 1 Express fractions in tenths as hundredths.
- ___ 2 Add fractions in tenths and hundredths.
- ___ 3 Convert between decimals and fractions in tenths or hundredths.
- ___ 4 Locate decimals on a number line.
- ___ 5 Compare two decimals to hundredths.

NAME _____ DATE _____

OPERATIONS & ALGEBRAIC THINKING

D.A1 Use the four operations with whole numbers to solve problems.

- ___ 1 Interpret multiplication as "times as many."
- ___ 2 Distinguish multiplicative from additive comparison in word problems.
- ___ 3 Solve number sentences involving multiple operations.
- ___ 4 Solve multi-step word problems using number sentences.
- ___ 5 Interpret remainders in division problems.
- ___ 6 Estimate to assess reasonableness of answers.

D.A2 Gain familiarity with factors and multiples.

- ___ 1 List factors pairs for numbers 1 to 100.
- ___ 2 Recognize factors and multiples.
- ___ 3 Recognize prime and composite numbers.

D.A3 Generate and analyze patterns.

- ___ 1 Complete number patterns.
- ___ 2 Generate number or shape patterns from rules.
- ___ 3 Identify and explain features of patterns.

MEASUREMENT & DATA

D.M1 Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

- ___ 1 Compare measurement units and convert from larger to smaller units.
- ___ 2 Create or complete tables of equivalent measurements.
- ___ 3 Solve problems involving distance, time, and elapsed time.
- ___ 4 Solve problems involving capacity (liquid volume) and weight (mass).
- ___ 5 Solve problems involving money.
- ___ 6 Represent measurements on number line diagrams.
- ___ 7 Solve problems involving area of rectangles.
- ___ 8 Solve problems involving perimeter of rectangles.

D.M2 Represent and interpret data.

- ___ 1 Make line plots using data including fractions.
- ___ 2 Solve problems involving data shown on a line plot.

D.M3 Understand concepts of angle and measure angles.

- ___ 1 Relate degrees to fractions of a circle.
- ___ 2 Measure and draw angles using a protractor.
- ___ 3 Solve problems involving angle measurements.

Checklist of Problem Types

MATH Level E

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NUMBER & OPERATIONS IN BASE TEN

E.B1 Understand the place value system.

- ___1 Relate place value to multiplying by 10 or $1/10$.
- ___2 Multiply and divide whole numbers by powers of 10.
- ___3 Multiply and divide decimals by powers of 10.
- ___4 Write powers of 10 using exponents.
- ___5 Read and write decimals to thousandths.
- ___6 Convert between standard and expanded forms of decimals.
- ___7 Compare decimals to thousandths.
- ___8 Round decimals to any place.

E.B2 Perform operations with multi-digit whole numbers.

- ___1 Multiply whole numbers up to 4-digit by 1-digit using the standard algorithm.
- ___2 Multiply whole numbers up to 2-digit by 2-digit using the standard algorithm.
- ___3 Relate division to multiplication by multiples of 10.
- ___4 Divide 3-digit dividends by multiples of 10 using place value and/or models.
- ___5 Relate division to multiplication by 2-digit factors.
- ___6 Divide 3- and 4-digit dividends by 2-digit divisors using place value and/or models.

E.B3 Perform operations with decimals to hundredths.

- ___1 Relate addition and subtraction of decimals.
- ___2 Add and subtract decimals to hundredths using place value and/or models.
- ___3 Relate multiplication and division of decimals.
- ___4 Multiply and divide decimals to hundredths using place value and/or models.

OPERATIONS & ALGEBRAIC THINKING

E.A1 Write and interpret numerical expressions.

- ___1 Evaluate numerical expressions with parentheses.
- ___2 Write and interpret numerical expressions.

E.A2 Analyze patterns and relationships.

- ___1 Write and compare two patterns given two rules.
- ___2 Identify features of related patterns in tables or graphs.

NUMBER & OPERATIONS WITH FRACTIONS

E.F1 Use equivalent fractions as a strategy to add and subtract fractions.

- ___1 Write equivalent fractions.
- ___2 Add and subtract fractions with unlike denominators.
- ___3 Add and subtract mixed numbers with unlike denominators.
- ___4 Add and subtract fractions to solve word problems.
- ___5 Add and subtract mixed numbers to solve word problems.
- ___6 Assess reasonableness of answers by using benchmarks and number sense.

E.F2 Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

- ___1 Interpret fractions as division to solve word problems.
- ___2 Multiply whole numbers by fractions.
- ___3 Represent multiplication of fractions using area models.
- ___4 Multiply fractions by fractions.
- ___5 Multiply fractions and mixed numbers to solve word problems.
- ___6 Divide unit fractions by whole numbers using models.
- ___7 Divide whole numbers by unit fractions using models.
- ___8 Relate division to multiplication of fractions.
- ___9 Divide with unit fractions and whole numbers to solve problems.

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GEOMETRY

E.G1 Graph points on the coordinate plane to solve real-world and mathematical problems.

- ___1 Graph and identify points with positive coordinates on a coordinate system.
- ___2 Use coordinates (positive only) to represent and solve problems.
- ___3 Use coordinates to analyze geometric shapes.

E.G2 Classify two-dimensional figures into categories based on their properties.

- ___1 Classify and identify quadrilaterals.
- ___2 Recognize categories and create hierarchies of shapes.

MEASUREMENT & DATA

E.M1 Convert like measurement units within a given measurement system.

- ___1 Convert metric measurements.
- ___2 Convert conventional measurements.

E.M2 Represent and interpret data.

- ___1 Make line plots using data including fractions.
- ___2 Solve problems about line plots.

E.M3 Understand concepts of volume and relate volume to multiplication and to addition.

- ___1 Identify a cube as a unit of volume.
- ___2 Measure volume by counting unit cubes.
- ___3 Add and/or multiply to find volumes of rectangular prisms.
- ___4 Solve problems involving volume of rectangular prisms (with whole numbers as lengths).
- ___5 Solve problems involving volumes of connected prisms.

Checklist of Problem Types

MATH Level F

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THE NUMBER SYSTEM

F.N1 Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

- ___1 Relate division and multiplication of fractions.
- ___2 Divide fractions by fractions using models.
- ___3 Divide fractions by fractions to solve problems.

F.N2 Compute fluently with multi-digit numbers and find common factors and multiples.

- ___1 Divide multi-digit numbers using the standard algorithm.
- ___2 Add and subtract multi-digit decimals.
- ___3 Multiply multi-digit decimals.
- ___4 Divide multi-digit decimals.
- ___5 Find greatest common factors.
- ___6 Find least common multiples.
- ___7 Use distributive property to isolate a common factor.

F.N3 Apply and extend previous understandings of numbers to the system of rational numbers.

- ___1 Relate positive and negative numbers to real situations.
- ___2 Write and identify opposites of integers.
- ___3 Relate opposite numbers in ordered pairs to reflections.
- ___4 Graph or identify points in four quadrants.
- ___5 Compare rational numbers using a number line.
- ___6 Write comparisons for ordering rational numbers in real situations.
- ___7 Solve problems involving coordinate graphs in four quadrants.
- ___8 Find distance between two points with the same first or second coordinate.

EXPRESSIONS & EQUATIONS

F.E1 Apply and extend previous understandings of arithmetic to algebraic expressions.

- ___1 Evaluate numerical expressions that include exponents.
- ___2 Write or interpret simple expressions with variables.
- ___3 Identify parts of an expression using mathematical terms.
- ___4 Evaluate expressions for specific values of variables.
- ___5 Evaluate formulas for specific values.
- ___6 Write equivalent expressions using the distributive property.
- ___7 Identify when two expressions are equivalent.

F.E2 Reason about and solve one-variable equations and inequalities.

- ___1 Use substitution to decide if a number is a solution to an equation.
- ___2 Use variables and expressions to represent situations.
- ___3 Write equations of the form $x + p = q$ to solve problems.
- ___4 Write equations of the form $px = q$ to solve problems.
- ___5 Write or interpret inequalities $x > c$ or $x < c$.
- ___6 Represent inequalities on number line diagrams.

F.E3 Represent and analyze quantitative relationships between dependent and independent variables.

- ___1 Use two variables to represent two related quantities.
- ___2 Graph ordered pairs of related quantities.
- ___3 Write equations to describe related variables.

RATIOS & PROPORTIONAL RELATIONSHIPS

F.R1 Understand ratio concepts and use ratio reasoning [and percents] to solve problems.

- ___1 Write and interpret ratios.
- ___2 Find unit rates related to ratios.
- ___3 Write equivalent ratios, including ratio tables.
- ___4 Use ratios to convert measurements.
- ___5 Plot pairs of ratios on the coordinate plane.
- ___6 Solve unit rate problems such as unit pricing.
- ___7 Write a fraction or ratio as a percent.
- ___8 Find a number given the part and the percent.
- ___9 Find a percent of a number.

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GEOMETRY

F.G1 Solve real-world and mathematical problems involving area, surface area, and volume.

- ___1 Find areas of triangles.
- ___2 Decompose and compose shapes into triangles and rectangles.
- ___3 Find areas of polygons.
- ___4 Use cubes to find volumes of prisms with fractional edge lengths.
- ___5 Multiply to find volumes of prisms with fractional edge lengths.
- ___6 Draw polygons given coordinates for the vertices.
- ___7 Use coordinates to calculate the length of vertical or horizontal segments.
- ___8 Represent 3-dimensional figures as nets.
- ___9 Calculate surface areas.

STATISTICS & PROBABILITY

F.S1 Develop understanding of statistical variability.

- ___1 Recognize statistical questions.
- ___2 Describe the center, spread (range), and shape of a data set.
- ___3 Recognize measures of center and variation of data.
- ___4 Display data on a dot plot.
- ___5 Display data using a histogram.
- ___6 Display data using a box plot.

F.S2 Summarize and describe distributions.

- ___1 Report the number and unit of measurement of a data set.
- ___2 Find the median and mean of a data set.
- ___3 Find the interquartile range of a data set.
- ___4 Find the mean absolute deviation of a data set.

Checklist of Problem Types

MATH Level G

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THE NUMBER SYSTEM

G.N1 Apply and extend previous understandings of operations with fractions to add and subtract rational numbers.

- ___1 Relate sums of rational numbers to movements or situations.
- ___2 Relate subtraction of rational numbers to adding the opposite.
- ___3 Find distances between rational numbers on a number line.
- ___4 Add and subtract integers.
- ___5 Add and subtract rational numbers.

G.N2 Apply and extend previous understandings of operations with fractions to multiply and divide rational numbers.

- ___1 Apply multiplication properties to rational numbers.
- ___2 Interpret products of rational numbers in real situations.
- ___3 Interpret quotients of rational numbers in real situations.
- ___4 Multiply and divide integers.
- ___5 Multiply and divide rational numbers.
- ___6 Write rational numbers as decimals.
- ___7 Compute with rational numbers to solve problems.
- ___8 Solve multi-step problems with rational numbers.

EXPRESSIONS & EQUATIONS

G.E1 Use properties of operations to generate equivalent expressions.

- ___1 Add and subtract linear expressions with rational coefficients.
- ___2 Expand or factor linear expressions.
- ___3 Interpret related expressions in real situations.

G.E2 Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

- ___1 Use operations with whole numbers to solve multi-step problems.
- ___2 Use fractions to solve multi-step problems.
- ___3 Use decimals to solve multi-step problems.
- ___4 Assess reasonableness of answers by using estimation.
- ___5 Solve linear equations of form $px + q = r$ and $p(x + q) = r$.
- ___6 Write linear equations to solve word problems.
- ___7 Relate algebraic solutions to arithmetic solutions.
- ___8 Write and solve linear inequalities for situations.
- ___9 Graph and interpret solutions to inequalities.

RATIOS & PROPORTIONAL RELATIONSHIPS

G.R1 Analyze proportional relationships and use them to solve real-world and mathematical problems.

- ___1 Calculate unit rates associated with ratios of fractions.
- ___2 Decide if two ratios or fractions form a proportion.
- ___3 Find the missing value in a proportion.
- ___4 Identify unit rates from tables, diagrams, or graphs.
- ___5 Identify unit rates from equations or verbal descriptions.
- ___6 Write equations for proportional relationships.
- ___7 Interpret points on graphs of proportions.

G.R2 Solve multi-step percent problems.

- ___1 Use percent to solve simple interest and tax problems.
- ___2 Use percent to solve markup and markdown problems.
- ___3 Use percent to solve problems about tips, commissions, and fees.
- ___4 Solve problems about percent increase or decrease.
- ___5 Calculate percent error.

GEOMETRY

G.G1 Draw, construct, and describe geometrical figures and describe the relationships between them.

- ___1 Compute lengths and areas from a scale drawing.
- ___2 Reproduce scale drawing using a different scale.
- ___3 Draw triangles given measures of sides or angles.
- ___4 Draw geometric shapes with given conditions.
- ___5 Describe two-dimensional figures that result from slicing solids.

G.G2 Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

- ___1 Recognize relationships between parts of a circle.
- ___2 Apply formulas for circumference and area of circles.
- ___3 Solve equations to find supplementary, complementary, vertical, and adjacent angles.
- ___4 Solve problems involving area and surface area.
- ___5 Solve problems involving volume of rectangular prisms.

STATISTICS & PROBABILITY

G.S1 Use random sampling to draw inferences about a population.

- ___1 Identify representative sampling methods.
- ___2 Use a sample to draw inferences about a population.
- ___3 Compare predictions from various samples.

G.S2 Draw informal comparative inferences about two populations.

- ___1 Visually compare the centers and spreads of distributions on dot plots.
- ___2 Use measures of center and variability to make inferences.

G.S3 Investigate chance processes and develop, use, and evaluate probability models.

- ___1 Compare probabilities and relate to likelihoods of events.
- ___2 Use relative frequency of outcomes to approximate probability.
- ___3 Calculate simple probabilities based on equally-likely outcomes.
- ___4 Make predictions based on relative frequency, and compare results to predictions.
- ___5 Calculate probabilities of compound events.
- ___6 Create an organized list, table, or tree diagram for a compound event.
- ___7 Design and use simulations of compound events.

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Checklist of Problem Types

MATH Level H

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GEOMETRY & MEASUREMENT

H.G1 Understand congruence and similarity using physical models, transparencies, or geometry software.

- ___1 Identify congruent parts in rotations, reflections, and translations.
- ___2 Identify transformations that move a figure onto a congruent figure.
- ___3 Use coordinates to describe translations, reflections, and rotations.
- ___4 Use coordinates to describe dilations.
- ___5 Compare ratios of side lengths to decide if two figures are similar.
- ___6 Identify the scale factor that enlarges or reduces a figure to match a similar figure.
- ___7 Identify transformations that move a figure onto a similar figure.
- ___8 Justify and calculate angle measures in triangles and line figures.
- ___9 Justify the angle-angle criterion of similar triangles.

H.G2 Understand and apply the Pythagorean Theorem.

- ___1 Explain a proof of the Pythagorean Theorem and its converse.
- ___2 Use the Pythagorean Theorem to find lengths.
- ___3 Use the Pythagorean Theorem to find distance between points.

H.G3 Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.

- ___1 Apply the formula for volume of a cone.
- ___2 Apply the formula for volume of a cylinder.
- ___3 Apply the formula for volume of a sphere.
- ___4 Apply formulas to find volumes of combined solids.

EXPRESSIONS, EQUATIONS, & FUNCTIONS

H.E1 Work with radicals and integer exponents.

- ___1 Simplify and evaluate numerical expressions with integer exponents.
- ___2 Develop and apply properties of exponents.
- ___3 Use square root and cube root symbols.
- ___4 Evaluate square roots and cube roots.
- ___5 Convert between standard notation and scientific notation.
- ___6 Use scientific notation to compare relative sizes of numbers.
- ___7 Perform operations on numbers in scientific notation.
- ___8 Use scientific notation to solve problems.
- ___9 Convert measurement results to appropriate units.

H.E2 Understand the connections between proportional relationships, lines, and linear equations.

- ___1 Graph proportional relationships.
- ___2 Compare two representations of a proportional relationship.
- ___3 Use similar triangles to verify that a line has constant slope.
- ___4 Relate linear equations to slopes and intercepts.

H.E3 Analyze and solve linear equations and pairs of simultaneous linear equations.

- ___1 Simplify and solve linear equations by writing equivalent forms.
- ___2 Identify or write equations with 0, 1, or infinitely many solutions.
- ___3 Simplify and solve linear equations with rational coefficients.
- ___4 Identify the solution to a system of two linear equations as the intersection point.
- ___5 Solve systems of two linear equations algebraically.
- ___6 Estimate the solution to two linear equations by graphing.
- ___7 Solve problems involving systems of two linear equations.

H.E4 Define, evaluate, and compare functions.

- ___1 Understand that a function is a rule.
- ___2 Compare two representations of a function.
- ___3 Decide if a function is linear or non-linear.

H.E5 Use functions to model relationships between quantities.

- ___1 Identify rate of change from a graph, table, or description.
- ___2 Identify initial value of a function from a graph, table, or description.
- ___3 Write a function from the rate of change and initial value.
- ___4 Describe features of a non-linear function from its graph.
- ___5 Sketch a graph from a verbal description of its features.

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THE NUMBER SYSTEM

H.N1 Know that there are numbers that are not rational, and approximate them by rational numbers.

- ___1 Identify rational and irrational numbers.
- ___2 Convert repeating decimals to rational numbers.
- ___3 Find approximations for irrational numbers.

STATISTICS & PROBABILITY

H.S1 Investigate patterns of association in bivariate data.

- ___1 Construct scatter plots.
- ___2 Interpret scatter plots.
- ___3 For data that appear to be linear, estimate a line of best fit.
- ___4 Informally assess the fit of a linear model.
- ___5 Interpret a linear model for real-world data.
- ___6 Compare frequencies and relative frequencies from two-way tables.