

# TABLE OF CONTENTS

## OPERATIONS AND ALGEBRAIC THINKING

### REPRESENT AND SOLVE PROBLEMS INVOLVING MULTIPLICATION AND DIVISION

**3.OA.A.1** - Interpret products of whole numbers, e.g., interpret  $5 \times 7$  as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as  $5 \times 7$ .

EQUAL GROUPS .....	10
RELATE ADDITION AND MULTIPLICATION .....	11
BUILDING ARRAYS .....	12
ARRAY PICTURE CARDS .....	13

**3.OA.A.2** - Interpret whole-number quotients of whole numbers, e.g., interpret  $56 \div 8$  as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as  $56 \div 8$ .

IDENTIFY THE UNKNOWN .....	24
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**3.OA.A.3** - Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

WORD PROBLEMS: ARRAYS (SET 1) .....	27
WORD PROBLEMS: ARRAYS (SET 2) .....	31
WORD PROBLEMS: EQUAL GROUPS .....	35
WORD PROBLEMS: NUMBER OF EQUAL GROUPS .....	39
WORD PROBLEMS: SIZE OF EQUAL GROUPS .....	43
EQUAL ROWS IN A MARCHING BAND .....	47
SHARING MARBLES .....	48
LITERATURE LINK: ONE HUNDRED HUNGRY ANTS .....	49
LITERATURE LINK: SIX DINNER SID .....	50
LITERATURE LINK: AMANDA BEAN'S AMAZING DREAM .....	51
LITERATURE LINK: THE DOORBELL RANG .....	52

**3.OA.A.4** - Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations  $8 \times ? = 48$ ,  $5 = ? \div 3$ ,  $6 \times 6 = ?$

MISSING NUMBERS: MULTIPLICATION .....	53
MISSING NUMBERS: DIVISION .....	61

### UNDERSTAND PROPERTIES OF MULTIPLICATION AND THE RELATIONSHIP BETWEEN MULTIPLICATION AND DIVISION

**3.OA.B.5** - Apply properties of operations as strategies to multiply and divide. Examples: if  $6 \times 4 = 24$  is known then  $4 \times 6 = 24$  is also known (Communicative properties of multiplication).  $3 \times 5 \times 2$  can be found by  $3 \times 5 = 15$ , then  $15 \times 2 = 30$ , or by  $5 \times 2 = 10$ , then  $3 \times 10 = 30$  (Associative property of multiplication). Knowing that  $8 \times 5 = 40$  and  $8 \times 2 = 16$ , one can find  $8 \times 7$  as  $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$  (Distributive property).

TURN YOUR ARRAY .....	68
DECOMPOSE A FACTOR (V.1) .....	69
DECOMPOSE A FACTOR (V.2) .....	70
LITERATURE LINK: EACH ORANGE HAD EIGHT SLICES .....	71

**3.OA.B.6** - Understand division as an unknown-factor problem. For example, find  $32 \div 8$  by finding the number that makes 32 when multiplied by 8.

DIVISION AS AN UNKNOWN FACTOR .....	73
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# TABLE OF CONTENTS (cont.)

## MULTIPLY AND DIVIDE WITHIN 100

**3.OA.C.7** - Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that  $8 \times 5 = 40$ , one knows  $40 \div 5 = 8$ ) or properties of operations. By the end of Grade 3, know from memory all products of two 1-digit numbers.

MORE OR LESS THAN 30 .....	85
FILL THE GRID .....	86
DOMINO MULTIPLICATION .....	88
MULTIPLES: LOOK, SAY, COVER, WRITE, CHECK .....	90
MULTIPLICATION SQUARES .....	97
FOUR IN A LINE ON A MULTIPLICATION CHART .....	102
FOUR PRODUCTS .....	104
MULTIPLICATION BUMP (X2 - X10) .....	109
MULTIPLES GAMES (X2 - X10) .....	127
MULTIPLY IT! .....	132
I HAVE ... WHO HAS? (X2, X4) .....	144
I HAVE ... WHO HAS? (X2, x4, x8) .....	147
I HAVE ... WHO HAS? (X5, X10) .....	150
I HAVE ... WHO HAS? (X9, X10) .....	153
I HAVE ... WHO HAS? (X6, X7) .....	156
I HAVE ... WHO HAS? (x2, x3) .....	159
I HAVE ... WHO HAS? (x5, x6) .....	162
I HAVE ... WHO HAS? Mixed Facts .....	165
SIX STICKS .....	168
DIVISION RACE .....	170
DIVISION RACE 1 (DIVISORS 2, 4, 8) .....	172
DIVISION RACE 2 (DIVISORS 5, 10) .....	173
DIVISION RACE 3 (DIVISORS 6, 7, 9) .....	174
DIVISION SQUARES (DIVISORS 2 & 4) .....	175
DIVISION SQUARES (DIVISORS 4 & 8) .....	176
DIVISION SQUARES (DIVISORS 3 & 6) .....	177
DIVISION SPIN (DIVISORS 2 - 9) .....	178
DIVISION BUMP (DIVISORS 2 - 10) .....	188

## SOLVE PROBLEMS INVOLVING THE FOUR OPERATIONS, AND IDENTIFY AND EXPLAIN PATTERNS IN ARITHMETIC

**3.OA.D.8** - Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimate strategies including rounding.

WORD PROBLEMS: TWO STEP (SET 1) .....	197
WORD PROBLEMS: TWO STEP (SET 2) .....	201

**3.OA.D.9** - Identify arithmetic patterns (including patterns in the addition table or multiplication table) and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.

ROLL A RULE (V. 1) .....	205
ROLL A RULE (V. 2) .....	206

# TABLE OF CONTENTS (cont.)

CREATE A NUMBER PATTERN (V. 1) .....	207
CREATE A NUMBER PATTERN (V. 2) .....	208
ODD AND EVEN SUMS .....	209
ODD AND EVEN PRODUCTS .....	210
PATTERNS IN THE MULTIPLICATION TABLE .....	211
DRAWING MULTIPLICATION PATTERNS .....	213

## NUMBER AND OPERATIONS IN BASE TEN

### USE PLACE VALUE UNDERSTANDING AND PROPERTIES OF OPERATIONS TO PERFORM MULTI-DIGIT ARITHMETIC

**3. NBT. A. 1** - Use place value understanding to round whole numbers to the nearest 10 or 100.

WHAT'S THE NEAREST TEN? .....	216
WHAT'S THE NEAREST HUNDRED? .....	218
ROUND TO THE NEAREST TEN .....	220
ROUND TO THE NEAREST HUNDRED .....	221
ESTIMATING SUMS (V.1) .....	223
ESTIMATING SUMS (V.2) .....	224
ESTIMATING DIFFERENCES (V.1) .....	225
ESTIMATING DIFFERENCES (V.2) .....	226

**3. NBT. A. 2** - Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

CLOSE TO ZERO (3-DIGIT) .....	227
ADD THE DIFFERENCE (v.1-2) .....	229
3-DIGIT ADDITION SPLIT .....	231
3-DIGIT SUBTRACTION SPLIT .....	235
DOUBLING TO 1,000 .....	239
WORD PROBLEMS: ADDITION & SUBTRACTION (within 1,000) .....	240
LITERATURE LINK: 365 PENGUINS .....	244

**3. NBT. A. 3** - Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g.,  $9 \times 80$ ,  $5 \times 60$ ) using strategies based on place value and properties of operations.

MULTIPLES OF TEN MULTIPLY .....	245
MULTIPLY ONE-DIGIT NUMBERS BY MULTIPLES OF TEN .....	248

## NUMBER AND OPERATIONS: FRACTIONS

### DEVELOP UNDERSTANDING OF FRACTIONS AS NUMBERS

**3.NF.A.1** - Understand a fraction  $\frac{1}{b}$  as a quantity formed by 1 part when a whole is partitioned into  $b$  equal parts: understand a fraction  $\frac{a}{b}$  as the quantity formed by  $a$  parts of size  $\frac{1}{b}$ .

MAKING FRACTION STRIPS (V.1) .....	250
MAKING FRACTION STRIPS (V.2) .....	252
CUISINAIRE FRACTIONS .....	253
MY FRACTION BAR RIDDLE .....	254
FRACTION POSTERS .....	256
NAME THE FRACTION .....	257
REPRESENTING UNIT FRACTIONS .....	261
MATCH THE LENGTH .....	262

# TABLE OF CONTENTS (cont.)

LITERATURE LINK: GATOR PIE (V.1 & 2)	263
LITERATURE LINK: PICTURE PIE	265
<b>3.NF.A.2</b> - Understand a fraction as a number on the number line; represent fractions on a number line diagram.	
A. Represent a fraction $1/b$ on a number line diagram by defining the interval from 0 to 1 as the whole and portioning it into $b$ equal parts. Recognize that each part has size $1/b$ and that the endpoint of the part based at 0 locates the number $1/b$ on the number line.	
FRACTIONS ON A NUMBER LINE	267
B. Represent a fraction $a/b$ on a number line diagram by marking off a lengths $1/b$ from 0. Recognize that the resulting interval has size $a/b$ and that its endpoint locates the number $a/b$ on the number line.	
ROLL A FRACTION	268
<b>3.NF.A.3</b> - Explain equivalence of fractions in special cases and compare fractions by reasoning about their size.	
A. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.	
PIZZA FOR DINNER	271
B. Recognize and generate simple equivalent fractions (e.g., $1/2 = 2/4$ , $4/6 = 2/3$ ). Explain why the fractions are equivalent, by using a visual method.	
EQUIVALENT FRACTIONS EXPLORATION (V. 1)	272
EQUIVALENT FRACTIONS EXPLORATION (V. 2)	273
BUILD EIGHT HEXAGONS	274
EQUIVALENT FRACTIONS ON A GEOBOARD	276
C. Express whole numbers as fractions and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form $3 = 3/1$ ; recognize $6/1 = 6$ ; locate $4/4$ and 1 at the same point of a number line diagram.	
MAKE ONE WHOLE (V.1)	277
MAKE ONE WHOLE (V.2)	278
D. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols $>$ , $=$ , or $<$ and justify the conclusions, e.g., by using a visual fraction model.	
COMPARE FRACTIONS OF A WHOLE (V.1)	279
COMPARE FRACTIONS OF A WHOLE (V.2)	283
WHO ATE MORE?	287

## MEASUREMENT AND DATA

### SOLVE PROBLEMS INVOLVING MEASUREMENT AND ESTIMATION OF INTERVALS OF TIME, LIQUID VOLUMES, AND MASSES OF OBJECTS

**3.MD.A.1** - Tell and write the time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.

TIME MATCH (V. 5)	288
TIME MATCH (V. 6)	291
TIME BARRIER GAME (V. 3)	293
TIME BUMP (NEAREST MINUTE)	296
WORD PROBLEMS: TIME INTERVALS	298

# TABLE OF CONTENTS (cont.)

**3.MD.A.2** - Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.

ESTIMATING WEIGHT .....	302
WEIGH IT TWICE .....	304
MARBLE GRAB .....	306
MEASURE ONE LITER .....	308
MORE OR LESS THAN A LITER? .....	309
CAPACITY LINEUP .....	311
WORD PROBLEMS: LIQUID VOLUME AND MASS .....	313

## REPRESENT AND INTERPRET DATA

**3.MD.B.3** - Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.

REPRESENT AND INTERPRET DATA .....	317
CANDY GRAPHS .....	320
GUMMY BEAR GRAPH .....	323
PAPER BALL THROW .....	325
JAKE’S SURVEY .....	327

**3.MD.B.4** - Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show data by making a line plot, where the horizontal scale is marked off in appropriate units - whole numbers, halves, or quarters.

MEASURE TO THE NEAREST HALF-INCH .....	328
MEASURE TO THE NEAREST QUARTER-INCH .....	330
SQUID EYES! .....	332
MEASURING STRIPS LINE PLOT .....	334
MEASURING NAMES LINE PLOT (V. 1) .....	338
MEASURING NAMES LINE PLOT (V. 2) .....	339
LITERATURE LINK TASK CARDS: INCHWORM AND A HALF .....	340
LITERATURE LINK TASK CARDS: JIM AND THE BEANSTALK .....	342

## GEOMETRIC MEASUREMENT: UNDERSTAND CONCEPTS OF AREA AND RELATE AREA TO MULTIPLICATION AND ADDITION

**3.MD.C.5** - Recognize area as an attribute of plane figures and understand concepts of area measurement.

A. A square with side length 1 unit, called a “unit square,” has “one square unit” of area, and can be used to measure area.

SQUARE UNITS .....	343
SQUARE METER .....	345

B. A plane figure which can be covered without gaps or overlaps by  $n$  unit squares is said to have an area of  $n$  square units.

FIND THE AREA .....	347
AREA ON THE GEOBOARD .....	350

**3.MD.C.5** - Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units.)

COVER YOUR NOTEBOOK .....	351
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# TABLE OF CONTENTS (cont.)

MEASURING OBJECTS IN SQUARE CENTIMETERS .....	353
RECTANGLES WITH COLOR TILES .....	354
AREA COMPARE .....	355
GRID PAPER ANIMALS .....	358

## **3.MD.C.7** - Relate area to the operations of multiplication and addition.

A. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.

FIND THE AREA OF A RECTANGLE .....	359
COMPLETE THE RECTANGLE (V.2) .....	360

B. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.

WORD PROBLEMS: AREA .....	363
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C. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths  $a$  and  $b + c$  is the sum of  $a \times b$  and  $a \times c$ . Use area models to represent the distributive property in mathematical reasoning.

BUILD RECTANGLES OF TWO COLORS .....	367
JACK'S RECTANGLES .....	368

D. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

THREE RECTANGLES .....	371
FIND AREAS OF RECTILINEAR FIGURES (V.1) .....	374
FIND AREAS OF RECTILINEAR FIGURES (V.2) .....	378
DESIGN A FLOWER BED .....	382

## **GEOMETRIC MEASUREMENT: RECOGNIZE PERIMETER AS AN ATTRIBUTE OF PLANE FIGURES AND DISTINGUISH BETWEEN LINEAR AND AREA MEASURES**

**3.MD.D.8** - Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

SQUARES ON A GEOBOARD .....	383
PERIMETER ON THE GEOBOARD .....	385
MEASURING PERIMETER .....	387
PERIMETER WITH COLOR TILES .....	391
THE PERIMETER STAYS THE SAME .....	392
THE AREA STAYS THE SAME .....	393
RECTANGULAR ROBOT .....	394
DESIGN A RABBIT ENCLOSURE .....	395
WORD PROBLEMS: PERIMETER .....	396

# TABLE OF CONTENTS (cont.)

## GEOMETRY

### REASON WITH SHAPES AND THEIR ATTRIBUTES

**3.G.A.1** - Understand that shapes in different categories (e.g., rhombuses, rectangles and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g. quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

HOW MANY SQUARES? .....	400
COMPARING QUADRILATERALS .....	401
SHAPE MATCH .....	403
CLASSIFY SHAPES USING A VENN DIAGRAM .....	406
QUADRILATERAL RIDDLE .....	410

**3.G.A.2** - Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For examples, partition a shape into 4 parts with equal area, and describe the area of each part as  $\frac{1}{4}$  of the area of the shape.

PARTITION SHAPES .....	412
PARTITION A SQUARE (V.1) .....	414
PARTITION A SQUARE (V.2) .....	416
PARTITION A SQUARE (V.3) .....	418

<b>USER LICENSE</b> .....	421
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