

# Level F Correlation to Grade 5 Common Core State Standards for Mathematics

## Operations and Algebraic Thinking (5.OA)

Write and interpret numerical expressions.

1. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.

Lesson	16	17	18	19	20	21	22	23	24	25
Exercise	16.1	17.2	18.2	19.1	20.2	21.5	22.2, 22.5	23.2, 23.6	24.1, 24.3	25.1, 25.3

Lesson	26	27	28	29	30	31	32	33	34	35
Exercise	26.4, 26.6	27.7, 27.8	28.8	29.6	30.3, 30.5, 30.8	31.8	32.8	33.2, 33.7	34.2, 34.7	35.5, 35.8

Lesson	36	37	38	39	40	41	42	43	44	45
Exercise	36.7	37.2, 37.6	38.3, 38.6, 38.7	39.2, 39.6	40.2, 40.8	41.2, 41.8	42.3	43.7	44.7	45.8

Lesson	46	47	48	49	50	51	52	53	54	55
Exercise	46.8, 46.9	47.8	48.8	49.7	50.5, 50.8	51.8	52.7	53.4, 53.6	54.5, 54.6	55.5, 55.7

Lesson	56	57	58	59	60
Exercise	56.6, 56.8	57.5, 57.7	58.6, 58.8	59.7	60.7

## Operations and Algebraic Thinking (5.OA)

Write and interpret numerical expressions.

2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as  $2 \times (8 + 7)$ . Recognize that  $3 \times (18932 + 921)$  is three times as large as  $18932 + 921$ , without having to calculate the indicated sum or product.*

Lesson	46	47	48
Exercise	46.6	47.6	48.9

## Operations and Algebraic Thinking (5.OA)

Write and interpret numerical expressions.

- \*2.1 Express a whole number in the range 2-50 as a product of its prime factors. *For example, find the prime factors of 24 and express 24 as  $2 \times 2 \times 2 \times 3$ .*

Lesson	50	51	52	53	54	55	56	57	58	59
Exercise	50.1	51.2	52.2	53.5	54.3	55.3	56.2, 56.8	57.2	58.8	59.7

\*Denotes California-only content.

## Operations and Algebraic Thinking (5.OA)

Analyze patterns and relationships.

3. Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.*

This standard is first addressed in **Lesson 118**.

## Number and Operations in Base Ten (5.NBT)

Understand the place value system.

1. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and  $1/10$  of what it represents in the place to its left.

Lesson	17
Exercise	17.8

## Number and Operations in Base Ten (5.NBT)

Understand the place value system.

2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.

This standard is first addressed in **Lesson 63**.

## Number and Operations in Base Ten (5.NBT)

Understand the place value system.

3. Read, write, and compare decimals to thousandths.
  - a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g.,  $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$ .
  - b. Compare two decimals to thousandths based on meanings of the digits in each place, using  $>$ ,  $=$ , and  $<$  symbols to record the results of comparisons.

Lesson	23	24	25	26	27	28	29	30	31	32
Exercise	23.4	24.4	25.4	26.7	27.8	28.3	29.4, 29.7	30.2	31.2	32.2, 32.8

Lesson	33	34	35	36	37	39	43	45	46	47
Exercise	33.3	34.3	35.3, 35.8	36.2, 36.8	37.7	39.6	43.7	45.8	46.9	47.8

Lesson	48	54	57	58	59	60
Exercise	48.3	54.8	57.7	58.7	59.2, 59.7	60.4

## Number and Operations in Base Ten (5.NBT)

Understand the place value system.

4. Use place value understanding to round decimals to any place.

This standard is first addressed in **Lesson 67**.

## Number and Operations in Base Ten (5.NBT)

Perform operations with multi-digit whole numbers and with decimals to hundredths.

5. Fluently multiply with multi-digit whole numbers using the standard algorithm.

Lesson	1	2	3	4	5	6	7	8	9	10
Exercise	1.1, 1.5	2.3, 2.7	3.3, 3.5	4.3	5.4	6.7, 6.8	7.6, 7.8	8.5, 8.6	9.7	10.7

Lesson	11	12	13	14	15	16	17	18	19	20
Exercise	11.9	12.1, 12.9	13.8	14.4, 14.8	15.1, 15.4, 15.5	16.7	17.1, 17.8	18.1, 18.8, 18.9	19.7, 19.9	20.1, 20.4, 20.7

Lesson	21	22	23	24	26	27	28	29	30	31
Exercise	21.2, 21.7	22.1, 22.6	23.1, 23.6	24.2, 24.6	26.1, 26.7	27.1, 27.8	28.1, 28.8	29.1, 29.7	30.1, 30.8	31.1, 31.4, 31.8

Lesson	32	33	34	35	36	37	38	39	40	41
Exercise	32.1, 32.5, 32.8	33.1, 33.4, 33.7	34.1, 34.4, 34.7	35.1, 35.8	36.3, 36.8	37.1, 37.3, 37.6, 37.7	38.1, 38.4, 38.6, 38.7	39.1, 39.5, 39.6	40.1, 40.3, 40.8, 40.9	41.6, 41.8

Lesson	42	43	44	45	46	47	48	49	50	51
Exercise	42.7	43.5, 43.7	44.5, 44.8	45.4, 45.8	46.3, 46.8, 46.9	47.3, 47.8	48.8, 48.9	49.7	50.6, 50.8	51.1, 51.5, 51.7, 51.8

Lesson	52	53	54	55	56	57	58	59	60
Exercise	52.1, 52.7	53.1, 53.8	54.7, 54.8	55.6, 55.7	56.7, 56.8	57.6, 57.7	58.8	59.7	60.8

## Number and Operations in Base Ten (5.NBT)

Perform operations with multi-digit whole numbers and with decimals to hundredths.

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

Lesson	1	2	3	4	5	6	7	8	9	10
Exercise	1.7	2.5	3.5	4.6	5.7	6.5, 6.8	7.8	8.7	9.6, 9.9	10.1, 10.8

Lesson	11	12	13	14	15	16	17	18	19	20
Exercise	11.1	12.9	13.1	14.2, 14.8	15.5	16.7	17.8	18.9	19.9	20.7

Lesson	21	22	23	24	25	26	27	28	29	30
Exercise	21.7	22.7	23.6	24.6	25.6	26.7	27.8	28.8	29.7	30.8

Lesson	31	34	35	36	37	38	39	40	44	46
Exercise	31.8	34.7	35.8	36.8	37.6, 37.7	38.6, 38.7	39.6	40.9	44.8	46.3, 46.8, 46.9

Lesson	47	48	49	50	51	52	53	54	55	56
Exercise	47.3, 47.8	48.9	49.7	50.8	51.7, 51.8	52.7	53.8	54.8	55.7	56.8

Lesson	57	59
Exercise	57.7	59.7

## Number and Operations in Base Ten (5.NBT)

Perform operations with multi-digit whole numbers and with decimals to hundredths.

7. Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Lesson	36	37	38	40	41	42	43	44	45	46
Exercise	36.4	37.4	38.7	40.5, 40.9	41.8	42.6	43.7	44.8	45.8	46.9

Lesson	47	48	49	50	51	52	53	54	55	56
Exercise	47.8	48.9	49.3, 49.7	50.2, 50.8	51.8	52.7	53.8	54.8	55.7	56.8

Lesson	58	59	60
Exercise	58.8	59.7	60.8

## Number and Operations—Fractions (5.NF)

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

1. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example,  $2/3 + 5/4 = 8/12 + 15/12 = 23/12$ . (In general,  $a/b + c/d = (ad + bc)/bd$ .)*

Lesson	16	17	18	19	20	21	22	23	24	25
Exercise	16.6	17.6	18.5	19.3	20.5	21.7	22.5, 22.6	23.6	24.1, 24.6	25.1

Lesson	26	27	28	29	30	31	33	35	36	38
Exercise	26.4, 26.7	27.8	28.8	29.7	30.8	31.8	33.7	35.8	36.8	38.7

Lesson	40	41	43	45	46	48	49	50	52	53
Exercise	40.9	41.8	43.7	45.6	46.4	48.4	49.7	50.8	52.7	53.8

Lesson	56
Exercise	56.8

## Number and Operations—Fractions (5.NF)

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

2. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result  $2/5 + 1/2 = 3/7$ , by observing that  $3/7 < 1/2$ .*

Lesson	45	46	48	49	50	52	53	56
Exercise	45.6	46.4	48.4	49.7	50.8	52.7	53.8	56.8

## Number and Operations—Fractions (5.NF)

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

3. Interpret a fraction as division of the numerator by the denominator ( $a/b = a \div b$ ). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret  $3/4$  as the result of dividing 3 by 4, noting that  $3/4$  multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size  $3/4$ . If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*

Lesson	8	9	10	11	12	13	14	15	16	17
Exercise	8.6	9.3	10.6	11.3	12.4	13.7	14.8	15.5	16.3, 16.6, 16.7	17.6, 17.8

Lesson	18	19	20	21	22	23	24	25	26	28
Exercise	18.5, 18.9	19.3, 19.9	20.5, 20.7	21.4, 21.7	22.4, 22.6	23.6	24.6	25.6	26.7	28.8

Lesson	30	31	32	33	34	35	37	39	42	44
Exercise	30.8	31.8	32.7, 32.8	33.7	34.7	35.8	37.7	39.2, 39.6	42.7	44.8

Lesson	46	47	48	49	50	53	59	60
Exercise	46.8, 46.9	47.8	48.9	49.7	50.4, 50.5, 50.8	53.8	59.7	60.8

## Number and Operations—Fractions (5.NF)

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

4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
- Interpret the product  $(a/b) \times q$  as  $a$  parts of a partition of  $q$  into  $b$  equal parts; equivalently, as the result of a sequence of operations  $a \times q \div b$ . *For example, use a visual fraction model to show  $(2/3) \times 4 = 8/3$ , and create a story context for this equation. Do the same with  $(2/3) \times (4/5) = 8/15$ . (In general,  $(a/b) \times (c/d) = ac/bd$ .)*
  - Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.

Lesson	9	10	11	12	13	14	15	16	17	18
Exercise	9.5	10.4	11.2, 11.7	12.3, 12.8	13.2, 13.5	14.1, 14.3, 14.7	15.3, 15.5	16.1	17.2	18.2

Lesson	19	20	21	22	23	24	25	26	27	28
Exercise	19.1	20.2	21.5, 21.7	22.2	23.2, 23.6	24.3	25.1, 25.3, 25.6	26.4, 26.6	27.5, 27.7, 27.8	28.6, 28.8

Lesson	29	30	31	32	33	34	35	36	37	38
Exercise	29.6, 29.7	30.3, 30.4	31.5, 31.8	32.7, 32.8	33.2, 33.7	34.2, 34.7	35.5, 35.8	36.6, 36.7, 36.8	37.6	38.3, 38.6, 38.7

Lesson	39	40	41	42	43	44	45	46	47	48
Exercise	39.2, 39.6	40.2, 40.8, 40.9	41.2, 41.8	42.3	43.7	44.7, 44.8	45.8	46.8, 46.9	47.8	48.8

Lesson	49	50	51	52	53	54	55	56	57	58
Exercise	49.7	50.5	51.7, 51.8	52.5, 52.7	53.6, 53.8	54.5, 54.8	55.5, 55.7	56.6, 56.8	57.5	58.4, 58.6

Lesson	59	60
Exercise	59.5, 59.7	60.3, 60.7

## Number and Operations—Fractions (5.NF)

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

5. Interpret multiplication as scaling (resizing), by:
- Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
  - Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence  $a/b = (n \times a)/(n \times b)$  to the effect of multiplying  $a/b$  by 1.

Lesson	11	12	13	14	15	16	17	18	19	20
Exercise	11.2	12.3	13.2	14.1	15.3, 15.5	16.1	17.2	18.2	19.1	20.2

Lesson	21	22	23	24	25	26	27	28	29	30
Exercise	21.5	22.2	23.2	24.1, 24.3	25.1, 25.3	26.4, 26.6	27.7, 27.8	28.6, 28.8	29.6	30.3, 30.8

Lesson	31	32	33	34	35	36	37	38	39	40
Exercise	31.8	32.8	33.2, 33.7	34.2, 34.7	35.5, 35.8	36.7	37.6	38.6, 38.7	39.6	40.8

Lesson	41	43	45	46	47	49	51	52	53	54
Exercise	41.8	43.7	45.8	46.9	47.8	49.7	51.8	52.7	53.8	54.5

Lesson	55	56	57	58	59	60
Exercise	55.5	56.6	57.5	58.2, 58.6	59.3, 59.7	60.2, 60.7

## Number and Operations—Fractions (5.NF)

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

6. Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

Lesson	49	50	51	52	53	54	55	57	59
Exercise	49.7	50.5	51.7	52.5, 52.7	53.6	54.8	55.7	57.7	59.7

## Number and Operations—Fractions (5.NF)

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

7. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
  - a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story context for  $(1/3) \div 4$ , and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that  $(1/3) \div 4 = 1/12$  because  $(1/12) \times 4 = 1/3$ .*
  - b. Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for  $4 \div (1/5)$ , and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that  $4 \div (1/5) = 20$  because  $20 \times (1/5) = 4$ .*
  - c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share  $1/2$  lb of chocolate equally? How many  $1/3$ -cup servings are in 2 cups of raisins?*

This standard is first addressed in **Lesson 73**.

## Measurement and Data (5.MD)

Convert like measurement units within a given measurement system.

1. Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.

This standard is first addressed in **Lesson 90**.

## Measurement and Data (5.MD)

Represent and interpret data.

2. Make a line plot to display a data set of measurements in fractions of a unit ( $1/2$ ,  $1/4$ ,  $1/8$ ). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*

This standard is first addressed in **Lesson 112**.

## Measurement and Data (5.MD)

Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

3. Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
  - a. A cube with side length 1 unit, called a “unit cube,” is said to have “one cubic unit” of volume, and can be used to measure volume.
  - b. A solid figure which can be packed without gaps or overlaps using  $n$  unit cubes is said to have a volume of  $n$  cubic units.

This standard is first addressed in **Lesson 68**.

## Measurement and Data (5.MD)

Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

4. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.

This standard is first addressed in **Lesson 68**.

## Measurement and Data (5.MD)

Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

5. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.
  - a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
  - b. Apply the formulas  $V = l \times w \times h$  and  $V = b \times h$  for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.
  - c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

This standard is first addressed in **Lesson 68**.

## Geometry (5.G)

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

1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g.,  $x$ -axis and  $x$ -coordinate,  $y$ -axis and  $y$ -coordinate).

Lesson	21	22	23	24	25	26	27	28	29	30
Exercise	21.3	22.3	23.3	24.5, 24.6	25.5, 25.6	26.2, 26.7	27.2	28.2	29.2	30.6

Lesson	31	32	33	34	35	36	37	39	42	45
Exercise	31.7	32.6, 32.8	33.6, 33.7	34.6, 34.7	35.8	36.8	37.7	39.6	42.7	45.7

Lesson	48	54	55	57	59
Exercise	48.9	54.8	55.7	57.7	59.7

## Geometry (5.G)

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

2. Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

Lesson	29	30	31	32	33	34	36	39	42	48
Exercise	29.2	30.6	31.7	32.8	33.7	34.7	36.8	39.6	42.7	48.9

Lesson	54	55	57	59
Exercise	54.8	55.7	57.7	59.7



## Geometry (5.G)

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

3. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.*

Lesson	41	42	43	54	55	58	60
Exercise	41.5	42.4	43.3	54.4	55.4	58.8	60.8

## Geometry (5.G)

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

4. Classify two-dimensional figures in a hierarchy based on properties.

Lesson	41	42	43
Exercise	41.5	42.4	43.3

# Level F Correlation to Grade 5 Common Core State Standards for Mathematics

## Operations and Algebraic Thinking (5.OA)

Write and interpret numerical expressions.

1. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.

Lesson	61	62	63	64	65	66	67	68	69	70
Exercise	61.6	62.2, 62.6	63.8	64.7	65.7	66.8	67.6	68.7	69.6, 69.7	70.7, 70.9

Lesson	71	72	73	74	75	76	77	78	79	83
Exercise	71.8	72.7	73.8	74.8	75.8	76.8	77.7	78.6	79.9	83.5

Lesson	84	85	86	87	88	89	90	91	92	93
Exercise	84.5, 84.9	85.4, 85.8	86.4, 86.9	87.7, 87.9	88.4, 88.7	89.4, 89.7	90.2, 90.8	91.8	92.7	93.8

Lesson	94	95	96	98	99	100	101	102	103	104
Exercise	94.6, 94.8	95.7	96.8	98.6, 98.7	99.7	100.5, 100.8	101.3, 101.5, 101.7	102.4, 102.7	103.3, 103.4, 103.7	104.3, 104.4, 104.7

Lesson	105	106	107	108	109	110	111	112	113	114
Exercise	105.4, 105.7	106.3, 106.6	107.5, 107.6	108.4, 108.6	109.4, 109.6	110.4, 110.6, 110.8	111.3, 111.6, 111.8	112.6	113.3, 113.6	114.3, 114.7

Lesson	115	116	117	118	119	120
Exercise	115.1, 115.5	116.1, 116.7	117.1, 117.7	118.5, 118.7	119.8	120.5

## Operations and Algebraic Thinking (5.OA)

Write and interpret numerical expressions.

2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation “add 8 and 7, then multiply by 2” as  $2 \times (8 + 7)$ . Recognize that  $3 \times (18932 + 921)$  is three times as large as  $18932 + 921$ , without having to calculate the indicated sum or product.*

Lesson	87	88	89	90	91	92	93	117	118	119
Exercise	87.7	88.4	89.4	90.8	91.8	92.7	93.7	117.7	118.1, 118.7	119.2

Lesson	120
Exercise	120.3

## Operations and Algebraic Thinking (5.OA)

Write and interpret numerical expressions.

- \*2.1** Express a whole number in the range 2–50 as a product of its prime factors. For example, find the prime factors of 24 and express 24 as  $2 \times 2 \times 2 \times 3$ .

Lesson	61	74	77
Exercise	61.6	74.8	77.7

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## Operations and Algebraic Thinking (5.OA)

Analyze patterns and relationships.

3. Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. For example, given the rule “Add 3” and the starting number 0, and given the rule “Add 6” and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.

Lesson	118	119	120
Exercise	118.2	119.2	120.1

## Number and Operations in Base Ten (5.NBT)

Understand the place value system.

1. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and  $\frac{1}{10}$  of what it represents in the place to its left.

Lesson	63	64	65	66	67	68	69	70	71	72
Exercise	63.6, 63.7	64.3	65.3	66.4	67.6	68.7	69.4, 69.7	70.3, 70.9	71.5	72.5, 72.7

Lesson	73	75	76	81	82	83	84	85	86	87
Exercise	73.2	75.8	76.1	81.2	82.2	83.3	84.3	85.3	86.2	87.9

Lesson	88	89	93	95	96	97	98	101	102	103
Exercise	88.7	89.7	93.7	95.7	96.7	97.8	98.7	101.2, 101.7	102.2	103.7

Lesson	104	105	106	108	109	110	111	112	113	115
Exercise	104.7	105.6	106.6	108.7	109.6	110.6, 110.7	111.7, 111.8	112.5, 112.6	113.6	115.7

Lesson	117
Exercise	117.7

## Number and Operations in Base Ten (5.NBT)

Understand the place value system.

2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.

Lesson	63	64	65	66	67	68	69	70	76	81
Exercise	63.6, 63.7	64.3	65.3	66.4	67.6	68.7	69.4, 69.7	70.3, 70.9	76.1	81.2

Lesson	82	83	84	85	86	87	88	89	93	95
Exercise	82.2	83.3	84.3	85.3	86.2	87.9	88.7	89.7	93.7	95.7

Lesson	96	97	98	101	102	103	104	105	106	108
Exercise	96.7	97.8	98.7	101.2, 101.7	102.2	103.7	104.7	105.6	106.6	108.7

Lesson	109	110	111	112	113	115	117
Exercise	109.6	110.6	111.7, 111.8	112.5, 112.6	113.6	115.7	117.7

## Number and Operations in Base Ten (5.NBT)

Understand the place value system.

3. Read, write, and compare decimals to thousandths.
- Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g.,  $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$ .
  - Compare two decimals to thousandths based on meanings of the digits in each place, using  $>$ ,  $=$ , and  $<$  symbols to record the results of comparisons.

Lesson	61	62	63	64	65	67	68	69	70	72
Exercise	61.6	62.6	63.8	64.7	65.7	67.5, 67.6	68.5	69.7	70.7, 70.9	72.7

Lesson	74	75	76	77	78	79	80	81	82	83
Exercise	74.8	75.3, 75.8	76.2	77.2, 77.7	78.2	79.4	80.4	81.7	82.7	83.8

Lesson	84	85	88	92	93	95	97	98	100	102
Exercise	84.9	85.8	88.7	92.7	93.7	95.7	97.8	98.8	100.9	102.6

Lesson	103	104	105	107
Exercise	103.5	104.5	105.7	107.6

## Number and Operations in Base Ten (5.NBT)

Understand the place value system.

4. Use place value understanding to round decimals to any place.

Lesson	67	68	69	70	71	72	73	74	75	76
Exercise	67.5	68.5	69.7	70.7, 70.9	71.7, 71.8	72.6	73.7	74.7, 74.8	75.7	76.6, 76.8

Lesson	79	81	83	85	87
Exercise	79.9	81.7	83.8	85.8	87.9

## Number and Operations in Base Ten (5.NBT)

Perform operations with multi-digit whole numbers and with decimals to hundredths.

5. Fluently multiply with multi-digit whole numbers using the standard algorithm.

Lesson	66	67	68	71	73	74	75	77	78	79
Exercise	66.8	67.6	68.7	71.8	73.2	74.2	75.8	77.1	78.1	79.2

Lesson	80	81	82	83	84	85	86	87	88	89
Exercise	80.3	81.1	82.1	83.1	84.1, 84.5, 84.9	85.1, 85.4	86.1, 86.4, 86.9	87.9	88.1, 88.4, 88.7	89.1, 89.4

Lesson	90	91	92	93	94	95	96	97	98	99
Exercise	90.1, 90.5, 90.7, 90.8	91.1, 91.5, 91.8	92.1, 92.5, 92.7	93.6, 93.7	94.2, 94.5, 94.8	95.5	96.3, 96.4, 96.7	97.5, 97.8	98.5, 98.7, 98.8	99.5, 99.8

Lesson	100	101	102	103	104	105	106	107	108	109
Exercise	100.4, 100.6, 100.9	101.7	102.3, 102.7	103.3, 103.7	104.3, 104.7	105.4, 105.7	106.3, 106.6	107.4, 107.5, 107.6	108.5, 108.6, 108.7	109.5, 109.6

Lesson	110	111	112	113	114	115	116	117	118	119
Exercise	110.5, 110.6, 110.8	111.3, 111.6, 111.8	112.6	113.6	114.3, 114.6, 114.7	115.2	116.7	117.7	118.7	119.8

Lesson	120
Exercise	120.5

## Number and Operations in Base Ten (5.NBT)

Perform operations with multi-digit whole numbers and with decimals to hundredths.

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

Lesson	61	62	65	66	67	68	69	70	73	75
Exercise	61.6	62.6	65.7	66.5	67.4	68.4	69.5	70.2	73.8	75.8

Lesson	77	81	82	83	84	85	86	87	88	90
Exercise	77.7	81.7	82.5, 82.7	83.7	84.9	85.6	86.9	87.9	88.6, 88.7	90.8

Lesson	91	93	95	96	97	98	99	100	101	102
Exercise	91.8	93.7	95.2, 95.5, 95.7	96.3, 96.7	97.8	98.5	99.5, 99.8	100.4	101.7	102.7

Lesson	103	104	105	106	107	108	109	110	111	112
Exercise	103.7	104.7	105.7	106.1, 106.3, 106.6	107.4	108.4	109.4	110.4, 110.8	111.3	112.3

Lesson	114	115	116	117	118	119	120
Exercise	114.7	115.7	116.7	117.6, 117.7	118.7	119.8	120.5

## Number and Operations in Base Ten (5.NBT)

Perform operations with multi-digit whole numbers and with decimals to hundredths.

7. Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Lesson	61	62	63	64	65	66	67	68	69	70
Exercise	61.2, 61.6	62.5	63.3, 63.8	64.7	65.7	66.3, 66.8	67.2, 67.6	68.2, 68.7	69.2	70.9

Lesson	71	72	73	74	75	76	77	78	79	80
Exercise	71.8	72.7	73.6, 73.8	74.6, 74.8	75.6, 75.8	76.8	77.5, 77.7	78.6	79.7, 79.9	80.7, 80.9

Lesson	81	82	84	85	86	87	89	91	93	94
Exercise	81.7	82.7	84.3, 84.9	85.3	86.9	87.9	89.7	91.8	93.7	94.8

Lesson	95	96	97	98	99	101	102	103	104	105
Exercise	95.7	96.7	97.7, 97.8	98.7	99.8	101.7	102.2	103.7	104.7	105.6

Lesson	106	108	109	111	113	114	115	117	118	119
Exercise	106.6	108.7	109.6	111.8	113.2	114.2	115.6	117.3	118.4	119.4

Lesson	120
Exercise	120.4

## Number and Operations—Fractions (5.NF)

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

1. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example,  $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$ . (In general,  $\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$ .)

Lesson	78	80	84	91	92	93	94	95	96	97
Exercise	78.6	80.9	84.9	91.4	92.3, 92.7	93.7	94.8	95.7	96.5, 96.7	97.6, 97.8

Lesson	98	99	101	102	103	104	106	107	108	109
Exercise	98.8	99.8	101.6	102.5	103.7	104.7	106.6	107.6	108.7	109.6

Lesson	110	111	113	114	115	116	117	118	119
Exercise	110.8	111.8	113.6	114.7	115.7	116.7	117.3, 117.7	118.6, 118.7	119.8

## Number and Operations—Fractions (5.NF)

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

2. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result  $2/5 + 1/2 = 3/7$ , by observing that  $3/7 < 1/2$ .*

Lesson	78	80	81	82	83	84	85	86	87	90
Exercise	78.6	80.9	81.4	82.4	83.8	84.9	85.8	86.9	87.9	90.8

Lesson	92	96	97	98	100	101	102	103	104	105
Exercise	92.7	96.7	97.8	98.8	100.9	101.6	102.5	103.7	104.7	105.7

Lesson	106	107	108	109	110	111	113	114	115	116
Exercise	106.6	107.6	108.7	109.6	110.8	111.8	113.6	114.7	115.7	116.7

Lesson	117	118	119	120
Exercise	117.7	118.6, 118.7	119.6, 119.8	120.5

## Number and Operations—Fractions (5.NF)

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

3. Interpret a fraction as division of the numerator by the denominator ( $a/b = a \div b$ ). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret  $3/4$  as the result of dividing 3 by 4, noting that  $3/4$  multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size  $3/4$ . If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*

Lesson	70	75	76	88	89	94	113	114	115	116
Exercise	70.5	75.1	76.1	88.1	89.1, 89.4	94.8	113.1	114.5	115.7	116.5, 116.7

Lesson	118
Exercise	118.3

## Number and Operations—Fractions (5.NF)

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

4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
- Interpret the product  $(a/b) \times q$  as  $a$  parts of a partition of  $q$  into  $b$  equal parts; equivalently, as the result of a sequence of operations  $a \times q \div b$ . *For example, use a visual fraction model to show  $(2/3) \times 4 = 8/3$ , and create a story context for this equation. Do the same with  $(2/3) \times (4/5) = 8/15$ . (In general,  $(a/b) \times (c/d) = ac/bd$ .)*
  - Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.

Lesson	61	62	63	64	65	66	67	68	69	70
Exercise	61.4, 61.6	62.2, 62.6	63.8	64.7	65.7	66.8	67.6	68.7	69.7	70.9

Lesson	71	72	73	74	75	76	77	78	79	80
Exercise	71.8	72.7	73.8	74.8	75.8	76.8	77.3, 77.4	78.4	79.6, 79.9	80.6

Lesson	81	82	83	84	85	86	87	88	89	90
Exercise	81.7	82.7	83.8	84.5, 84.9	85.8	86.4, 86.9	87.9	88.2, 88.7	89.2, 89.7	90.2, 90.7, 90.8

Lesson	91	92	93	94	95	96	97	98	99	100
Exercise	91.2, 91.7, 91.8	92.6	93.4, 93.7	94.4, 94.6, 94.8	95.7	96.7	97.8	98.2, 98.6, 98.8	99.2, 99.6	100.3, 100.5, 100.8

Lesson	101	102	103	104	105	106	107	108	109	110
Exercise	101.3, 101.5, 101.7	102.4, 102.7	103.4, 103.7	104.4, 104.7	105.7	106.6	107.3, 107.6	108.3, 108.7	109.3, 109.6	110.3, 110.8

Lesson	111	112	113	114	115	116	117	118	119	120
Exercise	111.4, 111.8	112.4, 112.6	113.3, 113.6	114.3, 114.7	115.4, 115.5, 115.7	116.3, 116.4, 116.7	117.2, 117.6, 117.7	118.1, 118.3, 118.5, 118.7	119.1, 119.3, 119.4, 119.5, 119.8	120.2, 120.5

## Number and Operations—Fractions (5.NF)

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

5. Interpret multiplication as scaling (resizing), by:
- Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
  - Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence  $a/b = (n \times a)/(n \times b)$  to the effect of multiplying  $a/b$  by 1.

Lesson	61	62	63	64	65	66	67	68	69	70
Exercise	61.3, 61.6	62.4, 62.6	63.2, 63.8	64.3, 64.7	65.7	66.8	67.6	68.1, 68.7	69.1, 69.7	70.1, 70.9

Lesson	71	72	73	74	75	76	77	78	79	80
Exercise	71.1, 71.8	72.1, 72.7	73.1, 73.8	74.1, 74.8	75.1, 75.2	76.1, 76.8	77.7	78.6	79.1, 79.8, 79.9	80.2, 80.9

Lesson	81	82	83	84	85	87	88	89	90	91
Exercise	81.7	82.7	83.8	84.9	85.8	87.2, 87.9	88.2	89.2, 89.7	90.2	91.2, 91.8

Lesson	92	93	94	95	96	97	98	100	103	105
Exercise	92.6	93.4	94.4, 94.8	95.7	96.7	97.8	98.2, 98.7	100.9	103.7	105.7

Lesson	107	113	114	115	116	117	118	119	120
Exercise	107.6	113.5	114.1	115.1	116.1	117.1, 117.3	118.1, 118.5	119.5	120.5



## Number and Operations—Fractions (5.NF)

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

6. Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

Lesson	61	62	64	66	68	70	71	72	73	74
Exercise	61.6	62.6	64.7	66.8	68.7	70.9	71.8	72.7	73.8	74.8

Lesson	75	76	77	78	79	80	81	82	83	84
Exercise	75.8	76.8	77.3	78.4, 78.6	79.6, 79.9	80.6	81.7	82.7	83.8	84.9

Lesson	85	86	87	90	91	93	94	95	96	97
Exercise	85.8	86.9	87.9	90.7	91.7, 91.8	93.7	94.6	95.7	96.7	97.8

Lesson	98	99	100	103	104	106	107	108	109	110
Exercise	98.6, 98.8	99.6	100.5, 100.9	103.4, 103.7	104.4, 104.7	106.6	107.6	108.7	109.6	110.3, 110.8

Lesson	111	112	113	114	115	116	117	118	119	120
Exercise	111.4, 111.8	112.4, 112.6	113.3, 113.6	114.3, 114.7	115.5, 115.7	116.4, 116.7	117.6, 117.7	118.7	119.8	120.5

## Number and Operations—Fractions (5.NF)

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

7. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
- Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story context for  $(1/3) \div 4$ , and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that  $(1/3) \div 4 = 1/12$  because  $(1/12) \times 4 = 1/3$ .*
  - Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for  $4 \div (1/5)$ , and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that  $4 \div (1/5) = 20$  because  $20 \times (1/5) = 4$ .*
  - Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share  $1/2$  lb of chocolate equally? How many  $1/3$ -cup servings are in 2 cups of raisins?*

Lesson	73	75	76	77	78	79	80	81	82	83
Exercise	73.3	75.4	76.3	77.4	78.5	79.5, 79.9	80.5, 80.9	81.3, 81.7	82.3	83.6, 83.8

Lesson	84	85	86	87	88	89	90	91	92	93
Exercise	84.6	85.5, 85.8	86.3	87.6	88.5	89.5, 89.7	90.6	91.6, 91.8	92.4	93.7

Lesson	94	95	96	97	98	113	114	115	116	117
Exercise	94.8	95.7	96.7	97.8	98.8	113.4	114.4	115.3, 115.7	116.2, 116.7	117.5

## Measurement and Data (5.MD)

Convert like measurement units within a given measurement system.

- Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.

Lesson	90	91	92	93	94	95	96	97	98	99
Exercise	90.5	91.5	92.5	93.6	94.5	95.5	96.4	97.5	98.5	99.5

Lesson	100	101	102	103	104	105	106	107	108	109
Exercise	100.4	101.7	102.7	103.7	104.7	105.7	106.6	107.2, 107.6	108.5, 108.7	109.5, 109.6

Lesson	110	111	112	113	114	115	116
Exercise	110.5, 110.8	111.8	112.6	113.6	114.7	115.7	116.7

## Measurement and Data (5.MD)

Represent and interpret data.

- Make a line plot to display a data set of measurements in fractions of a unit ( $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{8}$ ). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*

Lesson	112	113	114	115	116	117	119	120
Exercise	112.1	113.4	114.4	115.3	116.2	117.5	119.8	120.5

## Measurement and Data (5.MD)

Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

- Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
  - A cube with side length 1 unit, called a “unit cube,” is said to have “one cubic unit” of volume, and can be used to measure volume.
  - A solid figure which can be packed without gaps or overlaps using  $n$  unit cubes is said to have a volume of  $n$  cubic units.

Lesson	68	69
Exercise	68.3	69.6

**Student Practice Software:** Block 4 Activity 6, Block 5 Activities 3 and 6

## Measurement and Data (5.MD)

Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

4. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.

Lesson	68	69
Exercise	68.3	69.6

**Student Practice Software:** Block 4 Activity 6, Block 5 Activities 3 and 6

## Measurement and Data (5.MD)

Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

5. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.
- Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
  - Apply the formulas  $V = l \times w \times h$  and  $V = b \times h$  for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.
  - Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

Lesson	68	69	70	71	72	73	74	76	77	80
Exercise	68.3	69.6	70.6	71.6	72.7	73.8	74.8	76.4	77.7	80.7

Lesson	82	84	86	89	93	94	95	96	97	98
Exercise	82.7	84.9	86.9	89.7	93.5, 93.7	94.7, 94.8	95.6	96.6	97.7	98.7

Lesson	99	101	102
Exercise	99.7	101.7	102.7

## Geometry (5.G)

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

1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).

Lesson	62	102	104	106
Exercise	62.6	102.8	104.7	106.6

**Student Practice Software:** Block 2 Activity 5

## Geometry (5.G)

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

2. Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

Lesson	62	64	65	66	67	69	70	71	72	73
Exercise	62.6	64.2	65.2	66.2	67.3	69.3	70.4	71.3	72.2	73.4

Lesson	74	75	76	77	79	82	83	84	86	87
Exercise	74.4, 74.8	75.8	76.8	77.7	79.9	82.7	83.8	84.9	86.9	87.9

Lesson	88	91	94	96	99	101	105	109	111	118
Exercise	88.7	91.8	94.8	96.7	99.8	101.7	105.7	109.6	111.8	118.2

Lesson	119	120
Exercise	119.2	120.1

## Geometry (5.G)

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

3. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.*

Lesson	108	109	110	111	112	115	120
Exercise	108.2	109.2	110.2	111.2	112.2	115.7	120.5

## Geometry (5.G)

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

4. Classify two-dimensional figures in a hierarchy based on properties.

Lesson	108	109	110	111	112	115	120
Exercise	108.2	109.2	110.2	111.2	112.2	115.7	120.5