Kansas State Standards Alignment
For Grades K-8
About Zearn

Zearn is the 501(c)(3) nonprofit educational organization behind Zearn Math, the top-rated math learning platform used by 1 in 4 elementary-school students and by more than 1 million middle-school students nationwide. Zearn Math supports teachers with research-backed curriculum and digital lessons proven to double student academic growth across all levels of student proficiency. Zearn Math can be used flexibly to support a range of instructional needs including Tier 1 and 2 support, acceleration, intervention, tutoring, after school programming and summer programming.

Zearn Math is aligned to Kansas Mathematics Standards.

We are committed to ensuring that our high-quality instructional materials align to Kansas Mathematics Standards to fully support Kansas’s students and teachers. The tables on the following pages, organized by Kansas Mathematics Standards, identify the alignment between each grade-level standard and Zearn Math lesson(s).
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## Kindergarten

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| **K.CC.1** Count to 100 by ones and by tens and identify as a growth pattern. | Mission 5, Topic A  
Mission 5, Topic B  
Mission 5, Topic D  
Mission 5, Topic E |
| **K.CC.2** Count forward beginning from a given number within the known sequence (instead of having to begin at 1). | Mission 1, Topic G  
Mission 5, Topic A  
Mission 5, Topic B  
Mission 5, Topic D  
Mission 5, Topic E |
| **K.CC.3** Read and write numerals from 0 to 20. | Mission 1, Topic D  
Mission 1, Topic E  
Mission 1, Topic F  
Mission 5, Topic C  
Mission 5, Topic D  
Mission 5, Topic E |
| **K.CC.4** Understand the relationship between numbers and quantities; connect counting to cardinality. a. When counting objects, say each number’s name in sequential order, pairing each object with one and only one number name and each number name with one and only one object. b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted. c. Understand that each successive number name refers to a quantity that is one larger. d. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects). | Mission 1, Topic A  
Mission 1, Topic B  
Mission 1, Topic C  
Mission 1, Topic D  
Mission 1, Topic E  
Mission 1, Topic F  
Mission 1, Topic G  
Mission 1, Topic H  
Mission 5, Topic A  
Mission 5, Topic B  
Mission 5, Topic C  
Mission 5, Topic D  
Mission 5, Topic E |
| **K.CC.5** Count to answer “how many?” up to 20 concrete or pictorial objects arranged in a line, a rectangular array, or a circle, or as many as 10 objects in a scattered configuration given a number from 1 to 20, count out that many objects. | Mission 1, Topic C  
Mission 1, Topic D  
Mission 1, Topic E  
Mission 1, Topic F  
Mission 5, Topic A |
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| K.CC.6 | Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, (e.g. by using matching and counting strategies.) Include groups with up to ten objects. | Mission 3, Topic B  
Mission 3, Topic E  
Mission 3, Topic F  
Mission 3, Topic G  
Mission 3, Topic H  
Mission 5, Topic E |
| K.CC.7 | Compare two numbers between 1 and 10 presented as written numerals. | Mission 3, Topic F  
Mission 3, Topic G  
Mission 3, Topic H |

### Operations & Algebraic Thinking

| **K.OA.1** | Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g. claps), acting out situations, verbal explanations, expressions, or equations. | Mission 4, Topic A  
Mission 4, Topic B  
Mission 4, Topic C  
Mission 4, Topic D  
Mission 4, Topic G  
Mission 4, Topic H |
| **K.OA.2** | Solve addition and subtraction word problems, and add and subtract within 10, (e.g. by using objects or drawings to represent the problem.) | Mission 4, Topic C  
Mission 4, Topic D  
Mission 4, Topic F  
Mission 4, Topic G  
Mission 4, Topic H |
| **K.OA.3** | Decompose numbers less than or equal to 10 into pairs in more than one way, (e.g. by using objects or drawings, and record each decomposition by a drawing or equation (e.g. \(5 = 2 + 3\) and \(5 = 4 + 1\)).) | Mission 1, Topic C  
Mission 4, Topic A  
Mission 4, Topic B  
Mission 4, Topic C  
Mission 4, Topic D  
Mission 4, Topic E  
Mission 4, Topic G |
| **K.OA.4** | For any number from 1 to 9, find the number that makes 10 when added to the given number, (e.g. by using objects or drawings, and record the answer with a drawing or equation.). | Mission 4, Topic B  
Mission 4, Topic C  
Mission 4, Topic H |
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<tr>
<td><strong>K.OA.5</strong></td>
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<tr>
<td>Fluently (efficiently, accurately, and flexibly) add and subtract within 5.</td>
<td>Mission 4, Topic A</td>
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</table>

**Numbers & Operations in Base Ten**

| **K.NBT.1**                   |                      |
| Compose and decompose numbers from 11 to 19 into ten ones and some further ones, (e.g. by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g. $10 + 8 = 18$ and $19 = 10 + 9$); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones. | Mission 5, Topic A  
Mission 5, Topic B  
Mission 5, Topic C  
Mission 5, Topic D  
Mission 5, Topic E |

**Measurement & Data**

| **K.MD.1**                   |                      |
| Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. | Mission 3, Topic A  
Mission 3, Topic B  
Mission 3, Topic C  
Mission 3, Topic D  
Mission 3, Topic H |

| **K.MD.2**                   |                      |
| Directly compare two objects, with a measurable attribute in common, to see which object has “more of” / ”less of” the attribute, and describe the difference. | Mission 3, Topic A  
Mission 3, Topic B  
Mission 3, Topic C  
Mission 3, Topic D  
Mission 3, Topic F  
Mission 3, Topic H |

| **K.MD.3**                   |                      |
| Classify objects into given categories; count the numbers of objects in each category and sort the categories by count (Limit category counts to be less than or equal to 10). | Mission 1, Topic A  
Mission 1, Topic B  
Mission 1, Topic C  
Mission 1, Topic E  
Mission 2, Topic A  
Mission 2, Topic B  
Mission 2, Topic C |

**Geometry**

| **K.G.1**                    |                      |
| Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to. | Mission 2, Topic A  
Mission 2, Topic B  
Mission 2, Topic C  
Mission 6, Topic B |
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| **K.G.2** Correctly gives most precise name of shapes regardless of their orientations (position and direction in space) or overall size. | Mission 2, Topic A  
Mission 2, Topic B  
Mission 2, Topic C  
Mission 6, Topic A |
| **K.G.3** Identify shapes as two-dimensional (lying in a plane, “flat”) or three-dimensional (“solid”). |  |
| **K.G.4** Analyze and compare two- and three-dimensional shapes, in different sizes and orientations (position and direction in space), using informal language to describe their similarities, differences, parts (e.g. number of sides and vertices/“corners”) and other attributes (e.g. having sides of equal length). | Mission 2, Topic C |
| **K.G.5** Model shapes in the world by building shapes from components (e.g. sticks and clay balls) and drawing shapes. | Mission 2, Topic A  
Mission 2, Topic B  
Mission 2, Topic C  
Mission 6, Topic A  
Mission 6, Topic B |
| **K.G.6** Compose simple shapes to form larger shapes. | Mission 6, Topic B |
## 1st Grade Standards

### Operations & Algebraic Thinking

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| **1.OA.1** | Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, (e.g. by using objects, drawings, and situation equations and/or solution equations with a symbol for the unknown number to represent the problem.) | Mission 1, Topic A  
Mission 1, Topic B  
Mission 1, Topic C  
Mission 1, Topic G  
Mission 1, Topic H  
Mission 2, Topic A  
Mission 2, Topic B  
Mission 2, Topic C  
Mission 2, Topic D  
Mission 3, Topic C  
Mission 3, Topic D  
Mission 4, Topic E  
Mission 6, Topic A  
Mission 6, Topic F |
| **1.OA.2** | Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, (e.g. by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.) | Mission 2, Topic A |
| **1.OA.3** | Apply (not necessary to name) properties of operations as strategies to add and subtract. | Mission 1, Topic E  
Mission 1, Topic F  
Mission 2, Topic A  
Mission 2, Topic B |
| **1.OA.4** | Understand subtraction as an unknown-addend problem. | Mission 1, Topic G  
Mission 1, Topic H  
Mission 1, Topic I  
Mission 2, Topic B  
Mission 2, Topic C |
| **1.OA.5** | Relate counting to addition and subtraction (e.g. by counting on 2 to add 2, counting back 1 to subtract 1). | Mission 1, Topic A  
Mission 1, Topic B  
Mission 1, Topic C  
Mission 1, Topic D  
Mission 1, Topic G  
Mission 1, Topic H |
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| **1.OA.6** Add and subtract within 20, demonstrating fluency (efficiently, accurately, and flexibly) for addition and subtraction within 10. Use mental strategies such as counting on; making ten (e.g. \(8 + 6 = 8 + 2 + 4 = 10 + 4 = 14\)); decomposing a number leading to a ten (e.g. \(13 - 4 = 13 - 3 - 1 = 10 - 1 = 9\)); using the relationship between addition and subtraction (e.g. knowing that \(8 + 4 = 12\), one knows \(12 - 8 = 4\)); and creating equivalent but easier or known sums (e.g. adding \(6 + 7\) by creating the known equivalent \(6 + 6 + 1 = 12 + 1 = 13\)). | Mission 1, Topic B  
Mission 2, Topic C |
| **1.OA.7** Understand the meaning of the equal sign (the value is the same on both sides of the equal sign), and determine if equations involving addition and subtraction are true or false. | Mission 1, Topic D  
Mission 2, Topic C |
| **1.OA.8** Using related equations, Determine the unknown whole number in an addition or subtraction equation. | Mission 1, Topic H  
Mission 2, Topic C |

### Numbers & Operations in Base Ten

| **1.NBT.1** Count to 120 (recognizing growth and repeating patterns), starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral. | Mission 4, Topic A  
Mission 6, Topic B |
| **1.NBT.2** Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases: a. 10 can be thought of as a grouping of ten ones—called a “ten.” b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones. c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones). d. Show flexibility in composing and decomposing tens and ones (e.g. 20 can be composed from 2 tens or 1 ten and 10 ones, or 20 ones.) | Mission 2, Topic D  
Mission 4, Topic A  
Mission 4, Topic B  
Mission 4, Topic F  
Mission 6, Topic B |
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| **1.NBT.3**                  | Mission 4, Topic B  
                             | Mission 6, Topic B |
| Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the relational symbols $>$, $<$, $=$, and $\neq$. | |
| **1.NBT.4**                  | Mission 4, Topic C  
                             | Mission 4, Topic D  
                             | Mission 4, Topic F  
                             | Mission 6, Topic C  
                             | Mission 6, Topic D |
| Add within 100 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 including: a. Adding a two-digit number and a one-digit number b. Adding a two-digit number and a multiple of 10 c. Understanding that when adding two-digit numbers, combine like base-ten units such as tens and tens, ones and ones; and sometimes it is necessary to compose a ten. | |
| **1.NBT.5**                  | Mission 2, Topic D  
                             | Mission 4, Topic A  
                             | Mission 6, Topic B |
| Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. | |
| **1.NBT.6**                  | Mission 4, Topic C  
                             | Mission 6, Topic C |
| Subtract multiples of 10 in the range 10 to 90 from multiples of 10 in the range 10 to 90 (positive or zero differences), 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. | |
| **Measurement & Data**       |            |
| **1.MD.1**                   | Mission 3, Topic A  
                             | Mission 3, Topic B |
| Order three objects by length; compare the lengths of two objects indirectly by using a third object. | |
| **1.MD.2**                   | Mission 3, Topic B  
<pre><code>                         | Mission 3, Topic C |
</code></pre>
<p>| Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps. | |</p>
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<td><strong>1.MD.3</strong> Tell and write time in hours and half-hours using analog and digital clocks.</td>
<td>Mission 5, Topic D</td>
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<td><strong>1.MD.4</strong> Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.</td>
<td>Mission 3, Topic D</td>
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**Geometry**

| **1.G.1** Distinguish between defining attributes (e.g. triangles are closed and three-sided) versus non-defining attributes (e.g. color, orientation, overall size); build and draw shapes that possess defining attributes. | Mission 5, Topic A |
| **1.G.2** Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quartercircles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. Students do not need to learn formal names such as “right rectangular prism.” | Mission 5, Topic B |
| **1.G.3** Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Note: fraction notation (1/2, 1/4) is not expected at this grade level. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares. | Mission 5, Topic C Mission 5, Topic D |
### 2nd Grade Standards

#### Operations & Algebraic Thinking

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**2.OA.1** Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, (e.g. by using drawings and situation equations and/or solution equations with a symbol for the unknown number to represent the problem.)

- Mission 1, Topic B
- Mission 3, Topic G
- Mission 4, Topic A
- Mission 4, Topic B
- Mission 4, Topic C
- Mission 4, Topic F

**2.OA.2** Fluently (efficiently, accurately, and flexibly) add and subtract within 20 using mental strategies (counting on, making a ten, decomposing a number, creating an equivalent but easier and known sum, and using the relationship between addition and subtraction) Work with equal groups of objects to gain foundations for multiplication.

- Mission 1, Topic A
- Mission 1, Topic B

**2.OA.3** Determine whether a group of objects (up to 20) has an odd or even number of members, (e.g. by pairing objects or counting them by 2s); write an equation to express an even number as a sum of two equal addends.

- Mission 6, Topic D

**2.OA.4** Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

- Mission 6, Topic A
- Mission 6, Topic B
- Mission 6, Topic C

#### Numbers & Operations in Base Ten

**2.NBT.1** Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; (e.g. 706 equals 7 hundreds, 0 tens, and 6 ones.) Understand the following as special cases: a. 100 can be thought of as a bundle of ten tens—called a “hundred.” b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds. c. Show flexibility

- Mission 3, Topic A
- Mission 3, Topic B
- Mission 3, Topic C
- Mission 3, Topic D
- Mission 3, Topic E
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<td>in composing and decomposing hundreds, tens and ones (e.g. 207 can be composed from 2 hundreds 7 ones OR 20 tens 7 ones OR 207 ones OR 1 hundred 10 tens 7 ones OR 1 hundred 9 tens 17 ones, etc.)</td>
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</table>
| **2.NBT.2** \ Count within 1000; skip-count by 2s, 5s, 10s, and 100s; explain and generalize the patterns. | Mission 3, Topic B | Mission 3, Topic C  
Mission 3, Topic D  
Mission 3, Topic E  
Mission 3, Topic G  
Mission 6, Topic A  
Mission 6, Topic B  
Mission 7, Topic B  
Mission 7, Topic E  
Mission 8, Topic D |
| **2.NBT.3** \ Read and write numbers within 1000 using base-ten numerals, number names, expanded form, and unit form unit form. | Mission 3, Topic C  
Mission 3, Topic D  
Mission 3, Topic E |
| **2.NBT.4** \ Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, <, =, and ≠ relational symbols to record the results of comparisons. | Mission 3, Topic E  
Mission 3, Topic F |
| **2.NBT.5** \ Fluently (efficiently, accurately, and flexibly) add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction (e.g. composing/decomposing by like base-10 units, using friendly or benchmark numbers, using related equations, compensation, number line, etc.) | Mission 1, Topic B  
Mission 4, Topic A  
Mission 4, Topic B  
Mission 4, Topic C  
Mission 7, Topic B  
Mission 7, Topic E  
Mission 8, Topic D |
| **2.NBT.6** \ Add up to four two-digit numbers using strategies based on place value and properties of operations. | Mission 4, Topic D  
Mission 6, Topic B  
Mission 7, Topic B  
Mission 8, Topic D |
| **2.NBT.7** \ Add and subtract within 1000, 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. Understand that in adding or subtracting three-digit numbers, like base-ten units | Mission 4, Topic B  
Mission 4, Topic C  
Mission 4, Topic D  
Mission 4, Topic E  
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| such as hundreds and hundreds, tens and tens, ones and ones are used; and sometimes it is necessary to compose or decompose tens or hundreds. | Mission 5, Topic B  
Mission 5, Topic C  
Mission 5, Topic D |
| **2.NBT.8**                    | Mentally add 10 or 100 to a given number 100 – 900, and mentally subtract 10 or 100 from a given number 100 – 900. | Mission 3, Topic G  
Mission 5, Topic A  
Mission 5, Topic D |
| **2.NBT.9**                    | Explain why addition and subtraction strategies work using place value and the properties of operations. The explanations given may be supported by drawings or objects. | Mission 4, Topic A  
Mission 4, Topic B  
Mission 4, Topic C  
Mission 4, Topic D  
Mission 4, Topic E  
Mission 4, Topic F  
Mission 5, Topic A  
Mission 5, Topic B  
Mission 5, Topic C  
Mission 5, Topic D |

**Measurement & Data**

| 2.MD.1 | Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes. | Mission 2, Topic A  
Mission 2, Topic B  
Mission 2, Topic C  
Mission 2, Topic D  
Mission 7, Topic C  
Mission 7, Topic D  
Mission 7, Topic F  
Mission 8, Topic A |
| 2.MD.2 | Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen. | Mission 2, Topic C  
Mission 7, Topic D |
| 2.MD.3 | Estimate lengths using whole units of inches, feet, centimeters, and meters. | Mission 2, Topic B  
Mission 2, Topic D  
Mission 7, Topic D |
| 2.MD.4 | Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit (inches, feet, centimeters, and meters). | Mission 2, Topic C  
Mission 2, Topic D  
Mission 7, Topic D |
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| **2.MD.5** Use addition and subtraction within 100 to solve one- and two-step word problems involving lengths that are given in the same units, e.g. by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem. | Mission 2, Topic D  
Mission 7, Topic E  
Mission 7, Topic F |
| **2.MD.6** Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, …, and represent whole-number sums and differences within 100 on a number line diagram. | Mission 7, Topic A  
Mission 7, Topic E  
Mission 7, Topic F |
| **2.MD.7** Tell and write time from analog and digital clocks to the nearest five minutes. | Mission 8, Topic D |
| **2.MD.8** Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately (Do not use decimal point, if showing 25 cents, use the word cents or ¢). | Mission 3, Topic D  
Mission 7, Topic B |
| **2.MD.9** Identify coins and bills and their values. | Mission 3, Topic D  
Mission 7, Topic B |
| **2.MD.10** Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object using different units. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units. | Mission 7, Topic F |
| **2.MD.11** Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. | Mission 7, Topic A |

**Geometry**

| **2.G.1** Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. | Mission 8, Topic A  
Mission 8, Topic B  
Mission 8, Topic C |
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<tr>
<td><strong>2.G.2</strong></td>
<td>Mission 6, Topic C</td>
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<tr>
<td>Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.</td>
<td></td>
</tr>
</tbody>
</table>
| **2.G.3**                  | Mission 8, Topic B  
| Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Note: fraction notation 1/2, 1/3, 1/4 is not expected at this grade level. Recognize that equal shares of identical wholes need not have the same shape. | Mission 8, Topic C  
|                                             | Mission 8, Topic D |
## Operations & Algebraic Thinking

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### 3.OA.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.)

- Mission 1, Topic A
- Mission 1, Topic C
- Mission 1, Topic E
- Mission 1, Topic F
- Mission 3, Topic A
- Mission 3, Topic B
- Mission 3, Topic C
- Mission 3, Topic D
- Mission 3, Topic E
- Mission 3, Topic F

### 3.OA.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.)

- Mission 1, Topic B
- Mission 1, Topic D
- Mission 1, Topic E
- Mission 1, Topic F
- Mission 3, Topic A
- Mission 3, Topic B
- Mission 3, Topic C
- Mission 3, Topic D
- Mission 3, Topic E

### 3.OA.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.)

- Mission 1, Topic A
- Mission 1, Topic B
- Mission 1, Topic C
- Mission 1, Topic D
- Mission 1, Topic E
- Mission 1, Topic F
- Mission 3, Topic A
- Mission 3, Topic B
- Mission 3, Topic C
- Mission 3, Topic D
- Mission 3, Topic E

### 3.OA.4
Determine the unknown whole number in a multiplication or division equation by using related equations

- Mission 1, Topic B
- Mission 1, Topic C
- Mission 1, Topic D
- Mission 1, Topic E
- Mission 1, Topic F
## KANSAS MATHEMATICS STANDARDS

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### 3.OA.5
Apply properties of operations as strategies to multiply and divide.
- Mission 3, Topic A
- Mission 3, Topic B
- Mission 3, Topic C
- Mission 3, Topic D
- Mission 3, Topic E
- Mission 1, Topic C
- Mission 1, Topic E
- Mission 1, Topic F
- Mission 3, Topic A
- Mission 3, Topic B
- Mission 3, Topic C
- Mission 3, Topic D
- Mission 3, Topic F

### 3.OA.6
Understand division as an unknown-factor problem.
- Mission 1, Topic B
- Mission 1, Topic D
- Mission 1, Topic E
- Mission 1, Topic F
- Mission 3, Topic A
- Mission 3, Topic B
- Mission 3, Topic C
- Mission 3, Topic D
- Mission 3, Topic F

### 3.OA.7
Fluently (efficiently, accurately, and flexibly) multiply and divide with single digit multiplications and related divisions using strategies (e.g. relationship between multiplication and division, doubles, double and double again, half and then double, etc.) or properties of operations.
- Mission 1, Topic D
- Mission 1, Topic E
- Mission 1, Topic F
- Mission 3, Topic A
- Mission 3, Topic B
- Mission 3, Topic C
- Mission 3, Topic D
- Mission 3, Topic E

### 3.OA.8
Solve two-step word problems using any of the four operations. Represent these problems using both situation equations and/or solution equations with a letter or symbol standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. This standard is limited to problems posed with whole numbers and having whole-number answers.
- Mission 1, Topic F
- Mission 3, Topic C
- Mission 3, Topic E
- Mission 3, Topic F
- Mission 7, Topic A
### KANSAS MATHEMATICS STANDARDS

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</table>
| **3.OA.9** | Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. | Mission 3, Topic A  
Mission 3, Topic D  
Mission 3, Topic E  
Mission 3, Topic F |

### Numbers & Operations in Base 10

| 3.NBT.1 | Use place value understanding to round whole numbers to the nearest 10 or 100. | Mission 2, Topic C  
Mission 2, Topic D  
Mission 2, Topic E |
| 3.NBT.2 | Fluently (efficiently, accurately, & flexibly) add and subtract within 1000 using strategies (e.g. composing/decomposing by like base-10 units, using friendly or benchmark numbers, using related equations, compensation, number line, etc.) and algorithms (including, but not limited to: traditional, partial-sums, etc.) based on place value, properties of operations, and/or the relationship between addition and subtraction. | Mission 2, Topic A  
Mission 2, Topic D  
Mission 2, Topic E |
| 3.NBT.3 | Multiply one-digit whole numbers by multiples of 10 in the range 10 to 90 (e.g. 9 × 80, 5 × 60) using strategies based on place value and properties of operations. | Mission 3, Topic F |

### Numbers & Operations - Fractions

| 3.NF.1 | Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into $b$ equal parts; understand a fraction $a/b$ as the quantity formed by $a$ parts of size $1/b$. | Mission 5, Topic A  
Mission 5, Topic B  
Mission 5, Topic C |
| 3.NF.2 | 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 partitioning 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. 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 (a is the | Mission 5, Topic D |
# KANSAS MATHEMATICS STANDARDS

## 3rd Grade Standards

| NZRF.3 | Explain equivalence of fractions, and compare fractions by reasoning about their size (it is a mathematical convention that when comparing fractions, the whole is the same size). a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. b. Recognize and generate simple equivalent fractions, (e.g. 1/2 = 2/4, 4/6 = 2/3.) Explain why the fractions are equivalent, e.g. by using a visual fraction model. c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. 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 relational symbols >, <, =, or ≠, and justify the conclusions, (e.g. by using a visual fraction model.) | Mission 5, Topic B  
Mission 5, Topic C  
Mission 5, Topic D  
Mission 5, Topic E  
Mission 5, Topic F |

### Measurement & Data

| 3.MD.1 | Tell and write time to the nearest minute using a.m. and p.m. 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.) | Mission 2, Topic A  
Mission 2, Topic C  
Mission 2, Topic D  
Mission 2, Topic E |
| 3.MD.2 | Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l) (Excludes cubed units such as cm³ and finding the geometric volume of a container). | Mission 2, Topic B  
Mission 2, Topic C  
Mission 2, Topic D  
Mission 2, Topic E |
| 3.MD.3 | 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.) (Excludes multiplicative comparison problems). | Mission 2, Topic B  
Mission 2, Topic D  
Mission 2, Topic E |
<p>| 3.MD.4 | Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve | Mission 6, Topic A |</p>
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<tr>
<td>one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs.</td>
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</table>
| **3.MD.5** Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. | Mission 6, Topic B  
Mission 7, Topic D |
| **3.MD.6** 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,” is said to have “one square unit” of area, and can be used to measure area (does not require standard square units). 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 (does not require standard square units). | Mission 4, Topic A  
Mission 4, Topic B  
Mission 4, Topic C  
Mission 4, Topic D |
| **3.MD.7** Measure areas by counting unit squares (square cm, square m, square in, square ft, and non-standard square units). | Mission 4, Topic A  
Mission 4, Topic B  
Mission 4, Topic D |
| **3.MD.8** 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. 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. 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. d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into nonoverlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems. | Mission 4, Topic A  
Mission 4, Topic B  
Mission 4, Topic C  
Mission 4, Topic D |
## KANSAS MATHEMATICS STANDARDS

### 3rd Grade Standards

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<td><strong>3.MD.9</strong></td>
<td>- 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.</td>
</tr>
<tr>
<td><strong>3.G.1</strong></td>
<td>- Understand that shapes in different categories (e.g. rhombuses, rectangles, trapezoids, kites 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.</td>
</tr>
<tr>
<td><strong>3.G.2</strong></td>
<td>- Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.</td>
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### Operations & Algebraic Thinking

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

- Mission 1, Topic A  
- Mission 3, Topic A  
- Mission 3, Topic B  
- Mission 3, Topic D  
- Mission 7, Topic A  
- Mission 7, Topic B

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

- Mission 3, Topic A  
- Mission 3, Topic B  
- Mission 3, Topic C  
- Mission 3, Topic D  
- Mission 5, Topic G  
- Mission 7, Topic A  
- Mission 7, Topic B

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

- Mission 1, Topic D  
- Mission 1, Topic E  
- Mission 1, Topic F  
- Mission 3, Topic A  
- Mission 3, Topic D  
- Mission 3, Topic E  
- Mission 3, Topic G  
- Mission 3, Topic H  
- Mission 7, Topic B  
- Mission 7, Topic C

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

- Mission 3, Topic F

**4.OA.5** Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.  

- Mission 5, Topic H

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## KANSAS MATHEMATICS STANDARDS

### 4th Grade Standards

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<tr>
<td>4.NBT.1</td>
<td>Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.</td>
<td>Mission 1, Topic A&lt;br&gt;Mission 3, Topic B&lt;br&gt;Mission 3, Topic C&lt;br&gt;Mission 3, Topic G</td>
</tr>
<tr>
<td>4.NBT.2</td>
<td>Read and write multi-digit whole numbers using base-ten numerals, number names, expanded form, and unit form. Compare two multi-digit numbers based on meanings of the digits in each place, using &gt;, &lt;, =, and ≠ symbols to record the results of comparisons. (Note: Students should demonstrate understanding and application of place value decomposition.)</td>
<td>Mission 1, Topic B&lt;br&gt;Mission 1, Topic C&lt;br&gt;Mission 1, Topic D&lt;br&gt;Mission 1, Topic E&lt;br&gt;Mission 1, Topic F</td>
</tr>
<tr>
<td>4.NBT.3</td>
<td>Use place value understanding to round multi-digit whole numbers to any place.</td>
<td>Mission 1, Topic C</td>
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<tr>
<td>4.NBT.4</td>
<td>Fluently (efficiently, accurately, and flexibly) add and subtract multi-digit whole numbers using an efficient algorithm (including, but not limited to: traditional, partial-sums, etc.), based on place value understanding and the properties of operations.</td>
<td>Mission 1, Topic D&lt;br&gt;Mission 1, Topic E&lt;br&gt;Mission 1, Topic F</td>
</tr>
<tr>
<td>4.NBT.5</td>
<td>Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.</td>
<td>Mission 3, Topic B&lt;br&gt;Mission 3, Topic C&lt;br&gt;Mission 3, Topic D&lt;br&gt;Mission 3, Topic H</td>
</tr>
<tr>
<td>4.NBT.6</td>
<td>Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.</td>
<td>Mission 3, Topic E&lt;br&gt;Mission 3, Topic F&lt;br&gt;Mission 3, Topic G</td>
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### Numbers & Operations - Fractions

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<tr>
<td>4.NF.1</td>
<td>Explain why a fraction ( \frac{a}{b} ) is equivalent to a fraction ( \frac{(n \cdot a)}{(n \cdot b)} ) by using visual fraction models, with attention to how the number and size of the parts</td>
<td>Mission 5, Topic B&lt;br&gt;Mission 5, Topic D&lt;br&gt;Mission 5, Topic E</td>
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<tr>
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<tr>
<td>4th Grade Standards</td>
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<td>differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.</td>
<td>Mission 6, Topic B</td>
<td></td>
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<tr>
<td><strong>4.NF.2</strong></td>
<td>Compare two fractions with different numerators and different denominators, (e.g. by creating common numerators or denominators, or by comparing to a benchmark fraction such as 12.) Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with relational symbols &gt;, &lt;, =, or ≠, and justify the conclusions, (e.g. by using visual fraction models.)</td>
<td>Mission 5, Topic C  Mission 5, Topic E</td>
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<tr>
<td><strong>4.NF.3</strong></td>
<td>Understand a fraction $\frac{a}{b}$ with $a &gt; 1$ as a sum of fractions $\frac{1}{b}$. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g. by using a visual fraction model. c. Add and subtract mixed numbers with like denominators, e.g. by replacing each mixed number with an equivalent fraction (simplest form is not an expectation), and/or by using properties of operations and the relationship between addition and subtraction. d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g. by using visual fraction models and equations to represent the problem.</td>
<td>Mission 5, Topic A  Mission 5, Topic B  Mission 5, Topic D  Mission 5, Topic E  Mission 5, Topic F  Mission 6, Topic D</td>
</tr>
<tr>
<td><strong>4.NF.4</strong></td>
<td>Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction $\frac{a}{b}$ as a multiple of $\frac{1}{b}$ . b. Understand a multiple of $\frac{a}{b}$ as a multiple of $\frac{1}{b}$ , and use this understanding to multiply a fraction by a whole number. c. Solve word problems involving multiplication of a fraction by a whole number (e.g. by using visual fraction models and equations to represent the problem.)</td>
<td>Mission 5, Topic A  Mission 5, Topic E  Mission 5, Topic G</td>
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<tr>
<td><strong>4.NF.5</strong></td>
<td>Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use</td>
<td>Mission 6, Topic B  Mission 6, Topic D</td>
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<td>KANSAS MATHEMATICS STANDARDS</td>
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<td><strong>4th Grade Standards</strong></td>
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<td>this technique to add two fractions with respective denominators 10 and 100.</td>
<td>Mission 6, Topic E</td>
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</table>
| **4.NF.6** Use decimal notation for fractions with denominators 10 or 100. | Mission 6, Topic A  
Mission 6, Topic B  
Mission 6, Topic D  
Mission 6, Topic E |
| **4.NF.7** Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the relational symbols >, <, =, or ≠, and justify the conclusions, (e.g. by using a visual model.). | Mission 6, Topic B  
Mission 6, Topic C |

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| **4.MD.1** Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. | Mission 2, Topic A  
Mission 2, Topic B  
Mission 5, Topic D  
Mission 5, Topic F  
Mission 5, Topic G  
Mission 6, Topic A  
Mission 6, Topic B  
Mission 6, Topic C  
Mission 6, Topic D  
Mission 7, Topic A  
Mission 7, Topic B  
Mission 7, Topic C |
| **4.MD.2** Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. | Mission 2, Topic A  
Mission 2, Topic B  
Mission 5, Topic D  
Mission 5, Topic F  
Mission 5, Topic G  
Mission 6, Topic C  
Mission 6, Topic E  
Mission 7, Topic A  
Mission 7, Topic B  
Mission 7, Topic C |
| **4.MD.3** Apply the area and perimeter formulas for rectangles in real world and mathematical problems explaining and justifying the appropriate unit of measure. | Mission 3, Topic A  
Mission 3, Topic H |
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<tr>
<td><strong>4.MD.4</strong></td>
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</table>
| Make a data display (line plot, bar graph, pictograph) to show a set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in the data display. | Mission 5, Topic E  
Mission 5, Topic G |

**Geometry**

| 4.G.1 | Draw points, lines, line segments, rays, angles (right, acute, obtuse, straight, reflex), and perpendicular and parallel lines. Identify these in two-dimensional figures. | Mission 4, Topic A  
Mission 4, Topic D |
| 4.G.2 | Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles (right, acute, obtuse, straight, reflex). Recognize and categorize triangles based on angles (right, acute, obtuse, and equiangular) and/or sides (scalene, isosceles, and equilateral). | Mission 4, Topic D |
| 4.G.3 | Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. | Mission 4, Topic D |
# 5th Grade

## KANSAS MATHEMATICS STANDARDS

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<td><strong>Operations &amp; Algebraic Thinking</strong></td>
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| **5.OA.1** Use parentheses in numerical expressions and evaluate expressions with these symbols. | Mission 2, Topic A  
Mission 2, Topic B  
Mission 2, Topic C  
Mission 4, Topic D  
Mission 4, Topic G  
Mission 4, Topic H |
| **5.OA.2** Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. | Mission 2, Topic B  
Mission 2, Topic C  
Mission 4, Topic D  
Mission 4, Topic H  
Mission 6, Topic B |
| **Numbers & Operations in Base Ten** | |
| **5.NBT.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. | Mission 1, Topic A  
Mission 2, Topic A  
Mission 2, Topic C  
Mission 2, Topic D  
Mission 2, Topic E |
| **5.NBT.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. | Mission 1, Topic A  
Mission 1, Topic D  
Mission 1, Topic E  
Mission 2, Topic A  
Mission 2, Topic D  
Mission 2, Topic E  
Mission 2, Topic G |
| **5.NBT.3** Read, write, and compare decimals to thousandths.  
a. Read and write decimals to thousandths using base-ten numerals, number names, expanded form, and unit form (e.g. expanded form $47.392 = 4 \times 10 + 7 \times 1 + 3 \times 1/10 + 9 \times 1/100 + 2 \times 1/1000$ unit form $47.392 = 4$ tens $+ 7$ ones $+ 3$ tenths $+ 9$ hundredths $+ 2$ thousandths).  
b. Compare two decimals to thousandths based on meanings of the digits in each | Mission 1, Topic B  
Mission 1, Topic D  
Mission 1, Topic E  
Mission 1, Topic F |
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<td>place, using &gt;, &lt;, =, and ≠ relational symbols to record the results of comparisons</td>
<td>Mission 1, Topic C</td>
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</table>
| **5.NBT.4** Use place value understanding to round decimals to any place (Note: In fifth grade, decimals include whole numbers and decimal fractions to the hundredths place.) | Mission 2, Topic B  
Mission 2, Topic D |
| **5.NBT.5** Fluently (efficiently, accurately, and flexibly) multiply multi-digit whole numbers using an efficient algorithm (ex., traditional, partial products, etc.) based on place value understanding and the properties of operations. | Mission 2, Topic E  
Mission 2, Topic F  
Mission 2, Topic H |
| **5.NBT.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. | Mission 1, Topic D  
Mission 1, Topic E  
Mission 1, Topic F  
Mission 2, Topic C  
Mission 2, Topic D  
Mission 2, Topic G  
Mission 2, Topic H  
Mission 4, Topic E  
Mission 4, Topic G |
| **5.NBT.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. | Mission 1, Topic D  
Mission 1, Topic E  
Mission 1, Topic F  
Mission 2, Topic C  
Mission 2, Topic D  
Mission 2, Topic G  
Mission 2, Topic H  
Mission 4, Topic E  
Mission 4, Topic G |
| **Numbers & Operations - Fractions** | |
| **5.NF.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. | Mission 3, Topic A  
Mission 3, Topic B  
Mission 3, Topic C  
Mission 3, Topic D |
| **5.NF.2** Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, (e.g. by using | Mission 3, Topic B  
Mission 3, Topic C  
Mission 3, Topic D |
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<td>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.</td>
<td>Mission 4, Topic D</td>
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<tr>
<td><strong>5.NF.3</strong></td>
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<tr>
<td>Interpret a fraction as division of the numerator by the denominator (( \frac{a}{b} = a ÷ 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.</td>
<td>Mission 3, Topic A Mission 4, Topic B</td>
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<tr>
<td><strong>5.NF.4</strong></td>
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<tr>
<td>Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the product ( \frac{a}{b} \cdot q ) as a parts of a partition of ( q ) into ( b ) equal parts; equivalently, as the result of a sequence of operations ( a \cdot \frac{q}{b} ). b. 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.</td>
<td>Mission 4, Topic C Mission 4, Topic D Mission 4, Topic E Mission 5, Topic C</td>
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<tr>
<td><strong>5.NF.5</strong></td>
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<td>Interpret multiplication as scaling (resizing), by: a. Comparing the size of a product to the size of one factor based on the size of the other factor, without performing the indicated multiplication (e.g. They see ( \frac{1}{2} \times 3 ) as half the size of 3.). b. Explain 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); explain 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 ( \frac{a}{b} = \frac{na}{nb} ) to the effect of multiplying ( a/b ) by 1. (e.g. Students may have the misconception that multiplication always produces a larger result. They need to have the conceptual understanding with examples like; ( \frac{3}{4} \times \text{one dozen eggs} ) will have a product that is less than 12.)</td>
<td>Mission 4, Topic F</td>
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</table>
### 5th Grade Standards

| 5.NF.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). | Mission 4, Topic D  
Mission 4, Topic E  
Mission 4, Topic F  
Mission 5, Topic C |
| 5.NF.7 | Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. Division of a fraction by a fraction is not a requirement at this grade. a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. b. Interpret division of a whole number by a unit fraction, and compute such quotients. 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. | Mission 4, Topic G |

### Measurement & Data

| 5.MD.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. | Mission 1, Topic A  
Mission 2, Topic D  
Mission 4, Topic C  
Mission 4, Topic E |
| 5.MD.2 | Make a data display (line plot, bar graph, pictograph) to show a data set of measurements in fractions of a unit (1/2, 1/4, 1/8, 1/16). Use operations (add, subtract, multiply) on fractions for this grade to solve problems involving information presented in the data display. | Mission 4, Topic A |
| 5.MD.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. | Mission 5, Topic A  
Mission 5, Topic B |
| 5.MD.4 | Measure volumes by counting unit cubes such as cubic cm, cubic in, cubic ft. or non-standard cubic units. | Mission 5, Topic A |
## 5th Grade Standards

| 5.MD.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 three-dimensional 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 $V = B \times h$ ($B$ represents the area of the base) 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. |
|        | Mission 5, Topic B |

### Geometry

| 5.G.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). |
|       | Mission 6, Topic A |
|       | Mission 6, Topic B |
|       | Mission 6, Topic C |

<p>| 5.G.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. (e.g. plotting the relationship between two positive quantities such as maps, coordinate grid games (such as Battleship), time/temperature, time/distance, cost/quantity, etc.). |
|       | Mission 6, Topic C |
|       | Mission 6, Topic D |</p>
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<td>5.G.3</td>
<td>Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. Mission 5, Topic D</td>
</tr>
<tr>
<td>5.G.4</td>
<td>Classify two-dimensional figures in a hierarchy based on properties Mission 5, Topic D</td>
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# 6th Grade Standards

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<td><strong>Ratios &amp; Proportional Relationships</strong></td>
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</table>
| 6.RP.1 Use ratio language to describe a relationship between two quantities. Distinguish between part-to-part and part-to-whole relationships. | Mission 2, Topic A  
Mission 2, Topic B |
| 6.RP.2 Use unit rate language ("for each one", "for every one" and "per") and unit rate notation to demonstrate understanding the concept of a unit rate \( \frac{a}{b} \) associated with a ratio \( \frac{a:b}{b} \) with \( b \neq 0 \). | Mission 2, Topic C  
Mission 3, Topic A  
Mission 3, Topic B |
| 6.RP.3 Use ratio and rate reasoning to solve real-world and mathematical problems, (e.g. by reasoning about tables of equivalent ratios, tape diagrams, double number line diagram, or using calculations.) a. Make tables of equivalent ratios relating quantities with whole-number measurements, find the missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. Solve unit rate problems including those involving unit pricing and constant speed. b. Find a percent of a quantity as a rate per 100 (e.g. 30% of a quantity means 30 100 times the quantity); solve problems involving finding the whole, given a part and the percent. c. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. | Mission 2, Topic C  
Mission 2, Topic D  
Mission 2, Topic E  
Mission 2, Topic F  
Mission 3, Topic B  
Mission 3, Topic C  
Mission 3, Topic D  
Mission 3, Topic E  
Mission 6, Topic B  
Mission 6, Topic D |
| **The Number System** | |
| 6.NS.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, requiring multiple exposures connecting various concrete and abstract models. | Mission 4, Topic A  
Mission 4, Topic B  
Mission 4, Topic C  
Mission 4, Topic D  
Mission 4, Topic E |
<p>| 6.NS.2 Fluently (efficiently, accurately, and flexibly) divide multi-digit numbers using an efficient algorithm. | Mission 5, Topic D |</p>
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<tr>
<td><strong>6.NS.3</strong></td>
<td>Fluently (efficiently, accurately, and flexibly) add, subtract, multiply, and divide multi-digit decimals using an efficient algorithm for each operation.</td>
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| | Mission 5, Topic B  
| | Mission 5, Topic C  
| | Mission 5, Topic D  
| | Mission 5, Topic E  
| | Mission 6, Topic A  
| | Mission 8, Topic C |
| **6.NS.4** | Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. |
| | Mission 7, Topic D |
| **6.NS.5** | Understand positive and negative numbers to describe quantities having opposite directions or values (e.g. temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); a. Use positive and negative numbers to represent quantities in real-world contexts. b. Explaining the meaning of 0 in each situation. |
| | Mission 7, Topic A |
| **6.NS.6** | Understand a rational number as a point on the number line and a coordinate pair as a location on a coordinate plane. a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, (e.g. \(-(-3) = 3\)) and that 0 is its own opposite. b. Recognize signs of numbers in ordered pairs indicate locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane. |
| | Mission 7, Topic A  
| | Mission 7, Topic C |
| **6.NS.7** | Understand ordering and absolute value of rational numbers. a. Interpret statements of inequality as statements about the relative position of two numbers |
| | Mission 7, Topic A  
| | Mission 7, Topic B  
<p>| | Mission 7, Topic C |</p>
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<td>on a number line diagram. b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. c. Explain the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. d. Distinguish comparisons of absolute value from statements about order.</td>
<td>Mission 7, Topic C</td>
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<tr>
<td><strong>6.NS.8</strong> Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.</td>
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<td><strong>6.EE.1</strong> Write and evaluate numerical expressions involving whole-number exponents.</td>
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<tr>
<td><strong>6.EE.2</strong> Write, read, and evaluate expressions in which letters stand for numbers. a. Write expressions that record operations with numbers and with letters standing for numbers. b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).</td>
<td>Mission 1, Topic B Mission 1, Topic C Mission 1, Topic F Mission 6, Topic B Mission 6, Topic C Mission 7, Topic B</td>
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<tr>
<td><strong>6.EE.3</strong> Apply the properties of operations and combine like terms, with the conventions of algebraic notation, to identify and generate equivalent expressions</td>
<td>Mission 5, Topic D Mission 6, Topic B</td>
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<td><strong>6.EE.4</strong> Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given</td>
<td>Mission 6, Topic A Mission 6, Topic B Mission 6, Topic C Mission 7, Topic B</td>
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| number in a specified set makes an equation or inequality true. | Mission 6, Topic A  
Mission 6, Topic B  
Mission 7, Topic B |
| **6.EE.5** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. | Mission 6, Topic A  
Mission 6, Topic B  
Mission 7, Topic B |
| **6.EE.6** Write and solve one-step equations involving non-negative rational numbers using addition, subtraction, multiplication and division. | Mission 6, Topic A  
Mission 6, Topic B |
| **6.EE.7** Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams. | Mission 7, Topic B |
| **6.EE.8** Use variables to represent two quantities in a real-world problem that change in relationship to one another. a. Identify the independent and dependent variable. b. Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. c. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. | Mission 6, Topic D |
| **Geometry**                    |                |
| **6.G.1** Find the area of all triangles, special quadrilaterals (including parallelograms, kites and trapezoids), and polygons whose edges meet at right angles (rectilinear figure by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. | Mission 1, Topic A  
Mission 1, Topic B  
Mission 1, Topic C  
Mission 1, Topic D  
Mission 1, Topic G  
Mission 4, Topic D |
| **6.G.2** Find the volume of a right rectangular prism with fractional edge lengths by applying the formulas $V = lwh$ and $V = Bh$ ($B$ is the area of the base and $h$ is the | Mission 1, Topic E  
Mission 4, Topic D  
Mission 4, Topic E |
# KANSAS MATHEMATICS STANDARDS

## 6th Grade Standards

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<tr>
<td><strong>6.G.3</strong></td>
<td>Draw polygons whose edges meet at right angles (rectilinear figure polygons) in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.</td>
<td>Mission 7, Topic C</td>
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## Statistics & Probability

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<td><strong>6.SP.1</strong></td>
<td>Recognize and generate a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.</td>
<td>Mission 8, Topic A&lt;br&gt;Mission 8, Topic B&lt;br&gt;Mission 8, Topic D</td>
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<td><strong>6.SP.2</strong></td>
<td>Analyze a set of data collected to answer a statistical question with a distribution which can be described by its center (mean, median and/or mode), spread (range and/or interquartile range), and overall shape (cluster, peak, gap, symmetry, skew (data) and/or outlier).</td>
<td>Mission 8, Topic B&lt;br&gt;Mission 8, Topic C&lt;br&gt;Mission 8, Topic E</td>
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<tr>
<td><strong>6.SP.3</strong></td>
<td>Recognize that a measure of center (mean, median and/or mode) for a numerical data set summarizes all of its values with a single number, while a measure of variation (range and/or interquartile range) describes how its values vary with a single number.</td>
<td>Mission 8, Topic B</td>
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<tr>
<td><strong>6.SP.4</strong></td>
<td>Display numerical data on dot plots, histograms, stem-and-leaf plots, and box plots.</td>
<td>Mission 8, Topic A&lt;br&gt;Mission 8, Topic B&lt;br&gt;Mission 8, Topic C</td>
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<tr>
<td><strong>6.SP.5</strong> Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c. Giving quantitative measures of center (mean, median and/or mode) and variability (range and/or interquartile range), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. d. Relating the choice of measures of center and variability to the distribution of the data.</td>
<td>Mission 8, Topic D</td>
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## Ratios & Proportional Relationships

### 7.RP.1
Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.

- Mission 2, Topic C
- Mission 4, Topic A

### 7.RP.2
Recognize and represent proportional relationships between quantities:
- a. Determine whether two quantities are in a proportional relationship, e.g. by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
- b. Analyze a table or graph and recognize that, in a proportional relationship, every pair of numbers has the same unit rate (referred to as the “m”).
- c. Represent proportional relationships by equations.
- d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.

- Mission 2, Topic A
- Mission 2, Topic B
- Mission 2, Topic C
- Mission 2, Topic D
- Mission 2, Topic E
- Mission 3, Topic A
- Mission 3, Topic B
- Mission 4, Topic A
- Mission 5, Topic C
- Mission 5, Topic D

### 7.RP.3
Use proportional relationships to solve multistep ratio and percent problems.

- Mission 3, Topic A
- Mission 4, Topic B
- Mission 4, Topic C
- Mission 4, Topic D

## The Number System

### 7.NS.1
Represent addition and subtraction on a horizontal or vertical number line diagram.
- a. Describe situations in which opposite quantities combine to make 0. Show that a number and its opposite have a sum of 0 (are additive inverses).
- b. Show p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative.
- c. Model subtraction of rational numbers as adding the additive inverse, p – q = p + (–q).
- d. Model subtraction as the distance between two rational numbers on the number line where the distance is the absolute value of their difference.

- Mission 5, Topic A
- Mission 5, Topic B
- Mission 6, Topic D
- Mission 7, Topic B
### 7th Grade Standards

#### 7.NS.2
Apply and extend previous understandings of multiplication and division of positive rational numbers to multiply and divide all rational numbers.

a. Describe how multiplication is extended from positive rational numbers to all rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (−1)(−1) = 1 and the rules for multiplying signed numbers.

b. Explain that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. Leading to situations such that if \( p \) and \( q \) are integers, then \( -\frac{p}{q} = \frac{-p}{q} \). Apply properties of operations as strategies to multiply and divide rational numbers.

c. Convert a rational number in the form of a fraction to its decimal equivalent using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.

| Mission 4, Topic A | Mission 5, Topic A |
| Mission 5, Topic C | Mission 8, Topic D |

#### 7.NS.3
Solve and interpret real-world and mathematical problems involving the four operations with rational numbers. (Computations with rational numbers extend the rules for manipulating fractions to complex fractions.)

| Mission 5, Topic B | Mission 5, Topic C |
| Mission 5, Topic D | Mission 5, Topic E |
| Mission 5, Topic F |

### Expression & Equations

#### 7.EE.1
Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. Note: factoring is limited to integer coefficients.

| Mission 6, Topic D |

#### 7.EE.2
Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.

| Mission 6, Topic B |

#### 7.EE.3
Solve multi-step real-life and mathematical problems with rational numbers. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the

| Mission 3, Topic C | Mission 5, Topic C |
| Mission 5, Topic F | Mission 6, Topic A |
### 7th Grade Standards

<table>
<thead>
<tr>
<th>Reasonableness of answers using mental computation and estimation strategies.</th>
</tr>
</thead>
</table>

| 7.EE.4 | Use variables to represent quantities in a real-world or mathematical problem, and construct two-step equations and inequalities to solve problems by reasoning about the quantities. a. Solve word problems leading to equations of the form \( px + q = r \), and \( p(x + q) = r \) where \( p, q, \) and \( r \) are specific rational numbers. Solve equations of these forms fluently (efficiently, accurately, and flexibly). Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. b. Solve word problems leading to inequalities of the form \( px + q > r \) or \( px + q < r \) where \( p, q, \) and \( r \) are specific rational numbers and \( p > 0 \). Graph the solution set of the inequality and interpret it in the context of the problem. |
| --- |

### Geometry

| 7.G.1 | Solve problems involving scale drawings of geometric figures, such as computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. |
| --- |

| 7.G.2 | Identify three-dimensional objects generated by rotating a two-dimensional (rectangular or triangular) object around one edge. |
| --- |

| 7.G.3 | Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right cylinder. |
| --- |

| 7.G.4 | Use the formulas for the area and circumference of a circle and solve problems; give an informal derivation of the relationship between the circumference and area of a circle. |
| --- |

| 7.G.5 | Investigate the relationship between three-dimensional geometric shapes; a. Generalize |
| --- |

**It is recommended that teachers use supplemental materials to fully address this standard.**
### 7th Grade Standards

- **Lesson**: the volume formula for prisms and cylinders \((V = Bh)\) where \(B\) is the area of the base and \(h\) is the height. b. Generalize the surface area formula for prisms and cylinders \((SA = 2B + Ph)\) where \(B\) is the area of the base, \(P\) is the perimeter of the base, and \(h\) is the height (in the case of a cylinder, perimeter is replaced by circumference).

### 7.G.6

Solve real-world and mathematical problems involving area of two-dimensional objects and volume and surface area of three-dimensional objects including cylinders and right prisms. (Solutions should not require students to take square roots or cube roots.)


### Statistics & Probability

#### 7.SP.1

- **Use statistics to gain information about a population by examining a sample of the population**: a. Know that generalizations about a population from a sample are valid only if the sample is representative of that population and generate a valid representative sample of a population. b. Identify if a particular random sample would be representative of a population and justify your reasoning.

- **Lessons**: Mission 8, Topic C, Mission 8, Topic D, Mission 8, Topic E

#### 7.SP.2

- **Use data from a random sample to draw inferences about a population with an unknown characteristic of interest**: Generate multiple samples (or simulated samples) of the same size to informally gauge the variation in estimates or predictions.

- **Lessons**: Mission 8, Topic C, Mission 8, Topic D, Mission 8, Topic E

#### 7.SP.3

- **Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities**: measuring the difference between the centers by expressing it as a multiple of a measure of variability (requires introduction of mean absolute deviation).

- **Lessons**: Mission 8, Topic C, Mission 8, Topic D

#### 7.SP.4

- **Use measures of center (mean, median and/or mode) and measures of variability (range, interquartile range and/or mean absolute deviation)** for numerical data from random samples to draw informal comparative inferences about two populations.

- **Lessons**: Mission 8, Topic D, Mission 8, Topic E
<table>
<thead>
<tr>
<th><strong>KANSAS MATHEMATICS STANDARDS</strong></th>
<th><strong>ZEARN MATH</strong></th>
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<tbody>
<tr>
<td><strong>7th Grade Standards</strong></td>
<td>Lessons</td>
</tr>
<tr>
<td>7.SP.5  Express the probability of a chance event as a number between 0 and 1 that represents the likelihood of the event occurring. (Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.)</td>
<td>Mission 8, Topic A</td>
</tr>
<tr>
<td>7.SP.6  Collect data from a chance process (probability experiment). Approximate the probability by observing its long-run relative frequency. Recognize that as the number of trials increase, the experimental probability approaches the theoretical probability. Conversely, predict the approximate relative frequency given the probability.</td>
<td>Mission 8, Topic A</td>
</tr>
</tbody>
</table>
| 7.SP.7  Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. 7.SP.7a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. | Mission 8, Topic A  
Mission 8, Topic C  
Mission 8, Topic E |
| 7.SP.8  Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. a. Know that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g. "rolling double sixes"), identify the outcomes in the sample space which compose the event. c. Design and use a simulation to generate frequencies for compound events. | Mission 8, Topic A  
Mission 8, Topic B |
8th Grade Standards

**The Number System**

<table>
<thead>
<tr>
<th>8.NS.1</th>
<th>Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.NS.2</td>
<td>Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g. ( \pi^2 )).</td>
</tr>
</tbody>
</table>

**Expressions & Equations**

<table>
<thead>
<tr>
<th>8.EE.1</th>
<th>Use square root and cube root symbols to represent solutions to equations of the form ( x^2 = p ) and ( x^3 = p ), where ( p ) is a positive rational number. Evaluate square roots of whole number perfect squares with solutions between 0 and 15 and cube roots of whole number perfect cubes with solutions between 0 and 5. Know that ( \sqrt{2} ) is irrational.</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.EE.2</td>
<td>Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.</td>
</tr>
<tr>
<td>8.EE.3</td>
<td>Read and write numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g. use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.</td>
</tr>
</tbody>
</table>
Graph proportional relationships, interpreting its unit rate as the slope \((m)\) of the graph. Compare two different proportional relationships represented in different ways.

**Lesson:** Mission 3, Topic A

**Lesson:** Mission 3, Topic B

Use similar triangles to explain why the slope \((m)\) is the same between any two distinct points on a nonvertical line in the coordinate plane and extend to include the use of the slope formula \((m = (y_2 - y_1)/(x_2 - x_1))\) when given two coordinate points \((x_1, y_1)\) and \((x_2, y_2)\). Generate the equation \(y = mx\) for a line through the origin (proportional) and the equation \(y = mx + b\) for a line with slope \(m\) intercepting the vertical axis at \(y\)-intercept \(b\) (not proportional when \(b \neq 0\)).

**Lesson:** Mission 2, Topic C

**Lesson:** Mission 3, Topic B

**Lesson:** Mission 3, Topic C

**Lesson:** Mission 3, Topic E

Describe the relationship between the proportional relationship expressed in \(y = mx\) and the nonproportional linear relationship \(y = mx + b\) as a result of a vertical translation. Note: be clear with students that all linear relationships have a constant rate of change (slope), but only the special case of proportional relationships (line that goes through the origin) continue to have a constant of proportionality.

**Lesson:** Mission 3, Topic B

Fluently (efficiently, accurately, and flexibly) solve one-step, two-step, and multi-step linear equations and inequalities in one variable, including situations with the same variable appearing on both sides of the equal sign. a. Give examples of linear equations in one variable with one solution \((x = a)\), infinitely many solutions \((a = a)\), or no solutions \((a = b)\). Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form \(x = a, a = a, a = b\) results (where \(a\) and \(b\) are different numbers). b. Solve linear equations and inequalities with rational number coefficients, including equations/inequalities whose solutions require expanding and/or factoring expressions using the distributive property and collecting like terms.

**Lesson:** Mission 4, Topic B

**Lesson:** Grade 7, Mission 6, Topic C

**Functions**
<table>
<thead>
<tr>
<th>8th Grade Standards</th>
<th>Lessons</th>
</tr>
</thead>
</table>
| **8.F.1** Explain that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. (Function notation is not required in Grade 8.) | Mission 5, Topic A  
Mission 5, Topic B  
Mission 5, Topic E |
| **8.F.2** Compare properties of two linear functions represented in a variety of ways (algebraically, graphically, numerically in tables, or by verbal descriptions). | Mission 5, Topic B  
Mission 5, Topic C |
| **8.F.3** Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. | Mission 5, Topic B  
Mission 5, Topic C  
Mission 5, Topic E |
| **8.F.4** Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two $(x, y)$ values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. | Mission 5, Topic C  
Mission 5, Topic D  
Mission 5, Topic E |
| **8.F.5** Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g. where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally. | Mission 5, Topic B  
Mission 5, Topic C |

**Geometry**

<p>| 8.G.1 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a “one-degree angle,” and can be used to measure angles. b. An angle that turns through $n$ one-degree angles is said to have an angle measure of $n$ degrees. | Grade 4, Mission 4, Topic B |</p>
<table>
<thead>
<tr>
<th>KANSAS MATHEMATICS STANDARDS</th>
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</thead>
<tbody>
<tr>
<td><strong>8th Grade Standards</strong></td>
<td><strong>Lessons</strong></td>
</tr>
<tr>
<td><strong>8.G.2</strong> Measure angles in whole-number degrees using a protractor. Draw angles of specified measure using a protractor and straight edge.</td>
<td>Grade 4, Mission 4, Topic B</td>
</tr>
<tr>
<td><strong>8.G.3</strong> Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g. by using an equation with a symbol for the unknown angle measure.</td>
<td>Grade 4, Mission 4, Topic C</td>
</tr>
<tr>
<td><strong>8.G.4</strong> Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and use them to solve simple equations for an unknown angle in a figure.</td>
<td>Grade 7, Mission 7, Topic A</td>
</tr>
<tr>
<td><strong>8.G.5</strong> Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and use them to solve simple equations for an unknown angle in a figure.</td>
<td>Mission 1, Topic D Mission 2, Topic B Mission 2, Topic D</td>
</tr>
<tr>
<td><strong>8.G.6</strong> Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and use them to solve simple equations for an unknown angle in a figure.</td>
<td>Grade 7, Mission 3, Topic A Grade 7, Mission 7, Topic B Grade 7, Mission 7, Topic D</td>
</tr>
<tr>
<td><strong>8.G.7</strong> Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and use them to solve simple equations for an unknown angle in a figure.</td>
<td>Mission 8, Topic C</td>
</tr>
<tr>
<td><strong>8.G.8</strong> Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and use them to solve simple equations for an unknown angle in a figure.</td>
<td>Mission 8, Topic C</td>
</tr>
<tr>
<td><strong>8.G.9</strong> Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.</td>
<td>Mission 8, Topic C</td>
</tr>
</tbody>
</table>
### KANSAS MATHEMATICS STANDARDS

<table>
<thead>
<tr>
<th>8th Grade Standards</th>
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</thead>
</table>
| **8.G.10** Use the formulas or informal reasoning to find the arc length, areas of sectors, surface areas and volumes of pyramids, cones, and spheres. | Mission 5, Topic D  
Mission 5, Topic E  
Mission 5, Topic F |
| **8.G.11** Investigate the relationship between the formulas of three dimensional geometric shapes; a. Generalize the volume formula for pyramids and cones \((V = \frac{1}{3} Bh)\).  
b. Generalize surface area formula of pyramids and cones \((SA = B + \frac{1}{2} Pl)\). | It is recommended that teachers use supplemental materials to fully address this standard. |
| **8.G.12** Solve real-world and mathematical problems involving arc length, area of two-dimensional shapes including sectors, volume and surface area of three-dimensional objects including pyramids, cones and spheres. | Mission 5, Topic D  
Mission 5, Topic E  
Mission 5, Topic F |

### Statistics & Probability

| 8.SP.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. | Mission 6, Topic A  
Mission 6, Topic B |
| 8.SP.2 Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line. | Mission 6, Topic B |
| 8.SP.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. | Mission 6, Topic C |