

# Correlation

The following is a correlation of *Investigations 3* to the Common Core State Standards for Mathematics. Assessment Benchmarks are included with their associated standards.

Common Core State Standards for Mathematics Grade 5	Grade 5 <i>Investigations 3</i>
<b>Operations and Algebraic Thinking 5.OA</b>	
<b>Write and interpret numerical expressions.</b>	
<p><b>5.OA.A.1</b> Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.</p>	<p><b>Unit 1</b> 1.1, 1.4, 1.5, TMM 2.1, TMM 2.2, TMM 2.3, TMM 2.4, TMM 3.4, TMM 3.5, TMM 3.6, TMM 3.7  <b>Benchmark 1:</b> Use the order of operations to solve computation problems.</p> <p><b>Unit 3</b> TMM 2.3, TMM 2.4, TMM 2.5  <b>Unit 5</b> TMM 1.5, TMM 1.6, TMM 1.7, TMM 2.4, TMM 2.5, TMM 2.6, TMM 2.7  <b>Unit 8</b> TMM Investigation 2</p>
<p><b>5.OA.A.2</b> Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. <i>For example, express the calculation “add 8 and 7, then multiply by 2” as <math>2 \times (8 + 7)</math>. Recognize that <math>3 \times (18932 + 921)</math> is three times as large as <math>18932 + 921</math>, without having to calculate the indicated sum or product.</i></p>	<p><b>Unit 1</b> 1.2, 2.3, 2.4, 2.5, 2.7, 3.2, 3.4, 3.6, 3.7  <b>Benchmark 1:</b> Use the order of operations to solve computation problems.</p> <p><b>Unit 3</b> 3.3  <b>Unit 5</b> 2.5</p>
<b>Analyze patterns and relationships.</b>	
<p><b>5.OA.B.3</b> Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. <i>For example, given the rule “Add 3” and the starting number 0, and given the rule “Add 6” and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.</i></p>	<p><b>Unit 4</b> 1.4, 1.5  <b>Unit 5</b> 2.3, 2.4, 2.6, 2.7  <b>Benchmark 1:</b> Use tables to record ordered pairs and construct coordinate graphs to represent the relationship between x-coordinates and y-coordinates.  <b>Benchmark 2:</b> Determine what values are represented by points on a coordinate grid.  <b>Benchmark 3:</b> Represent real world and mathematical problems by graphing points in the coordinate plane and interpret the graph in the context of the situation.  <b>Benchmark 4:</b> Use tables and graphs to compare two situations governed by rules that generate numerical patterns.</p> <p><b>Unit 8</b> 2.2, 2.3, 2.4, 2.5  <b>Benchmark 2:</b> Identify and explain numerical patterns when comparing perimeters and areas of related rectangles.</p>

**Common Core State Standards  
for Mathematics Grade 5**

**Grade 5  
Investigations 3**

**Number and Operations in Base Ten 5.NBT**

**Understand the place value system.**

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

**Unit 6** 1.2, 1.6, 1.7  
**Benchmark 1:** Write, compare, and round decimals to thousandths.  
**Unit 7** 3.1, 3.2, 3.4, 3.5, 3.6, 3.7  
**Benchmark 5:** Recognize and use place value relationships to explain patterns when multiplying and dividing by powers of 10, including placement of the decimal point.

**5.NBT.A.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.

**Unit 1** 2.3, 2.4, 2.5, 3.6, 3.7  
**Benchmark 1:** Solve 2-digit by 2-digit multiplication problems efficiently.  
**Unit 4** 1.4, TMM 1.5, TMM 2.1, TMM 2.2, TMM 2.6, TMM 2.7, TMM 3.1, TMM 3.4, TMM 3.5  
**Unit 7** 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, TMM 3.7, TMM 3.8, TMM 3.9, TMM 3.10, TMM 3.11  
**Benchmark 5:** Recognize and use place value relationships to explain patterns when multiplying and dividing by powers of 10, including placement of the decimal point.

**5.NBT.A.3** Read, write, and compare decimals to thousandths.

**5.NBT.A.3a** Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g.,  
 $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times \left(\frac{1}{10}\right) + 9 \times \left(\frac{1}{100}\right) + 2 \times \left(\frac{1}{1000}\right)$ .

**Unit 6** 1.1, 1.2, 1.4, 1.5, 1.6, TMM 1.7, TMM 1.8, TMM 2.1, TMM 2.2, TMM 2.3, TMM 2.4, TMM 2.5, TMM 2.6, 2.9  
**Benchmark 1:** Write, compare, and round decimals to thousandths.  
**Unit 7** TMM 1.1, TMM 1.2, TMM 1.3, TMM 1.4, TMM 2.1, TMM 2.2, 2.3, 2.4, TMM 3.1, TMM 3.2, TMM 3.3, TMM 3.4

**5.NBT.A.3b** Compare two decimals to thousandths based on meanings of the digits in each place, using  $>$ ,  $=$ , and  $<$  symbols to record the results of comparisons.

**Unit 6** 1.3, 1.4, 1.5, 1.7, 1.8, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9  
**Benchmark 1:** Write, compare, and round decimals to thousandths.

Common Core State Standards for Mathematics Grade 5	Grade 5 Investigations 3
<p><b>5.NBT.A.4</b> Use place value understanding to round decimals to any place.</p>	<p><b>Unit 6</b> 1.6, TMM 1.7, TMM 1.8, TMM Investigation 2, 2.9  <b>Benchmark 1:</b> Write, compare, and round decimals to thousandths.</p> <p><b>Unit 7</b> TMM 1.1, TMM 1.2, TMM 1.3, TMM 1.4, TMM 2.1, 2.2, TMM 2.3, TMM 2.4, TMM 3.1, TMM 3.2, TMM 3.3, TMM 3.4</p>
<p><b>Perform operations with multi-digit whole numbers and with decimals to hundredths.</b></p>	
<p><b>5.NBT.B.5</b> Fluently multiply multi-digit whole numbers using the standard algorithm.</p>	<p><b>Unit 3</b> TMM 2.1, TMM 2.2, TMM 2.3, TMM 2.4, TMM 2.5  <b>Unit 4</b> Investigation 1, 2.4, 2.5, 2.7, Investigation 3  <b>Benchmark 1:</b> Fluently solve multidigit multiplication problems using a variety of strategies including the standard algorithm.</p> <p><b>Unit 5</b> TMM 2.1, TMM 2.2, TMM 2.3  <b>Unit 6</b> 1.3, 1.4, 2.1, 2.2, 2.3  <b>Unit 8</b> 2.3, 2.4, 2.5</p>
<p><b>5.NBT.B.6</b> 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.</p>	<p><b>Unit 1</b> TMM 2.5, TMM 2.6, TMM 2.7, 3.1, 3.2, TMM 3.3, 3.4, 3.5, 3.6, 3.7  <b>Benchmark 2:</b> Solve division problems with 1-digit and 2-digit divisors.  <b>Benchmark 3:</b> Use the order of operations to solve computation problems.</p> <p><b>Unit 2</b> TMM 1.5, TMM 1.6, TMM 2.1, TMM 2.2, TMM 2.3, TMM 2.4  <b>Unit 3</b> TMM 2.1, TMM 2.2  <b>Unit 4</b> Investigation 2, Investigation 3  <b>Benchmark 2:</b> Solve division problems with up to 4-digit dividends and 2-digit divisors efficiently.</p> <p><b>Unit 5</b> TMM 2.1, TMM 2.2, TMM 2.3  <b>Unit 6</b> TMM 1.4, TMM 1.5, TMM 1.6</p>
<p><b>5.NBT.B.7</b> 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.</p>	<p><b>Unit 6</b> Investigation 2  <b>Benchmark 2:</b> Add and subtract decimals.</p> <p><b>Unit 7</b> TMM 1.1, TMM 1.2, TMM 1.3, TMM 1.4, TMM 2.1, TMM 2.2, TMM 2.3, TMM 2.4, Investigation 3  <b>Benchmark 6:</b> Multiply and divide decimals to hundredths.</p> <p><b>Unit 8</b> 2.2</p>

**Common Core State Standards  
for Mathematics Grade 5**

**Grade 5  
Investigations 3**

**Number and Operations—Fractions 5.NF**

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

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

**Unit 3** 2.1, 2.2, 2.3, 2.5, 2.6, 2.7, Investigation 3  
**Benchmark 1:** Add fractions with unlike denominators.  
**Benchmark 2:** Subtract fractions with unlike denominators.  
**Unit 4** TMM 1.1, TMM 1.2, TMM 1.3, TMM 1.4  
**Unit 5** TMM 1.1, TMM 1.2, TMM 1.3, TMM 1.4  
**Unit 6** TMM 1.2, TMM 1.3  
**Unit 8** 2.3, 2.4, 2.5

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

**Unit 3** 2.3, 2.5, 2.6, 2.7, Investigation 3  
**Benchmark 1:** Add fractions with unlike denominators.  
**Benchmark 2:** Subtract fractions with unlike denominators.  
**Unit 6** TMM 1.1, TMM 1.2, TMM 1.3

**Apply and extend previous understandings of multiplication and division.**

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

**Unit 7** Investigation 2  
**Benchmark 4:** Solve division problems with two whole numbers resulting in a fraction or a mixed number.

**5.NF.B.4** Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.

**5.NF.B.4a** Interpret the product  $\left(\frac{a}{b}\right) \times q$  as a parts of a partition of  $q$  into  $b$  equal parts; equivalently, as the result of a sequence of operations  $a \times q \div b$ . *For example, use a visual fraction model to show  $\left(\frac{2}{3}\right) \times 4 = \frac{8}{3}$ , and create a story context for this equation. Do the same with  $\left(\frac{2}{3}\right) \times \left(\frac{4}{5}\right) = \frac{8}{15}$ . (In general,  $\left(\frac{a}{b}\right) \times \left(\frac{c}{d}\right) = \frac{ac}{bd}$ .)*

**Unit 7** 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, TMM 1.9, TMM 1.10, TMM 1.11, 3.9, 3.10, 3.11  
**Benchmark 1:** Multiply fractions, mixed numbers, and whole numbers.

Common Core State Standards for Mathematics Grade 5	Grade 5 Investigations 3
<p><b>5.NF.B.4b</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.</p>	<p><b>Unit 7</b> 1.7, 1.8  <b>Benchmark 1:</b> Multiply fractions, mixed numbers, and whole numbers.</p> <p><b>Unit 8</b> 2.3  <b>Benchmark 2:</b> Identify and explain numerical patterns when comparing perimeters and areas of related rectangles.</p>
<p><b>5.NF.B.5</b> Interpret multiplication as scaling (resizing), by:</p>	
<p><b>5.NF.B.5a</b> Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.</p>	<p><b>Unit 7</b> 1.3, 1.4, 1.5, TMM 1.6, TMM 1.7, TMM 1.8, TMM 1.9, TMM 1.10, TMM 1.11  <b>Benchmark 2:</b> Compare the size of the factors and the size of the product and explain their relationship.</p>
<p><b>5.NF.B.5b</b> Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence <math>\frac{a}{b} = \frac{(n \times a)}{(n \times b)}</math> to the effect of multiplying <math>\frac{a}{b}</math> by 1.</p>	<p><b>Unit 7</b> 1.3, 1.4, 1.5  <b>Benchmark 2:</b> Compare the size of the factors and the size of the product and explain their relationship.</p>
<p><b>5.NF.B.6</b> Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.</p>	<p><b>Unit 7</b> 1.1, 1.2, 1.3, 1.4, 1.5, 1.7, 1.8  <b>Benchmark 1:</b> Multiply fractions, mixed numbers, and whole numbers.</p> <p><b>Unit 8</b> 2.3, 2.4, 2.5</p>
<p><b>5.NF.B.7</b> Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. <i>(Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.)</i></p>	
<p><b>5.NF.B.7a</b> Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. <i>For example, create a story context for <math>(\frac{1}{3}) \div 4</math>, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that <math>(\frac{1}{3}) \div 4 = \frac{1}{12}</math> because <math>(\frac{1}{12}) \times 4 = \frac{1}{3}</math>.</i></p>	<p><b>Unit 7</b> 1.10, 1.11  <b>Benchmark 3:</b> Divide a unit fraction by a whole number and a whole number by a unit fraction.</p>

Common Core State Standards for Mathematics Grade 5	Grade 5 Investigations 3
<p><b>5.NF.B.7b</b> Interpret division of a whole number by a unit fraction, and compute such quotients. <i>For example, create a story context for <math>4 \div \left(\frac{1}{5}\right)</math>, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that <math>4 \div \left(\frac{1}{5}\right) = 20</math> because <math>20 \times \left(\frac{1}{5}\right) = 4</math>.</i></p>	<p><b>Unit 7</b> 1.9, 1.11  <b>Benchmark 3:</b> Divide a unit fraction by a whole number and a whole number by a unit fraction.</p>
<p><b>5.NF.B.7c</b> 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. <i>For example, how much chocolate will each person get if 3 people share <math>\frac{1}{2}</math> lb of chocolate equally? How many <math>\frac{1}{3}</math>-cup servings are in 2 cups of raisins?</i></p>	<p><b>Unit 7</b> 1.9, 1.10, 1.11, 3.9, 3.10, 3.11  <b>Benchmark 3:</b> Divide a unit fraction by a whole number and a whole number by a unit fraction.</p>
<p><b>Measurement &amp; Data 5.MD</b></p>	
<p><b>Convert like measurement units within a given measurement system.</b></p>	
<p><b>5.MD.A.1</b> 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.</p>	<p><b>Unit 7</b> 3.8, 3.9, 3.10, 3.11  <b>Benchmark 7:</b> Solve measurement conversion problems including multi-step word problems.</p>
<p><b>Represent and interpret data.</b></p>	
<p><b>5.MD.B.2</b> Make a line plot to display a data set of measurements in fractions of a unit <math>\left(\frac{1}{2}, \frac{1}{4}, \frac{1}{8}\right)</math>. Use operations on fractions for this grade to solve problems involving information presented in line plots. <i>For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.</i></p>	<p><b>Unit 3</b> 3.4, 3.5, 3.6  <b>Benchmark 3:</b> Represent data including fractions on a line plot and solve addition and subtraction problems about data.</p>

Common Core State Standards for Mathematics Grade 5	Grade 5 Investigations 3
<b>Geometric measurement: understand concepts of volume.</b>	
<b>5.MD.C.3</b> Recognize volume as an attribute of solid figures and understand concepts of volume measurement.	
<b>5.MD.C.3a</b> 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>Unit 2</b> 1.1, 1.2, 1.5, 1.6, 2.1, 2.4 <b>Benchmark 1:</b> Find the volume of rectangular prisms, including the use of volume formulas. <b>Benchmark 2:</b> Find the volume of a solid composed of two rectangular prisms.
<b>5.MD.C.3b</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.	<b>Unit 2</b> 1.1, 1.2, 1.5, 1.6, 2.1, 2.4 <b>Benchmark 1:</b> Find the volume of rectangular prisms, including the use of volume formulas. <b>Benchmark 2:</b> Find the volume of a solid composed of two rectangular prisms.
<b>5.MD.C.4</b> Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	<b>Unit 2</b> 1.1, 1.2, 1.4, Investigation 2 <b>Benchmark 1:</b> Find the volume of rectangular prisms, including the use of volume formulas. <b>Benchmark 3:</b> Use standard units to measure volume.
<b>5.MD.C.5</b> Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.	
<b>5.MD.C.5a</b> Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.	<b>Unit 2</b> 1.2, 1.3, 1.5, 1.6, 1.7, 1.8, Investigation 2 <b>Benchmark 1:</b> Find the volume of rectangular prisms, including the use of volume formulas. <b>Benchmark 3:</b> Use standard units to measure volume.
<b>5.MD.C.5b</b> Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.	<b>Unit 2</b> 1.6, 2.3, 2.4 <b>Benchmark 1:</b> Find the volume of rectangular prisms, including the use of volume formulas. <b>Benchmark 3:</b> Use standard units to measure volume.
<b>5.MD.C.5c</b> 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.	<b>Unit 2</b> 1.6, 1.7, 1.8 <b>Benchmark 1:</b> Find the volume of rectangular prisms, including the use of volume formulas. <b>Benchmark 2:</b> Find the volume of a solid composed of two rectangular prisms. <b>Benchmark 3:</b> Use standard units to measure volume.

**Common Core State Standards  
for Mathematics Grade 5**

**Grade 5  
Investigations 3**

**Geometry 5.G**

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

**5.G.A.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).

**Unit 5** Investigation 1, 2.3, 2.4, 2.5, 2.6, 2.7  
**Benchmark 1:** Use tables to record ordered pairs and construct coordinate graphs to represent the relationship between  $x$ -coordinates and  $y$ -coordinates.  
**Benchmark 2:** Determine what values are represented by points on a coordinate grid.

**5.G.A.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.

**Unit 5** 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 2.3, 2.4, 2.5, 2.6, 2.7  
**Benchmark 1:** Use tables to record ordered pairs and construct coordinate graphs to represent the relationship between  $x$ -coordinates and  $y$ -coordinates.  
**Benchmark 2:** Determine what values are represented by points on a coordinate grid.  
**Benchmark 3:** Represent real world and mathematical problems by graphing points in the coordinate plane and interpret the graph in the context of the situation.  
**Benchmark 4:** Use tables and graphs to compare two situations governed by rules that generate numerical patterns.

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

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

**Unit 8** Investigation 1  
**Benchmark 1:** Classify polygons by their attributes and know that some quadrilaterals can be classified in more than one way.

**5.G.B.4** Classify two-dimensional figures in a hierarchy based on properties.

**Unit 8** Investigation 1  
**Benchmark 1:** Classify polygons by their attributes and know that some quadrilaterals can be classified in more than one way.