

## Grade 7 Number Strand

Outcome	Achievement Indicators
<p>7.N.1. Determine and explain why a number is divisible by 2, 3, 4, 5, 6, 8, 9, or 10, and why a number cannot be divided by 0.</p>	<ul style="list-style-type: none"> <li>➤ Determine if a number is divisible by 2, 3, 4, 5, 6, 8, 9, or 10 and explain why.</li> <li>➤ Sort a set of numbers based upon their divisibility using organizers, such as Venn and Carroll diagrams.</li> <li>➤ Determine the factors of a number using the divisibility rules.</li> <li>➤ Explain, using an example, why numbers cannot be divided by 0.</li> </ul>
<p>7.N.2. Demonstrate an understanding of the addition, subtraction, multiplication, and division of decimals to solve problems (for more than 1-digit divisors or 2-digit multipliers, the use of technology is expected).</p>	<ul style="list-style-type: none"> <li>➤ Solve a problem involving the addition of two or more decimal numbers.</li> <li>➤ Solve a problem involving the subtraction of decimal numbers.</li> <li>➤ Solve a problem involving the multiplication or division of decimal numbers with 2-digit multipliers or 1-digit divisors (for more than 1-digit divisors or 2-digit multipliers, the use of technology is expected).</li> <li>➤ Place the decimal in a sum or difference using front-end estimation (e.g., for <math>4.5 + 0.73 + 256.458</math>, think <math>4 + 256</math>, so the sum is greater than 260).</li> <li>➤ Place the decimal in a product using front-end estimation (e.g., for <math>\\$12.33 \times 2.4</math>, think <math>\\$12 \times 2</math>, so the product is greater than \$24).</li> <li>➤ Place the decimal in a quotient using front-end estimation (e.g., for <math>51.50 \text{ m} \div 2.1</math>, think <math>50 \text{ m} \div 2</math>, so the quotient is approximately 25 m).</li> <li>➤ Check the reasonableness of solutions using estimation.</li> <li>➤ Solve a problem that involves operations on decimals (limited to thousandths) taking into consideration the order of operations.</li> <li>➤ Explain, using an example, how to use mental math for products or quotients when the multiplier or divisor is 0.1 or 0.5 or 0.25</li> </ul>

<p>7.N.3. Solve problems involving percents from 1% to 100%.</p>	<ul style="list-style-type: none"> <li>➤ Express a percent as a decimal or fraction.</li> <li>➤ Solve a problem that involves finding a percent.</li> <li>➤ Determine the answer to a percent problem where the answer requires rounding, and explain why an approximate answer is needed (e.g., total cost including taxes).</li> </ul>
<p>7.N.4. Demonstrate an understanding of the relationship between repeating decimals and fractions, and terminating decimals and fractions.</p>	<ul style="list-style-type: none"> <li>➤ Predict the decimal representation of a fraction using patterns (e.g., <math>\frac{1}{11} = 0.\overline{09}</math>, <math>\frac{2}{11} = 0.\overline{18}</math>, <math>\frac{3}{11} = ? \dots</math>)</li> <li>➤ Match a set of fractions to their decimal representations.</li> <li>➤ Sort a set of fractions as repeating or terminating decimals.</li> <li>➤ Express a fraction as a terminating or repeating decimal.</li> <li>➤ Express a repeating decimal as a fraction.</li> <li>➤ Express a terminating decimal as a fraction.</li> <li>➤ Provide an example where the decimal representation of a fraction is an approximation of its exact value.</li> </ul>
<p>7.N.5. Demonstrate an understanding of adding and subtracting positive fractions and mixed numbers, with like and unlike denominators, concretely, pictorially, and symbolically (limited to positive sums and differences).</p>	<ul style="list-style-type: none"> <li>➤ Model addition and subtraction of positive fractions or mixed numbers using concrete representations, and record symbolically.</li> <li>➤ Determine the sum of two positive fractions or mixed numbers with like denominators.</li> <li>➤ Determine the difference of two positive fractions or mixed numbers with like denominators.</li> <li>➤ Determine a common denominator for a set of positive fractions or mixed numbers.</li> <li>➤ Determine the sum of two positive fractions or mixed numbers with unlike denominators.</li> <li>➤ Determine the difference of two positive fractions or mixed numbers with unlike denominators.</li> <li>➤ Simplify a positive fraction or mixed number by identifying the common factor between the numerator and denominator.</li> <li>➤ Simplify the solution to a problem involving the sum or difference of two positive fractions or mixed numbers.</li> <li>➤ Solve a problem involving the addition or subtraction of positive fractions or mixed numbers, and determine if the solution is reasonable.</li> </ul>

<p>7.N.6. Demonstrate an understanding of addition and subtraction of integers, concretely, pictorially, and symbolically.</p>	<ul style="list-style-type: none"> <li>➤ Explain, using concrete materials such as integer tiles and diagrams, that the sum of opposite integers is zero.</li> <li>➤ Illustrate, using a number line, the results of adding or subtracting negative and positive integers (e.g., a move in one direction followed by an equivalent move in the opposite direction results in no net change in position).</li> <li>➤ Add two integers using concrete materials or pictorial representations and record the process symbolically.</li> <li>➤ Subtract two integers using concrete materials or pictorial representations and record the process symbolically.</li> <li>➤ Solve a problem involving the addition and subtraction of integers.</li> </ul>
<p>7.N.7. Compare and order fractions, decimals (to thousandths), and integers by using</p> <ul style="list-style-type: none"> <li>• benchmarks</li> <li>• place value</li> <li>• equivalent fractions and/or decimals</li> </ul>	<ul style="list-style-type: none"> <li>➤ Order the numbers of a set that includes fractions, decimals, and/or integers in ascending or descending order, and verify the result using a variety of strategies.</li> <li>➤ Identify a number that would be between two numbers in an ordered sequence or on a number line.</li> <li>➤ Identify incorrectly placed numbers in an ordered sequence or on a number line. (horizontal or vertical)</li> <li>➤ Position fractions with like and unlike denominators from a set on a number line, and explain strategies used to determine order.</li> <li>➤ Order the numbers of a set by placing them on a number line that contains benchmarks, such as 0 and 1 or 0 and 5.</li> <li>➤ Position a set of fractions, including mixed numbers and improper fractions, on a number line, and explain strategies used to determine position.</li> </ul>

## Grade 7 Patterns & Relations Strand

Outcome	Achievement
<p>7.PR.1. Demonstrate an understanding of oral and written patterns and their equivalent relations.</p>	<ul style="list-style-type: none"> <li>➤ Formulate a relation to represent the relationship in an oral or written pattern.</li> <li>➤ Provide a context for a relation that represents a pattern.</li> <li>➤ Represent a pattern in the environment using a relation.</li> </ul>
<p>7.PR.2. Construct a table of values from a relation, graph the table of values, and analyze the graph to draw conclusions and solve problems.</p>	<ul style="list-style-type: none"> <li>➤ Create a table of values for a relation by substituting values for the variable.</li> <li>➤ Create a table of values using an <math>r</math> relation and graph the table of values (limited to discrete elements).</li> <li>➤ Sketch the graph from a table of values created for a relation, and describe the patterns found in the graph to draw conclusions (e.g., graph the relationship between <math>n</math> and <math>2n + 3</math>).</li> <li>➤ Describe the relationship shown on a graph using everyday language in spoken or written form to solve problems.</li> <li>➤ Match a set of relations to a given set of graphs.</li> <li>➤ Match a set of graphs to a given set of relations.</li> </ul>
<p>7.PR.3. Demonstrate an understanding of preservation of equality by</p> <ul style="list-style-type: none"> <li>• modelling preservation of equality, concretely, pictorially, and symbolically</li> <li>• applying preservation of equality to solve equations</li> </ul>	<ul style="list-style-type: none"> <li>➤ Model the preservation of equality for each of the four operations using concrete materials or using pictorial representations, explain the process orally, and record it symbolically.</li> <li>➤ Solve a problem by applying preservation of equality.</li> </ul>
<p>7.PR.4. Explain the difference between an expression and an equation.</p>	<ul style="list-style-type: none"> <li>➤ Identify and provide an example of a constant term, a numerical coefficient and a variable in an expression and an equation.</li> <li>➤ Explain what a variable is and how it is used in an expression.</li> <li>➤ Provide an example of an expression and an equation and explain how they are similar and different.</li> </ul>
<p>7.PR.5. Evaluate an expression given the value of the variable(s).</p>	<ul style="list-style-type: none"> <li>➤ Substitute a value for each unknown in an expression and evaluate the expression.</li> </ul>

<p>7.PR.6.</p> <p>Model and solve problems that can be represented by one-step linear equations of the form <math>x + a = b</math>, concretely, pictorially, and symbolically, where <math>a</math> and <math>b</math> are integers.</p>	<ul style="list-style-type: none"> <li>➤ Represent a problem with a linear equation and solve the equation using concrete models.</li> <li>➤ Draw a visual representation of the steps required to solve a linear equation.</li> <li>➤ Solve a problem using a linear equation.</li> <li>➤ Verify the solution to a linear equation using concrete materials and diagrams.</li> <li>➤ Substitute a possible solution for the variable in a linear equation to verify the equality.</li> </ul>
<p>7.PR.7.</p> <p>Model and solve problems that can be represented by linear equations of the form:</p> <ul style="list-style-type: none"> <li>• <math>ax + b = c</math></li> <li>• <math>ax = b</math></li> <li>• <math>\frac{x}{a} = b, a \neq 0</math></li> </ul> <p>concretely, pictorially, and symbolically, where <math>a, b,</math> and <math>c</math> are whole numbers.</p>	<ul style="list-style-type: none"> <li>➤ Model a problem with a linear equation and solve the equation using concrete models.</li> <li>➤ Draw a visual representation of the steps used to solve a linear equation.</li> <li>➤ Solve a problem using a linear equation and record the process.</li> <li>➤ Verify the solution to a linear equation using concrete materials and diagrams.</li> <li>➤ Substitute a possible solution for the variable in a given linear equation to verify the equality.</li> </ul>

## Grade 7 Shape and Space strand

Outcome	Achievement Indicators
<p>7.SS.1.</p> <p>Demonstrate an understanding of circles by</p> <ul style="list-style-type: none"> <li>• describing the relationships among radius, diameter, and circumference of circles</li> <li>• relating circumference to pi</li> <li>• determining the sum of the central angles</li> <li>• constructing circles with a given radius or diameter</li> <li>• solving problems involving the radii, diameters, and/or circumferences of circles</li> </ul>	<ul style="list-style-type: none"> <li>➤ Illustrate and explain that the diameter is twice the radius in a circle.</li> <li>➤ Illustrate and explain that the circumference is approximately three times the diameter in a circle.</li> <li>➤ Explain that, for all circles, pi is the ratio of the circumference to the diameter <math>\left(\frac{C}{d}\right)</math>, and its value is approximately 3.14.</li> <li>➤ Explain, using an illustration, that the sum of the central angles of a circle is <math>360^\circ</math>.</li> <li>➤ Draw a circle with a given radius or diameter with and without a compass.</li> <li>➤ Solve a contextual problem involving circles.</li> </ul>
<p>7.SS.2.</p> <p>Develop and apply a formula for determining the area of</p> <ul style="list-style-type: none"> <li>• triangles</li> <li>• parallelograms</li> <li>• circles</li> </ul>	<ul style="list-style-type: none"> <li>➤ Illustrate and explain how the area of a rectangle can be used to determine the area of a triangle.</li> <li>➤ Generalize a rule to create a formula for determining the area of triangles.</li> <li>➤ Illustrate and explain how the area of a rectangle can be used to determine the area of a parallelogram.</li> <li>➤ Generalize a rule to create a formula for determining the area of parallelograms.</li> <li>➤ Illustrate and explain how to estimate the area of a circle without the use of a formula.</li> <li>➤ Apply a formula for determining the area of a circle.</li> <li>➤ Solve a problem involving the area of triangles, parallelograms, and/or circles.</li> </ul>
<p>7.SS.3.</p> <p>Perform geometric constructions, including</p> <ul style="list-style-type: none"> <li>• perpendicular line segments</li> <li>• parallel line segments</li> <li>• perpendicular bisectors</li> <li>• angle bisectors</li> </ul>	<ul style="list-style-type: none"> <li>➤ Describe examples of parallel line segments, perpendicular line segments, perpendicular bisectors, and angle bisectors in the environment.</li> <li>➤ Identify line segments on a diagram that are parallel or perpendicular.</li> <li>➤ Draw a line segment perpendicular to another line segment and explain why they are perpendicular.</li> <li>➤ Draw a line segment parallel to another line segment, and explain why they are parallel.</li> <li>➤ Draw the bisector of an angle using more than one method, and verify that the resulting angles are equal.</li> <li>➤ Draw the perpendicular bisector of a line segment using more than one method, and verify the construction.</li> </ul>

<p>7.SS.4. Identify and plot points in the four quadrants of a Cartesian plane using integral ordered pairs.</p>	<ul style="list-style-type: none"> <li>➤ Label the axes of a Cartesian plane and identify the origin.</li> <li>➤ Identify the location of a point in any quadrant of a Cartesian plane using an integral ordered pair.</li> <li>➤ Plot the point corresponding to an ordered pair on a Cartesian plane with units of 1, 2, 5, or 10 on its axes.</li> <li>➤ Draw shapes and designs, using ordered pairs, in a Cartesian plane.</li> <li>➤ Create shapes and designs in a Cartesian plane and identify the points used.</li> </ul>
<p>7.SS.5. Perform and describe transformations of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral number vertices).</p>	<p>(It is intended that the original shape and its image have vertices with integral coordinates.)</p> <ul style="list-style-type: none"> <li>➤ Identify the coordinates of the vertices of a 2-D shape on a Cartesian plane.</li> <li>➤ Describe the horizontal and vertical movement required to move from a given point to another point on a Cartesian plane.</li> <li>➤ Describe the positional change of the vertices of a 2-D shape to the corresponding vertices of its image as a result of a transformation or successive transformations on a Cartesian plane.</li> <li>➤ Perform a transformation or consecutive transformations on a 2-D shape and identify coordinates of the vertices of the image.</li> <li>➤ Describe the image resulting from the transformation of a 2-D shape on a Cartesian plane by comparing the coordinates of the vertices of the image.</li> </ul>

## Grade 7 Statistics and Probability strand

Outcome	Achievement Indicators
<p>7.SP.1. Demonstrate an understanding of central tendency and range by</p> <ul style="list-style-type: none"> <li>• determining the measures of central tendency (mean, median, mode) and range</li> <li>• determining the most appropriate measures of central tendency to report findings</li> </ul>	<ul style="list-style-type: none"> <li>➤ Determine mean, median, and mode for a set of data, and explain why these values may be the same or different.</li> <li>➤ Determine the range of a set of data.</li> <li>➤ Provide a context in which the mean, median, or mode is the most appropriate measure of central tendency to use when reporting findings.</li> <li>➤ Solve a problem involving the measures of central tendency.</li> </ul>
<p>7.SP.2. Determine the effect on the mean, median and mode when an outlier is included in a data set.</p>	<ul style="list-style-type: none"> <li>➤ Analyze a set of data to identify any outliers.</li> <li>➤ Explain the effect of outliers on the measures of central tendency for a data set.</li> <li>➤ Identify outliers in a set of data and justify whether or not they are to be included in the reporting of the measures of central tendency.</li> <li>➤ Provide examples of situations in which outliers would and would not be used in reporting the measures of central tendency.</li> </ul>
<p>7.SP.3. Construct, label and interpret circle graphs to solve problems.</p>	<ul style="list-style-type: none"> <li>➤ Identify common attributes of circle graphs, such as               <ul style="list-style-type: none"> <li>• title, label, or legend</li> <li>• the sum of the central angles is <math>360^\circ</math></li> <li>• the data is reported as a percent of the total and the sum of the percents is equal to 100%</li> </ul> </li> <li>➤ Create and label a circle graph, with and without technology, to display a given set of data.</li> <li>➤ Find and compare circle graphs in a variety of print and electronic media, such as newspapers, magazines, and the Internet.</li> <li>➤ Translate percentages displayed in a circle graph into quantities to solve a problem.</li> <li>➤ Interpret a circle graph to answer questions.</li> </ul>
<p>7.SP.4. Express probabilities as ratios, fractions, and percents.</p>	<ul style="list-style-type: none"> <li>➤ Determine the probability of an outcome occurring for a given probability experiment, and express it as a ratio, fraction, and percent.</li> <li>➤ Provide an example of an event with a probability of 0 or 0% (impossible) and an event with a probability of 1 or 100% (certain).</li> </ul>



<p>7.SP.5.</p> <p>Identify the sample space (where the combined sample space has 36 or fewer elements) for a probability experiment involving two independent events.</p>	<ul style="list-style-type: none"> <li>➤ Provide an example of two independent events, such as <ul style="list-style-type: none"> <li>• spinning a four section spinner and an eight-sided die</li> <li>• tossing a coin and rolling a twelve-sided die</li> <li>• tossing two coins</li> <li>• rolling two dice</li> </ul> and explain why they are independent. </li> <li>➤ Identify the sample space (all possible outcomes) for each of two independent events using a tree diagram, table, or another graphic organizer.</li> </ul>
<p>7.SP.6.</p> <p>Conduct a probability experiment to compare the theoretical probability (determined using a tree diagram, table, or another graphic organizer) and experimental probability of two independent events.</p>	<ul style="list-style-type: none"> <li>➤ Determine the theoretical probability of an outcome involving two independent events.</li> <li>➤ Conduct a probability experiment for an outcome involving two independent events, with and without technology, to compare the experimental probability to the theoretical probability.</li> <li>➤ Solve a probability problem involving two independent events.</li> </ul>