



<b>Mathematics Grade 9 Shape and Space (SS)</b>				
<b>Outcome</b>	<b>1 – Little Evidence</b> With help, I understand parts of the simpler ideas and do a few of the simpler skills.	<b>2 – Partial Evidence</b> I understand the simpler ideas and can do the simpler skills. I am working on the more complex ideas and skills.	<b>3 – Sufficient Evidence</b> I understand the more complex ideas and can master the complex skills that are taught in class. <b>I achieve the outcome.</b>	<b>4- Extensive Evidence</b> I have a deep understanding of the complex ideas, and I can use the skills I have learned in situations that were not taught in class.
<b>SS9.1</b> <b>I can demonstrate understanding of circle properties including:</b> <ul style="list-style-type: none"> <li>○ perpendicular line segments from the centre of a circle to a chord bisect the chord</li> <li>○ inscribed angles subtended by the same arc have the same measure</li> <li>○ the measure of a central angle is twice the measure of an inscribed angle subtending the same arc</li> <li>○ tangents to a circle are perpendicular to the radius ending at the point of tangency.</li> </ul> <b>[C, CN, PS, R, T, V]</b>	<ul style="list-style-type: none"> <li>• <b>With help</b>, I can identify perpendicular line segments from the centre of a circle through a chord.</li> </ul>	<ul style="list-style-type: none"> <li>• I can <b>identify perpendicular line segments</b> from the centre of a circle through a chord.</li> </ul>	<ul style="list-style-type: none"> <li>• I can <b>explain what a perpendicular bisector</b> is in relation to a radius of a circle and a chord.</li> </ul>	<ul style="list-style-type: none"> <li>• I can <b>use perpendicular bisectors and radii to determine measurements of line segments</b> within a circle.</li> </ul>
	<ul style="list-style-type: none"> <li>• I can identify two inscribed angles subtended by the same arc <b>AND</b> an inscribed angle and a central angle subtended by the same arc.</li> </ul>	<ul style="list-style-type: none"> <li>• I can <b>determine the measure</b> of an inscribed angle given the measure of another inscribed angle or central angle on the same arc.</li> </ul>	<ul style="list-style-type: none"> <li>• Given two inscribed angles subtended by the same arc, <b>AND</b> an inscribed angle and a central angle that are subtended by the same arc, I can <b>determine the measure of those angles in comparison to each other.</b></li> </ul>	<ul style="list-style-type: none"> <li>• Given two inscribed angles subtended by the same arc, <b>AND</b> an inscribed angle and a central angle that are subtended by the same arc, I can <b>determine the measure of those angles in comparison to each other, and justify my response.</b></li> </ul>
	<ul style="list-style-type: none"> <li>• <b>With help</b>, I can identify a point of tangency and a line of tangency.</li> </ul>	<ul style="list-style-type: none"> <li>• I can <b>identify a point of tangency and a line of tangency.</b></li> </ul>	<ul style="list-style-type: none"> <li>• I can identify a point of tangency and <b>describe the relationship between a line of tangency and a radius.</b></li> </ul>	<ul style="list-style-type: none"> <li>• I can <b>construct a tangent to a circle</b> using my knowledge of tangents and circles.</li> </ul>



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	<ul style="list-style-type: none"> <li>With help, I can solve situational questions and problems involving <b>ONE</b> circle property, including:               <ul style="list-style-type: none"> <li>perpendicular line segments from the centre bisecting a chord</li> <li>inscribed angles</li> <li>central angles</li> <li><b>OR</b></li> <li>tangents.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>I can solve situational questions and problems involving <b>ONE</b> circle property, including:               <ul style="list-style-type: none"> <li>perpendicular line segments from the centre bisecting a chord</li> <li>inscribed angles</li> <li>central angles</li> <li><b>OR</b></li> <li>tangents.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>I can <b>solve situational questions and problems</b> involving <b>more than one</b> circle property, including:               <ul style="list-style-type: none"> <li>perpendicular line segments from the centre bisecting a chord</li> <li>inscribed angles</li> <li>central angles</li> <li><b>OR</b></li> <li>tangents.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>I can solve situational questions and problems involving <b>ALL</b> circle properties, including:               <ul style="list-style-type: none"> <li>perpendicular line segments from the centre bisecting a chord</li> <li>inscribed angles</li> <li>central angles</li> <li><b>AND</b></li> <li>tangents</li> <li><b>AND</b> explain my reasoning.</li> </ul> </li> </ul>
Comments				



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<b>SS9.2</b> <b>I can extend understanding of area to surface area of right rectangular prisms, right cylinders, right triangular prisms, to composite 3-D objects. [CN, PS, R, V]</b>	<ul style="list-style-type: none"> <li>I can determine the area of simple 2-D shapes.</li> </ul>	<ul style="list-style-type: none"> <li>I can determine the surface area of simple 3-D objects (right rectangular prisms, right cylinders, and right triangular prisms).</li> </ul>	<ul style="list-style-type: none"> <li>I can determine the surface area of composite 3-D objects.</li> </ul>	<ul style="list-style-type: none"> <li>I can determine the surface area of composite 3-D objects, including those with cut-outs and/or more complex shapes (ie: hexagons).</li> </ul>
	<ul style="list-style-type: none"> <li>I can solve situational questions involving simple 2-D shapes.</li> </ul>	<ul style="list-style-type: none"> <li>I can solve situational questions involving simple 3-D objects.</li> </ul>	<ul style="list-style-type: none"> <li>I can solve situational questions involving the surface area of composite 3-D objects.</li> </ul>	<ul style="list-style-type: none"> <li>I can solve situational questions involving more complex composite 3-D objects.</li> </ul>
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<b>SS9.3</b> <b>I can demonstrate understanding of similarity of 2-D shapes.</b> <b>[C, CN, PS, R, V]</b>	Similar polygons	<ul style="list-style-type: none"><li>I can explain the difference between similarity and equality.</li><li><b>With help</b>, I can draw a polygon similar to a given polygon.</li><li><b>With help</b>, I can <b>take steps to solve a basic situational question</b> involving the similarity of polygons</li></ul>	<ul style="list-style-type: none"><li>I can identify whether or not two polygons are similar.</li><li>I can draw a polygon similar to a given polygon.</li><li>I can <b>take steps to solve a basic situational question</b> involving the similarity of polygons.</li></ul>	<ul style="list-style-type: none"><li>I can prove whether or not two polygons are similar.</li><li>I can draw a polygon similar to a given polygon <b>and explain the strategy I used.</b></li><li>I can <b>solve situational questions</b> involving the similarity of polygons.</li></ul>	<ul style="list-style-type: none"><li>I can identify and prove whether two polygons that are reflected, translated, and transformed in the Cartesian plane are similar.</li><li>I can create two similar polygons and explain the strategy I used.</li><li>I can solve a situational problem involving the use of <b>surface area as well as similarity.</b></li></ul>
	Scale diagrams	<ul style="list-style-type: none"><li><b>I can identify and describe situations relevant to me</b>, my family, or my community that involve scale diagrams, and explain the meaning of the scale factor involved.</li><li><b>With help</b>, I can confirm whether or not a given diagram is a scale diagram of a 2-D shape.</li><li><b>With help</b>, I can solve simple situational questions involving scale</li></ul>	<ul style="list-style-type: none"><li><b>*I can determine scale factor for a given 2-D shape</b> and an enlargement or reduction of the shape.</li><li>I can <b>confirm whether or not a given diagram is a scale diagram of a 2-D shape.</b></li><li>I can <b>solve situational questions</b> involving scale diagrams <b>OR</b> scale factors.</li></ul>	<ul style="list-style-type: none"><li><b>*I can draw a diagram</b> to scale that represents an enlargement or reduction of a given 2-D shape <b>and explain the strategy used.</b></li><li>I can confirm whether or not a given diagram is a scale diagram of a 2-D shape and, <b>if it is, identify the scale factor for the diagram.</b></li><li>I can <b>solve situational questions</b> involving scale diagrams <b>AND</b> scale</li></ul>	<ul style="list-style-type: none"><li><b>I can create a scale diagram of a given space, and choose an appropriate scale factor for this diagram.</b></li><li>I can confirm whether or not a given diagram is a scale diagram of a 2-D shape, and if it is, <b>identify the fractional scale factor for the diagram.</b></li><li>I can solve situational questions <b>involving fractional scale factors</b></li></ul>



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		diagrams <b>OR</b> scale factors.		factors.	<b>without the use of technology.</b>
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<b>SS9.4</b> <b>Demonstrate understanding of line and rotation symmetry. [C, CN, PS, V]</b>	Line Symmetry	<ul style="list-style-type: none"> <li>• <b>With help</b>, I can determine if a given 2-D shape or design has line symmetry.</li> <li>• <b>With help</b>, I can complete a simple 2-D shape or design given part of a shape or design and the line/lines of symmetry.</li> <li>• <b>With help</b>, I can identify a line of symmetry in a <b>simple shape</b>.</li> <li>• <b>With help</b>, determine whether two 2-D shapes on the Cartesian plane are related by line symmetry.</li> </ul>	<ul style="list-style-type: none"> <li>• I can <b>determine if a given 2-D shape or design has line symmetry</b>.</li> <li>• I can complete a <b>simple 2-D shape or design</b> given part of a shape or design and the line/lines of symmetry.</li> <li>• I can <b>identify a line of symmetry in a simple shape</b>.</li> <li>• I can <b>determine whether two 2-D shapes on the Cartesian plane are related by line symmetry</b>.</li> </ul>	<ul style="list-style-type: none"> <li>• I can <b>classify 2-D shapes and designs according to the number of lines of symmetry</b>.</li> <li>• I can <b>complete a complex 2-D shape or design given part of a shape or design and the line/lines of symmetry</b>.</li> <li>• I can <b>identify a line of symmetry in a tessellation</b>.</li> <li>• I can determine whether two 2-D shapes on the Cartesian plane are related by line symmetry <b>and explain</b>.</li> </ul>	<ul style="list-style-type: none"> <li>• I can create a design that <b>shows a specific number of lines of symmetry</b> and explain the lines of symmetry used.</li> <li>• I can <b>create a design</b> given part of the design and the coordinates to create the lines of symmetry to be used.</li> <li>• I can identify a line of symmetry in a <b>complex tessellation involving small differences</b>.</li> <li>• I can determine whether two <b>complex shapes on the Cartesian plane</b> are related by line symmetry using a line other than the x and y axis as the line of reflection and explain.</li> </ul>
	Rotation Symmetry	<ul style="list-style-type: none"> <li>• <b>With help</b>, I can determine if a given 2-shape or design has rotation symmetry.</li> </ul>	<ul style="list-style-type: none"> <li>• I can determine <b>if a given 2-D shape or design has rotation symmetry</b>.</li> </ul>	<ul style="list-style-type: none"> <li>• I can determine if a given 2-D shape or design has rotation symmetry and <b>I can identify the order and angle of rotation in a 2-D shape or design</b>.</li> </ul>	<ul style="list-style-type: none"> <li>• I can create a design that shows rotation symmetry and that shows a specific order and angle of rotation.</li> </ul>



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		<ul style="list-style-type: none"> <li>• <b>With help</b>, I can determine whether two 2-D shapes on the Cartesian plane are related by rotation symmetry.</li> </ul>	<ul style="list-style-type: none"> <li>• I can <b>determine whether two 2-D shapes on the Cartesian plane are related by rotation symmetry.</b></li> </ul>	<ul style="list-style-type: none"> <li>• I can determine whether two 2-D shapes on the Cartesian plane are related by rotation symmetry <b>and explain.</b></li> </ul>	<ul style="list-style-type: none"> <li>• I can <b>create a design</b> on the Cartesian plane given a simple 2-D shape and the order of rotation needed.</li> </ul>