Alberta's Program of Studies (Curriculum) - Mathematics - Shape and Space (Strand and Sub-strands with Achievement Outcomes)

Note: These strands are not intended to be discrete units of instruction. The integration of outcomes across trands makes mathematical experiences meaningful. Students should make the connection between concepts both within and across strands.

PROGRESSION IS HIGHLIGHTED IN THE FOLLOWING DOCUMENT VIA BOLDED TEXT.

MATHEMATICAL PROCESSES										
	There are critical components that students must encounter in a mathematics program in order to achieve the goals of mathematics education and embrace lifelong learning in mathematics.									
MATHEMATICAL PROCESS	Communication [C]	Connections [CN]	Mental Mathematics and Estimation [ME]	Problem Solving [PS]	Reasoning [R]	Technology [T]	Visualization [V]			
Students are expected to	communicate in order to learn and express their understanding	connect mathematical ideas to other concepts in mathematics, to everyday experiences and to other disciplines	demonstrate fluency with mental mathematics and estimation	develop and apply new mathematical knowledge through problem solving	develop mathematical reasoning	select and use technologies as tools for learning and for solving problems	develop visualization skills to assist in processing information, making connections and solving problems			

		express their understanding	everyday expenences and to other disciplines	mathematics and estimation	sowng		prociems	connections and solving problems	
					Sub-strand: Measurement				
	Kindergarten		Grade 1	General Outcome:	Grade 2 Ise direct and infirect measurement to solve problems		Grade 3		Grade 4
Specific Outcome	Achievement Indicators	Specific Outcome	Achievement Indicators	Specific Outcome	Achievement Indicators	Specific Outcome	Achievement Indicators	Specific Outcome	Achievement Indicators
It is expected that students will:	The following set of indicators may be used to determine whether students have met the corresponding specific outcome. * Compare the length (height) of two given objects; and explain the	It is expected that students will:	The following set of indicators may be used to determine whether students have met the corresponding specific outcome. I identify common attributes, such as length (height), mass (weight),	It is expected that students will:	The following set of indicators may be used to determine whether students have met the corresponding specific outcome.	It is expected that students will:	The following set of indicators may be used to determine whether students have met the corresponding specific outcome.	It is expected that students will:	The following set of indicators may be used to determine whether students have met the corresponding specific outcome.
 Use direct comparison to compare two objects based on a single attribute, such as length 	comparison, using the words shorter, longer (taller) or almost the same.	 Demonstrate an understanding of measurement as a process of comparing by: 	I identify common attributes, such as length (height), mass (weight), wolume (capacity) and area, that could be used to compare two given objects.	 Relate the number of days to a week and the number of months to a year in a problem-solving 	* Read a date on a calendar. * Name and order the days of the week.	Relate the number of seconds to a minute, the number of minutes to an hour and the number of days to	* Determine the number of days in any given month, using a calendar. * Solve a given problem involving the number of seconds in a minute,	 Read and record time, using digital and analog clocks, including 24-hour clocks. 	* State the number of hours in a day. * Express the time orally and numerically from a 12-hour analog clock.
(height), mass (weight) and volume (capacity).	* Compare the mass (weight) of two given objects; and explain the comparison, using the words lighter, heavier or almost the same.	identifying attributes that can be compared ordering objects	* Order a set of objects by length (height), mass (weight), volume (capacity) or area, and explain their ordering.	context. [C. CN. PS. R]	* Identify the day of the week and the month of the year for an identified calendar date.	a month in a problem-solving context.	minutes in an hour or days in a given month. * Create a calendar that includes days of the week, dates and personal	[C, CN, V]	* Express the time orally and numerically from a 24-hour analog clock.
[C, CN, PS, R, V]	* Compare the volume (capacity) of two given objects; and explain the comparison, using the words less, more, bigger, smaller or almost the same.	making statements of comparison filling, covering or matching.	* Compare two given objects, and identify the attributes used to	[U, UN, F3, N]	* Communicate that there are seven days in a week and twelve months in a year.	[C, CN, PS, R, V]	events.	ļ I	* Express the time orally and numerically from a 12-hour digital clock. * Express time orally and numerically from a 24-hour digital clock.
	saile.	[C, CN, PS, R, V]	* Determine which of two or more given objects is longest/shortest by		* Determine whether a given set of days is more or less than a week.			ļ I	* Describe time orally as "minutes to" or "minutes after" the hour.
			matching, and explain the reasoning. * Determine which of two or more given objects is heaviest/lightest by		* Identify yesterday's/tomorrow's date.			ļ Ī	* Explain the meaning of a.m. and p.m., and provide an example of an activity that occurs during the a.m., and another that occurs during the
			comparing, and explain the reasoning. * Determine which of two or more given objects holds the most/least by		Identify the month that comes before and the month that comes after a given month.			ļ I	p.m.
			filling, and explain the reasoning. Determine which of two or more given objects has the greatest/least		* Name and order the months of the year. * Solve a given problem involving time that is limited to the number of			ļ I	
			area by covering, and explain the reasoning.		days in a week and the number of months in a year.			<u> </u>	
				Relate the size of a unit of measure to the number of units (limited to nonstandard units)	 Explain why one of two given nonstandard units may be a better choice for measuring the length of an object. 	Relate the passage of time to common activities, using nonstandard and standard units	* Select and use a nonstandard unit of measure, such as television shows or pendulum swings, to measure the passage of time, and explain the choice.	Read and record calendar dates in a variety of formats.	Write dates in a variety of formats; e.g., yyyy/mm/dd, dd/mm/yyyy, March 21, 2007, dd/mm/yy.
				used to measure length and mass (weight).	 Explain why one of two given nonstandard units may be a better choice for measuring the mass (weight) of an object. 	(minutes, hours, days, weeks, months, years).	1 Identify activities that can or cannot be accomplished in minutes, hours, days, weeks, months and years.	[C, V]	* Relate dates written in the format yyyy/mm/dd to dates on a calendar. * Identify possible interpretations of a given date; e.g., 06/03/04.
				[C, CN, ME, R, V]	* Select a nonstandard unit for measuring the length or mass (weight) of an object, and explain why it was chosen.	[CN, ME, R]	* Provide personal referents for minutes and hours.	ļ I	
					* Estimate the number of nonstandard units needed for a given measurement task.			1	
					 Explain why the number of units of a measurement will vary depending upon the unit of measure used. 			ļ I	
								1	
				Compare and order objects by	* Estimate, measure and record the length, height, distance around or	Demonstrate an understanding of	* Measure and record the perimeter of a given regular shape, and	Demonstrate an understanding of	* Describe area as the measure of surface recorded in square units.
				length, height, distance around and mass (weight), using	mass (weight) of a given object, using nonstandard units. * Compare and order the measure of two or more objects in ascending	perimeter of regular and irregular shapes by:	explain the strategy used. * Measure and record the perimeter of a given regular shape, and	area of regular and irregular 2-D shapes by:	* Identify and explain why the square is the most efficient unit for
				nonstandard units, and make statements of comparison.	 Compare and order the measure of two or more objects in ascending or descending order, and explain the method of ordering. 	estimating perimeter, using referents for cm or m measuring and recording	explain the strategy used.	 recognizing that area is measured in square units selecting and justifying referents 	measuring area. * Provide a referent for a square centimetre, and explain the choice.
				[C, CN, ME, R, V]		perimeter (cm, m) constructing different shapes fo a given perimeter (cm, m) to	Construct a shape for a given perimeter (cm, m). Construct or draw more than one shape for a given perimeter.	for the units cm ² or m ² • estimating area, using referents for cm ² or m ²	* Provide a referent for a square metre, and explain the choice.
						demonstrate that many shapes are possible for a perimeter.	* Estimate the perimeter of a given shape (cm, m), using personal referents.	 determining and recording area (cm² or m²) 	Determine which standard square unit is represented by a given referent.
						[C, ME, PS, R, V]		 constructing different rectangles for a given area (cm² or m²) in order to demonstrate that many 	* Estimate the area of a given 2-D shape, using personal referents. * Determine the area of a regular 2-D shape, and explain the strategy.
				Measure length to the nearest nonstandard unit by:	 Explain why overlapping or leaving gaps does not result in accurate measures. 	Demonstrate an understanding of measuring length (cm, m) by: selecting and justifying referents	Provide a personal referent for one centimetre, and explain the choice. Provide a personal referent for one metre, and explain the choice.	different rectangles may have the same area.	* Determine the area of an irregular 2-D shape, and explain the strategy.
				using multiple copies of a unit using a single copy of a unit (iteration process).	* Count the number of nonstandard units required to measure the length of a given object, using a single copy or multiple copies of a unit.	for the units cm and m modelling and describing the	* Match a given standard unit to a given referent.	[C, CN, ME, PS, R, V]	Construct a rectangle for a given area. Demonstrate that many rectangles are possible for a given area by
				[C, ME, R, V]	* Estimate and measure a given object, using multiple copies of a nonstandard unit and using a single copy of the same unit many times, and explain the results.	relationship between the units or and m - estimating length, using	Show that 100 cm is equivalent to 1 m by using concrete materials.	ļ I	drawing at least two different rectangles for the same given area.
					* Estimate and measure, using nonstandard units, a given length that is	referents - measuring and recording length, width and height.	* Estimate the length of an object, using personal referents. * Determine and record the length and width of a given 2-D shape.	l İ	
					not a straight line.	[C, CN, ME, PS, R, V]	* Determine and record the length, width or height of a given 3-D object.	!]	
							* Draw a line segment of a given length, using a ruler. * Sketch a line segment of a given length without using a ruler.	1	
								l İ	
				Demonstrate that changing the orientation of an object does not alter the measurements of its	* Measure a given object, change the orientation, re-measure, and explain the results.	 Demonstrate an understanding of measuring mass (g, kg) by: selecting and justifying referents 	* Provide a personal referent for one gram, and explain the choice. S * Provide a personal referent for one kilogram, and explain the choice.	l İ	
				attributes. [C, R, V]		for the units g and kg • modelling and describing the	Match a given standard unit to a given referent.	!]	
				[6, n, V]		relationship between the units g and kg • estimating mass, using referents	Explain the relationship between 1000 g and 1 kg, using a model.	!]	
						 measuring and recording mass. [C, CN, ME, PS, R, V] 	* Estimate the mass of a given object, using personal referents. * Determine and record the mass of a given 3-D object.	!]	
						F	Measure, using a scale, and record, using the units g and kg, the mass of given everyday objects.	!]	
							* Provide examples of 3-D objects that have a mass of approximately 1 g, 100 g and 1 kg.	l İ	
							* Determine the mass of two given similar objects with different masses, and explain the results.	i I	
							* Determine the mass of an object, change its shape, re-measure its mass, and explain the results.	i I	

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MATHEMATICAL PROCESSES

There are critical components that students must encounter in a mathematics program in order to achieve the goals of mathematics education and embrace lifelong learning in mathematics.

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	MATHEMATICAL PROCE	Communication [C]	Connections [CN]	Mental Mathematics and Estimation [ME]	Problem Solving [PS]	Reasoning [R]	Technology [T]	Visualization [V]	
	Students are expecte	d to communicate in order to learn and	connect mathematical ideas to other concepts in mathematics, to everyday experiences and to other disciplines	demonstrate fluency with mental mathematics and estimation	develop and apply new mathematical knowledge through problem	develop mathematical reasoning	select and use technologies as tools for learning and for solving	develop visualization skills to assist in	1
		express their understanding	everyday experiences and to other disciplines		rand: 3-D Objects and 2-D Shapes		problems	processing information, making	
	Kindergarten		Grade 1		Grade 2		Grade 3		Grade 4
Specific Outcome	Achievement Indicators	Specific Outcome	Achievement Indicators	Specific Outcome	Achievement Indicators	Specific Outcome	Achievement Indicators	Specific Outcome: Desc	and 2-D shapes, and analyze the re Achievement Indicators
It is expected that students will:	The following set of indicators may be used to determine whether	It is expected that students will:	The following set of indicators may be used to determine whether	It is expected that students will:	The following set of indicators may be used to determine whether	It is expected that students will:	The following set of indicators may be used to determine whether	It is expected that students will:	The following set of indicators may be used to determine whether
Sort 3-D objects, using a single attribute.	* Identify a common attribute in a given set of 3-D objects.	Sort 3-D objects and 2-D shapes, using one attribute, and explain the	* Sort a given set of familiar 3-D objects or 2-D shapes, using a given sorting rule.	Sort 2-D shapes and 3-D objects, using two attributes, and explain th	* Determine the differences between two given pre-sorted sets, and explain the sorting rule.	Sort regular and irregular polygons, including:	* Classify a given set of regular and irregular polygons according to the	 Describe and construct right rectangular and right triangular 	* Identify and name common attributes of right rectangular prisms from given sets of right rectangular prisms.
[C, CN, PS, R, V]	* Sort a given set of familiar 3-D objects, using a single attribute such as size or shape, and explain the sorting rule.	sorting rule.	* Choose a single attribute to sort a given set of familiar 3-D objects, sort	sorting rule.	* Identify and name two common attributes of items within a given	triangles quadrilaterals	* Identify given regular and irregular polygons that have different	prisms.	* Identify and name common attributes of right triangular prisms from
[4,41,141,17]	* Determine the difference between two given pre-sorted sets by	[C, CN, R, V]	the set, and explain the sorting rule.	[C, CN, R, V]	sorted group.	pentagons hexagons	dimensions.	[C, CN, R, V]	given sets of right triangular prisms.
	explaining a sorting rule used to sort them.		* Choose a single attribute to sort a given set of 2-D shapes, sort the set, and explain the sorting rule.		Sort a given set of 2-D shapes (regular and irregular), according to two attributes, and explain the sorting rule.	octagons	* Identify given regular and irregular polygons that have different orientations.		* Sort a given set of right rectangular and right triangular prisms, using the shape of the base.
			* Determine the difference between two given pre-sorted sets of familiar		* Sort a given set of 3-D objects, according to two attributes, and explain	according to the number of sides. [C. CN. R. VI			* Construct and describe a model of a right rectangular and a right
			3-D objects or 2-D shapes, and explain a possible sorting rule used to sort them.		the sorting rule.	[C, CN, H, V]			triangular prism, using materials such as pattern blocks or modelling clay.
									* Construct right rectangular prisms from their nets.
									* Construct right triangular prisms from their nets.
									* Identify examples of right rectangular and right triangular prisms found
									in the environment.
3. Build and describe 3-D objects.	* Create a representation of a given 3-D object, using materials such as	3. Replicate composite 2-D shapes	* Select 2-D shapes from a given set to reproduce a given composite 2-	7. Describe, compare and construct	* Sort a given set of 3-D objects, and explain the sorting rule.	6. Describe 3-D objects according to	* Identify the faces, edges and vertices of given 3-D objects, including		
[CN, PS, V]	modelling clay and building blocks, and compare the representation to the original 3-D object.	and 3-D objects.	D shape.	D objects,including: • cubes	* Identify common attributes of cubes, spheres, cones, cylinders and pyramids from given sets of the same 3-D objects.	the shape of the faces and the number of edges and vertices.	cubes, spheres, cones, cylinders, pyramids and prisms.		
1	* Describe a given 3-D object, using words such as big, little, round, like a box and like a can.	[CN, PS, V]	* Select 3-D objects from a given set to reproduce a given composite 3-D object.	• spheres • cones		[C, CN, PS, R, V]	* Identify the shape of the faces of a given 3-D object.		
	a box and like a can.		* Predict and select the 2-D shapes used to produce a composite 2-D shape, and verify by deconstructing the composite shape.	cylinders pyramids.	 Identify and describe given 3-D objects with different dimensions. Identify and describe given 3-D objects with different orientations. 		* Determine the number of faces, edges and vertices of a given 3-D object.		
1			Predict and select the 3-D objects used to produce a composite 3-D	[C, CN, R, V]	dentify and describe given 3-D objects with different orientations. Create and describe a representation of a given 3-D object, using		* Construct a skeleton of a given 3-D object, and describe how the skeleton relates to the 3-D object.		
1			Predict and select the 3-D objects used to produce a composite 3-D object, and verify by deconstructing the composite object.	1	Create and describe a representation of a given 3-D object, using materials such as modelling clay.		 Sort a given set of 3-D objects according to the number of faces, edges 		
					Identify examples of cubes, spheres, cones, cylinders and pyramids found in the emissionment.		or vertices.		
		 Compare 2-D shapes to parts of 3- D objects in the environment. 	* Identify 3-D objects in the environment that have parts similar to a given 2-D shape.	 Identify 2-D shapes as parts of 3-D objects in the environment. 	Sound in the environment. *Compare and match a given 2-D shape, such as a triangle, square, rectangle or circle, to the faces of 3-D objects in the environment.				
		[C, CN, V]	great 2 5 shape.	[C, CN, R, V]	* Name the 2-D faces of a given 3-D object.				
		[0, 01, 1]			* Sort a given set of 2-D shapes, and explain the sorting rule.				
				Describe, compare and construct 2-D shapes, including: triangles					
				triangles squares	* Identify common attributes of triangles, squares, rectangles and circles from given sets of the same 2-D shapes.				
				rectangles circles.	* Identify given 2-D shapes with different dimensions.				
				[C, CN, R, V]	* Identify given 2-D shapes with different orientations.				
					* Create a model to represent a given 2-D shape.				
					* Create a pictorial representation of a given 2-D shape.				
Specific Outcome	Achievement Indicators	Specific Outcome	General Outcome: N/A Achievement Indicators	Specific Outcome		Specific Outcome	Achievement Indicators	Specific Outcome	Achievement indicators
Specific Outcome N/A	Achievement Indicators	Specific Outcome N/A	General Outcome: N/A Achievement Indicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome N/A	Achievement Indicators	Demonstrate an understanding of	Achievement Indicators * Determine if two given 2-0 shapes are congruent, and explain the strategy used.
Specific Outcome N/A	Achievement Indicators	Specific Outcome N/A	General Quisome: N/A Achievement Indicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome N/A	Achievement Indicators	 Demonstrate an understanding of congruency, concretely and pictorially. 	Achievement Indicators *Determine if two given 25 shapes are congruent, and explain the shategy used. *Create a shape that is congruent to a given 2-0 shape.
Specific Outcome N/A	Achievement Indicators	Specific Outcome N/A	General Outcome: N/A Achievement Indicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome N/A	Achievement Indicators	Demonstrate an understanding of congruency, concretely and	* Determine if two given 2-D shapes are congruent, and explain the strategy used. * Create a shape that is congruent to a given 2-D shape. * Identify congruent 2-D shapes from a given set of shapes shown in
Specific Outcome N/A	Achievement Indicators	Specific Outcome N/A	General Outcome: NA Achievement Indicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome N/A	Achievement Indicators	 Demonstrate an understanding of congruency, concretely and pictorially. 	* Determine if two given 2-D shapes are congruent, and explain the strategy used. * Create a shape that is congruent to a given 2-D shape. * Identify congruent 2-D shapes from a given set of shapes shown in different crientalisms.
Specific Outcome N/A	Achievement Indicators	Specific Outcome N/A	General Outcome: NA Anthervement Indicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome NA	Achievement Indicators	 Demonstrate an understanding of congruency, concretely and pictorially. 	* Determine if two given 2-D shapes are congruent, and explain the strategy used. * Create a shape that is congruent to a given 2-D shape. * Identify congruent 2-D shapes from a given set of shapes shown in
Specific Outcome	Achievement Indicators	Specific Outcome N/A	General Outcome: N/A Achievement indicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome NA	Achievement Indicators	 Demonstrate an understanding of congruency, concretely and pictorially. 	* Determine if two given 2-D shapes are congruent, and explain the strategy used. * Create a shape that is congruent to a given 2-D shape. * Identify congruent 2-D shapes from a given set of shapes shown in different crientalisms.
Specific Outcome N.A	Achievement Indicators	Specific Outcome N/A	General Outcome: N/A Achievement Indicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome N/A	Achievement indicators	 Demonstrate an understanding of congruency, concretely and pictorially. 	* Determine if two given 2-0 shapes are congruent, and explain the strategy used. *Create a shape that is congruent to a given 2-0 shape. *dentify congruent 2-0 shapes from a given set of shapes shown in different orientations.
Specific Outcome NA	Achievement Indicators	Specific Outcome N/A	General Concess: VIA Achievement tridicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome N/A	Achievement Indicators	 Demonstrate an understanding of congruency, concretely and pictorially. 	* Determine if two given 2-D shapes are congruent, and explain the strategy used. *Create a shape that is congruent to a given 2-D shape. *dentify congruent 2-D shapes from a given set of shapes shown in different orientations.
Specific Outcome NA	Achievement Indicators	Specific Outcome N/A	General Outcome: V/A Ashbevenmen Indicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome NA	Achievement Indicators	 Demonstrate an understanding of congruency, concretely and pictorially. 	* Determine if two given 2-0 shapes are congruent, and explain the strategy used. *Create a shape that is congruent to a given 2-0 shape. *dentify congruent 2-0 shapes from a given set of shapes shown in different orientations.
Specific Outcome N.A.	Achievement Indicators	Specific Outcome N/A	General Outcome: N/A Achievement Indicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome N/A	Achlevement Indicators	Demonstrate an understanding of congruency, concretely and pictorially. (CN, R, V)	*Determine I two given 2-0 shapes are congruent, and explain the strategy used. *Create a shape that is congruent to a given 2-0 shape. *Identify congruent 2-0 shapes from a given set of shapes shown in different direntation. *Identify corresponding vertices and sides of two given congruent shapes.
Specific Outcome Vi. A	Achievement Indicators	Specific Outcome N/A	General Outcome: N/A Achievement indicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome N/A	Achievement Indicators	Demonstrate an understanding of congruency, concretely and pictorially. [CN. R. V] Demonstrate an understanding of Communication of	* Determine if two given 2-0 shapes are congruent, and explain the strategy used. *Create a shape that is congruent to a given 2-0 shape. *dentify congruent 2-0 shapes from a given set of shapes shown in different orientations.
Specific Outcome N.A.	Achievement Indicators	Specific Outcome N/A	General Chalcens VIA Achievement Indicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome N/A	Achievement Indicators	Demonstrate an understanding of congruency, concretely and pictorially. [CN. R. V] Demonstrate an understanding of line symmetry by: - identifying symmetry by: - identifying symmetry by: - identifying symmetrical 2-D	*Determine I two given 2-O shapes are congruent, and explain the strategy used. *Create a shape that is congruent to a given 2-D shape. *I dentify congruent 2-D shapes from a given set of shapes shown in different direlations. *Identify corresponding vertices and sides of two given congruent shapes.
Specific Outcome N.A.	Achievement Indicators	Specific Outcome N/A	General Outcome: V/A Arthur sement to disalors		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome NA	Achievement Indicators	Demonstrate an understanding of congruency, concretely and pictorially. [CN. R. V] Demonstrate an understanding of line symmetry by: identifying symmetry by: identifying symmetrical 2-D shapes of the pictorial symmetry by: identifying symmetrical 2-D shapes of the pictorial symmetry by: identifying symmetrical 2-D shapes of the pictorial symmetry by: identifying symmetrical 2-D shapes of the pictorial symmetry by: identifying symmetrical 2-D shapes of the pictorial symmetry and symmetrical 2-D shapes of the pictorial symmetry and symmetrical 2-D shapes of the pictorial symmetry and symmetrical 2-D shapes of the pictorial symmetry and sy	Determine I two given 2.0 shapes are congruent, and explain the strategy used. Create a shape that is congruent to a given 2.0 shape. Valentify congruent 2.0 shapes from a given set of shapes shown in different crientation. I dentify corresponding vertices and sides of two given congruent shapes. I dentify the characteristics of given symmetrical and non-symmetrical 0 shapes.
Specific Outcome N.A.	Achievement Indicators	Specific Outcome N/A	General Outcome: NA Ashbevement Indicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome NA	Achievement Indicators	Demonstrate an understanding of congruency, concretely and pictorially. (CN. R. V.) Demonstrate an understanding of limits symmetry by: Identifying symmetrical 2-D shapes - drawing one or more lines of symmetry or or more lines of symmetry in 2-D shapes - drawing one or more lines of symmetry in 2-D shapes	Determine I two given 2.0 shapes are conguent, and explain the strategy used. Create a shape that is conguent to a given 2.0 shapes. Restletis, conguent 2.0 shapes from a given set of shapes shown in different orientations. I dentify corresponding vertices and sides of two given congruent distance. I dentify the characteristics of given symmetrical and non-symmetrical charges. Sort a given set of 2.0 shapes as symmetrical and non-symmetrical charges. Complete a symmetrical 2.0 shapes as symmetrical and non-symmetrical congruence.
Specific Outcome N.A	Achievement Indicators	Specific Outcome N/A	General Guizense IVA Achievement Indicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome N/A	Achievement Indicators	Demonstrate an understanding of congruency, concretely and pictorially. [CN. R. V] Demonstrate an understanding of line symmetry by: identifying symmetry by: identifying symmetrical 2-D shapes of the pictorial symmetry by: identifying symmetrical 2-D shapes of the pictorial symmetry by: identifying symmetrical 2-D shapes of the pictorial symmetry by: identifying symmetrical 2-D shapes of the pictorial symmetry by: identifying symmetrical 2-D shapes of the pictorial symmetry and symmetrical 2-D shapes of the pictorial symmetry and symmetrical 2-D shapes of the pictorial symmetry and symmetrical 2-D shapes of the pictorial symmetry and sy	- Tolkermine if two given 2.0 shapes are congruent, and explain the strategy used. - Create a shape that is congruent to a given 2.0 shape. - Creates a shape that is congruent to a given 2.0 shape. - Identify compruent 2.0 shapes from a given set of shapes shown in different crientations. - Identify corresponding vertices and sides of two given congruent shapes. - Identify the characteristics of given symmetrical and non-symmetrical Dahapes. - Good a given set of 2.0 shapes as symmetrical and non-symmetrical congruents as a symmetrical and non-symmetrical. - Complete a symmetrical 2.0 shape, given half the shape and its line or given stymmetry. - Vederify fines of symmetry of a given set of 2.0 shapes, and explain with each shape is symmetrical.
Specific Outcome NA	Achievement Indicators	Specific Outcome N/A	General Concess vi A Achievement tridicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome NA	Achievement Indicators	Demonstrate an understanding of congruency, concretely and pictorially. (CN. R. V.) Demonstrate an understanding of limits symmetry by: Identifying symmetrical 2-D shapes - drawing one or more lines of symmetry or or more lines of symmetry in 2-D shapes - drawing one or more lines of symmetry in 2-D shapes	Control of the characteristics of given symmetrical and non-symmetrical branching in Soft a symmetrical branching in Soft and symmetrical branching in Soft and symmetrical branching in Soft and Soft a
Specific Outcome N.A.	Achievement Indicators Achievement Indicators	Specific Outcome N/A	General Outcome VA Athlessement to dealers		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome NA	Achievement Indicators	Demonstrate an understanding of congruency, concretely and pictorially. (CN. R. V.) Demonstrate an understanding of limits symmetry by: Identifying symmetrical 2-D shapes - drawing one or more lines of symmetry or or more lines of symmetry in 2-D shapes - drawing one or more lines of symmetry in 2-D shapes	- Toekennee it wo given 2.0 shapes are conguent, and explain the strategy used. - Create a shape that is conguent to a given 2.0 shape. - Create a shape that is conguent to a given 2.0 shape. - Identify corresponding vertices and sides of two given congruent different orientations. - Identify corresponding vertices and sides of two given congruent dispers. - Identify the characteristics of given symmetrical and non-symmetrical Dahapes. - Complete a symmetrical 2.0 shape, given half the shape and its line or governmetry. - Vederify insec of symmetry of a given set of 2.0 shapes, and explain every each shape is symmetrical.
Specific Outcome NA	Achievement Indicators	Specific Outcome N/A	General Outcome: VA Ashbevement Indicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome NA	Achievement Indicators	Demonstrate an understanding of congruency, concretely and pictorially. (CN. R. V.) Demonstrate an understanding of limits symmetry by: Identifying symmetrical 2-D shapes - drawing one or more lines of symmetry or or more lines of symmetry in 2-D shapes - drawing one or more lines of symmetry in 2-D shapes	Contains a symmetrical 2-D shapes are conguent, and explain the strategy used. Create a shape that is conguent to a given 2-D shape. I dentify conguent 2-D shapes from a given set of shapes shown in different crientalisms. I dentify corresponding vertices and sides of two given congruent shapes. I dentify corresponding vertices and sides of two given congruent shapes. I dentify the characteristics of given symmetrical and non-symmetrical D shapes. Son a given set of 2-D shapes as symmetrical and non-symmetrical D shapes. Complete a symmetrical 2-D shapes, given half the shape and list line crymmetry. Complete a symmetrical 2-D shapes as given set of 2-D shapes, and explain why each shape is symmetrical to 2-D shapes and shape is symmetrical to 2-D shapes and shape is symmetrical to 2-D shapes and shape is symmetrical to 2-D shapes and shape is symmetrical shape with and without manipulation or symmetrical shape with and without manipulation of symmetrical shape with and without manipulation of symmetrical shape with and without manipulation of symmetrical shape with and without manipulation of symmetrical shape with and without manipulation of symmetrical shape with and without manipulation of symmetrical shape with and without manipulation of symmetrical shape with and without manipulation of symmetrical shape with and without manipulation of symmetrical shape with and without manipulation of symmetrical shape shape load in the environment, the symmetrical shape with and without manipulation of symmetrical shape
Specific Outcome N.A.	Achievement Indicators	Specific Outcome N/A	General Guizense IVA Achievement Indicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome NA	Achlevement Indicators	Demonstrate an understanding of congruency, concretely and pictorially. (CN. R. V.) Demonstrate an understanding of limits symmetry by: Identifying symmetrical 2-D shapes - drawing one or more lines of symmetry or or more lines of symmetry in 2-D shapes - drawing one or more lines of symmetry in 2-D shapes	Determine I two given 2.0 shapes are conguent, and explain the strategy used. *Create a shape that is conguent to a given 2.0 shapes. *Lestedly conguent 2.0 shapes from a given set of shapes shown in different orientations. *Lestedly conguent 2.0 shapes from a given set of shapes shown in different orientations. *Lestedly conguent 2.0 shapes from a given set of shapes shown in different orientations. *Lestedly conguent 2.0 shapes and sides of two given congruent disapes. *Lestedly be the characteristics of given symmetrical and non-symmetrical 2.0 shapes. *Son a given set of 2.0 shapes as symmetrical and non-symmetrical 2.0 shapes as ymmetrical 2.0 shapes, given half the shape and its line orymmetry. *Lestedly insec of symmetrical 2.0 shapes, given half the shape and lest line orymmetry. *Lestedly insec of symmetrical 2.0 shapes is symmetrical by using an image reflector by folding and superingenging. *Create a symmetrical shape with and without manipulatives.
Specific Outcome NA	Achievement Indicators Achievement Indicators	Specific Outcome N/A	General Concess vi A Achievement tridicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome NA	Achievement indicators	Demonstrate an understanding of congruency, concretely and pictorially. (CN. R. V.) Demonstrate an understanding of limits symmetry by: Identifying symmetrical 2-D shapes - drawing one or more lines of symmetry or or more lines of symmetry in 2-D shapes - drawing one or more lines of symmetry in 2-D shapes	Contains a symmetrical 2-D shapes are conguent, and explain the strategy used. Create a shape that is conguent to a given 2-D shape. I dentify conguent 2-D shapes from a given set of shapes shown in different crientalisms. I dentify corresponding vertices and sides of two given congruent shapes. I dentify corresponding vertices and sides of two given congruent shapes. I dentify the characteristics of given symmetrical and non-symmetrical D shapes. Son a given set of 2-D shapes as symmetrical and non-symmetrical D shapes. Complete a symmetrical 2-D shapes, given half the shape and list line crymmetry. Complete a symmetrical 2-D shapes as given set of 2-D shapes, and explain why each shape is symmetrical to 2-D shapes and shape is symmetrical to 2-D shapes and shape is symmetrical to 2-D shapes and shape is symmetrical to 2-D shapes and shape is symmetrical shape with and without manipulation or symmetrical shape with and without manipulation of symmetrical shape with and without manipulation of symmetrical shape with and without manipulation of symmetrical shape with and without manipulation of symmetrical shape with and without manipulation of symmetrical shape with and without manipulation of symmetrical shape with and without manipulation of symmetrical shape with and without manipulation of symmetrical shape with and without manipulation of symmetrical shape with and without manipulation of symmetrical shape shape load in the environment, the symmetrical shape with and without manipulation of symmetrical shape
Specific Outcome NA	Achievement Indicators Achievement Indicators	Specific Outcome N/A	General Outcome VA Arthur sement to disasters		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome NA	Achievement Indicators	Demonstrate an understanding of congruency, concretely and pictorially. (CN. R. V.) Demonstrate an understanding of limits symmetry by: Identifying symmetrical 2-D shapes - drawing one or more lines of symmetry or or more lines of symmetry in 2-D shapes - drawing one or more lines of symmetry in 2-D shapes	* Determine I two given 2 G shapes are congruent, and explain the strategy used. * Create a shape that is congruent to a given 2 O shape. * Identify congruent 2 D shapes from a given set of shapes shown in different crientiation. * Identify corresponding vertices and sides of two given congruent shapes. * Identify corresponding vertices and sides of two given congruent shapes. * Identify the characteristics of given symmetrical and non-symmetrical D shapes. * Complete a symmetrical S D shapes as symmetrical and non-symmetrical to symmetry. * Complete a symmetrical S D shapes, given half the shape and its line or symmetry. * Complete a symmetrical S D shapes as symmetrical symmetrical by sain and inaper influence or the given and superimposing an image reflector or by folding and superimposing an image reflector or by folding and superimposing. * Provide exampless of symmetrical shapes found in the environment, and dentify the fine(s) of symmetry.
Specific Outcome NA	Achievement Indicators	Specific Outcome N/A	General Outcome: VA Ashbevenmen Indicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome NA	Achievement Indicators	Demonstrate an understanding of congruency, concretely and pictorially. (CN. R. V.) Demonstrate an understanding of limits symmetry by: Identifying symmetrical 2-D shapes - drawing one or more lines of symmetry or or more lines of symmetry in 2-D shapes - drawing one or more lines of symmetry in 2-D shapes	Potentime I two given ≥ 0 shapes are congruent, and explain the strategy used. *Create a shape that is congruent to a given ≥ 0 shapes. *Identify congruent ≥ 0 shapes from a given set of shapes shown in different ceirralistics. *Identify corresponding vertices and sides of two given congruent shapes. *Identify corresponding vertices and sides of two given congruent shapes. *Identify the characteristics of given symmetrical and non-symmetrical ≥ 0 shapes. *Identify the characteristics of given symmetrical and non-symmetrical ≥ 0 shapes as symmetrical ≥ 0 shapes as given set of ≥ 0 shapes as symmetrical ≥ 0 shapes as given set of ≥ 0 shapes as given set of ≥ 0 shapes as given set of ≥ 0 shapes as given set of ≥ 0 shapes as given set of ≥ 0 shapes as given set of ≥ 0 shapes and sparing an image reflector or by folding and supprimposing. *Create a symmetrical shape with and without manipulatives. *Provide examples of symmetrical shapes found in the environment, and identify the fine(s) of symmetry.
Specifis Outcome	Achievement Indicators Achievement Indicators	Specific Outcome N/A	General Concerns VIA Achievement Indicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome N/A	Achievement Indicators	Demonstrate an understanding of congruency, concretely and pictorially. (CN. R. V.) Demonstrate an understanding of limits symmetry by: Identifying symmetrical 2-D shapes - drawing one or more lines of symmetry or or more lines of symmetry in 2-D shapes - drawing one or more lines of symmetry in 2-D shapes	Potentime I two given ≥ 0 shapes are congruent, and explain the strategy used. *Create a shape that is congruent to a given ≥ 0 shapes. *Identify congruent ≥ 0 shapes from a given set of shapes shown in different ceirralistics. *Identify corresponding vertices and sides of two given congruent shapes. *Identify corresponding vertices and sides of two given congruent shapes. *Identify the characteristics of given symmetrical and non-symmetrical ≥ 0 shapes. *Identify the characteristics of given symmetrical and non-symmetrical ≥ 0 shapes as symmetrical ≥ 0 shapes as given set of ≥ 0 shapes as symmetrical ≥ 0 shapes as given set of ≥ 0 shapes as given set of ≥ 0 shapes as given set of ≥ 0 shapes as given set of ≥ 0 shapes as given set of ≥ 0 shapes as given set of ≥ 0 shapes and sparing an image reflector or by folding and supprimposing. *Create a symmetrical shape with and without manipulatives. *Provide examples of symmetrical shapes found in the environment, and identify the fine(s) of symmetry.
Specific Outcome NA	Achievement Indicators Achievement Indicators	Specific Outcome N/A	General Concess vi A Achievement ledicators		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome NA	Achievement indicators Achievement indicators	Demonstrate an understanding of congruency, concretely and pictorially. (CN. R. V.) Demonstrate an understanding of limits symmetry by: Identifying symmetrical 2-D shapes - drawing one or more lines of symmetry or or more lines of symmetry in 2-D shapes - drawing one or more lines of symmetry in 2-D shapes	* Determine I two given 2 G shapes are congruent, and explain the strategy used. * Create a shape that is congruent to a given 2 O shape. * Identify congruent 2 D shapes from a given set of shapes shown in different crientiation. * Identify corresponding vertices and sides of two given congruent shapes. * Identify corresponding vertices and sides of two given congruent shapes. * Identify the characteristics of given symmetrical and non-symmetrical D shapes. * Complete a symmetrical S D shapes as symmetrical and non-symmetrical to symmetry. * Complete a symmetrical S D shapes, given half the shape and its line or symmetry. * Complete a symmetrical S D shapes as symmetrical symmetrical by sain and inaper influence or the given and superimposing an image reflector or by folding and superimposing an image reflector or by folding and superimposing. * Provide exampless of symmetrical shapes found in the environment, and dentify the fine(s) of symmetry.
Specific Outcome NA	Achievement Indicators	Specific Outcome N/A	General Outcome VA Achie seement to diseases		* Create a pictorial representation of a given 2-D shape. Sub-Strand: Transformations	Specific Outcome NA	Achievement Indicators	Demonstrate an understanding of congruency, concretely and pictorially. (CN. R. V.) Demonstrate an understanding of limits symmetry by: Identifying symmetrical 2-D shapes - drawing one or more lines of symmetry or or more lines of symmetry in 2-D shapes - drawing one or more lines of symmetry in 2-D shapes	Potentime I two given ≥ 0 shapes are congruent, and explain the strategy used. *Create a shape that is congruent to a given ≥ 0 shapes. *Identify congruent ≥ 0 shapes from a given set of shapes shown in different ceirralistics. *Identify corresponding vertices and sides of two given congruent shapes. *Identify corresponding vertices and sides of two given congruent shapes. *Identify the characteristics of given symmetrical and non-symmetrical ≥ 0 shapes. *Identify the characteristics of given symmetrical and non-symmetrical ≥ 0 shapes as symmetrical ≥ 0 shapes as given set of ≥ 0 shapes as symmetrical ≥ 0 shapes as given set of ≥ 0 shapes as given set of ≥ 0 shapes as given set of ≥ 0 shapes as given set of ≥ 0 shapes as given set of ≥ 0 shapes as given set of ≥ 0 shapes and sparing an image reflector or by folding and supprimposing. *Create a symmetrical shape with and without manipulatives. *Provide examples of symmetrical shapes found in the environment, and identify the fine(s) of symmetry.

Alberta's Program of Studies (Curriculum) Curriculum - Mathematics - Shape and Space (Strand and Sub-strands with Achievement Outcomes)

Note: These strands are not intended to be discrete units of instruction. The integration of outcomes across trands makes mathematical experiences meaningful. Students should make the connection between concepts both within and across strands.

PROGRESSION IS HIGHLIGHTED IN THE FOLLOWING DOCUMENT VIA BOLDED TEXT.

PROGRESSION IS THAT IS THE FOLLOWING DOCUMENT VIN BOLDED TEAT.										
MATHEMATICAL PROCESSES										
There are critical components that students must encounter in a mathematics program in order to achieve the goals of mathematics education and embrace lifelong learning in mathematics.										
Communication Connections Mental Mathematics and Estimation Problem Solving Ressoning Technology Visualization [C] [CN] [ME] [PS] [R] [T] [V]										
Students are expected to communicate in order to learn and express their understanding connect mathematical ideas to other concepts in mathematics, to everyday experiences and to other disciplines		demonstrate fluency with mental mathematics and estimation	develop and apply new mathematical knowledge through problem solving	develop mathematical reasoning	select and use technologies as tools for learning and for solving problems	develop visualization skills to assist i processing information, making connections and solving problems				
Sub-strand: Measurement										
Grade 5		Grade 6	I	Grade 7		Grade 8				
			General Outcome: U	se direct and indirect measurement to solve problems.						

								connections and solving problems	
					Sub-strand: Measurement				
	Grade 5		Grade 6	General Outcome:	Grade 7 Use direct and indirect measurement to solve problems		Grade 8		Grade 9
Specific Outcome	Achievement Indicators	Specific Outcome	Achievement Indicators	Specific Outcome	Achievement Indicators	Specific Outcome	Achievement Indicators	Specific Outcome	Achievement Indicators
It is expected that students will:	The following set of indicators may be used to determine whether	It is expected that students will:	The following set of indicators may be used to determine whether	It is expected that students will:	The following set of indicators may be used to determine whether	It is expected that students will:	The following set of indicators may be used to determine whether	It is expected that students will:	The following set of indicators may be used to determine whether
Identify 90° angles.	students have met the corresponding specific outcome. * Provide examples of 90° angles in the environment.	2 Demonstrate that the sum of	students have met the corresponding specific outcome. * Explain, using models, that the sum of the interior angles of a triangle	Demonstrate an understanding of	students have met the corresponding specific outcome. * Illustrate and explain that the diameter is twice the radius in a given	Develop and apply the Pythagorean	students have met the corresponding specific outcome. * Model and explain the Pythagorean theorem concretely, pictorially or	Solve problems and justify the	students have met the corresponding specific outcome. Provide an example that illustrates:
[ME, V]	* Sketch 90° angles without the use of a protractor.	. interior angles is: • 180° in a triangle	is the same for all triangles.	circles by: • describing the relationships	circle.	theorem to solve problems.	using technology.	solution strategy, using the following circle properties:	the perpendicular from the centre of a circle to a chord bisects the chord
[m2, v]	* Label a 90° angle, using a symbol.	• 360° in a quadrilateral.	* Explain, using models, that the sum of the interior angles of a quadrilateral is the same for all quadrilaterals.	among radius, diameter and	* Illustrate and explain that the circumference is approximately three times the diameter in a given circle.	[CN, PS, R, T, V] [ICT: P2-3.4]	* Explain, using examples, that the Pythagorean theorem applies only to right triangles.	 the perpendicular from the 	 the measure of the central angle is equal to twice the measure of the inscribed angle subtended by the same arc
	Label a 90° angle, using a symbol.	[C, R]	quadrilateral is the same for all quadrilaterals.	 relating circumference to pi 		[IC1: P2-3.4]		centre of a circle to a chord bisects the chord	 the inscribed angles subtended by the same arc are congruent
				 determining the sum of the central angles 	Explain that, for all circles, pi is the ratio of the circumference to the diameter () Cd and its value is approximately 3.14.		Determine whether or not a given triangle is a right triangle by applying the Pythagorean theorem.	 the measure of the central angle is equal to twice the measure of 	 a tangent to a circle is perpendicular to the radius at the point of tangency.
				 constructing circles with a given 	* Explain, using an illustration, that the sum of the central angles of a		* Determine the measure of the third side of a right triangle, given the	the inscribed angle subtended by	* Solve a given problem involving application of one or more of the circle
				radius or diameter - solving problems involving the	circle is 360o.		measures of the other two sides, to solve a given problem.	the same arc the inscribed angles subtended	properties.
				radii, diameters and circumferences of circles.	* Draw a circle with a given radius or diameter, with and without a		* Solve a given problem that involves Pythagorean triples; e.g., 3, 4, 5 or	by the same arc are congruent	* Determine the measure of a given angle inscribed in a semicircle,
				[C, CN, PS, R, V]	compass.		5, 12, 13.	 a tangent to a circle is perpendicular to the radius at the 	using the circle properties.
				[C, CN, PS, H, V]	* Solve a given contextual problem involving circles.			point of tangency.	* Explain the relationship among the centre of a circle, a chord and the perpendicular bisector of the chord.
								[C, CN, PS, R, T, V] [ICT: C6-3.1, C6-3.4]	
								[101.00-3.1,00-3.4]	
4. Demonstrate an understanding of	Identify the cube as the most efficient unit for measuring volume, and	1 Demonstrate an understanding of	* Provide examples of angles found in the environment.			Develop and apply formulas for	Determine the volume of a given right prism, given the area of the		
volume by: • selecting and justifying referents	explain why.	 angles by: identifying examples of angles in 	* Classify a given set of angles according to their measure; e.g., acute,			determining the volume of right rectangular prisms, right triangular	uase.		
for cm ² or m ² units • estimating volume, using	* Provide a referent for a cubic centimetre, and explain the choice.	the environment classifying angles according to	right, obtuse, straight, reflex.		1	prisms and right cylinders.	* Generalize and apply a rule for determining the volume of right cylinders.		
referents for cm3 or m3	* Provide a referent for a cubic metre, and explain the choice.	their measure	* Sketch 45°, 90° and 180° angles without the use of a protractor, and describe the relationship among them.			[C, CN, PS, R, V]	* Explain the connection between the area of the base of a given right 3-		
 measuring and recording volume (cm² or m²) 	* Determine which standard cubic unit is represented by a given referent.	 estimating the measure of angles, using 45°, 90° and 180° as 					D object and the formula for the volume of the object.		
 constructing right rectangular prisms for a given volume. 	* Estimate the volume of a given 3-D object, using personal referents.	reference angles	* Estimate the measure of an angle, using 45°, 90° and 180° as reference angles.				* Demonstrate that the orientation of a given 3-D object does not affect		
IC. CN. ME. PS. R. VI	* Determine the volume of a given 3-D object, using manipulatives, and	 determining angle measures in degrees 	* Measure, using a protractor, given angles in various orientations.		1		its volume.		
[O, ON, ME, PS, H, V]	explain the strategy.	 drawing and labelling angles when the measure is specified. 	* Draw and label a specified angle in various orientations, using a				* Apply a formula to solve a given problem involving the volume of a right cylinder or a right prism.		
	* Construct a right rectangular prism for a given volume.	[C, CN, ME, V]	protractor.				Symbol of a right phane.		
	* Construct more than one right rectangular prism for the same given	[O, GN, ME, V]							
	volume.								
Design and construct different	* Construct or draw two or more rectangles for a given perimeter in a	3 Develop and apply a formula for	* Explain, using models, how the perimeter of any polygon can be	Develop and apply a formula for	* Illustrate and explain how the area of a rectangle can be used to	Determine the surface area of:	* Explain, using examples, the relationship between the area of 2-D		
rectangles, given either perimeter	problem-solving context.	determining the:	determined.	determining the area of:	determine the area of a triangle.	 right rectangular prisms 	shapes and the surface area of a given 3-D object.		
or area, or both (whole numbers), and make generalizations.	* Construct or draw two or more rectangles for a given area in a problem-	perimeter of polygons area of rectangles	* Generalize a rule (formula) for determining the perimeter of polygons,	triangles parallelograms	* Generalize a rule to create a formula for determining the area of	 right triangular prisms right cylinders 	* Identify all the faces of a given prism, including right rectangular and		
[C, CN, PS, R, V]	solving context.	 volume of right rectangular prisms. 	including rectangles and squares.	• circles.	triangles.	to solve problems.	right triangular prisms.		
[0, 0, 1, 0, 1, 4]	* Determine the shape that will result in the greatest area for any given	[C, CN, PS, R, V]	* Explain, using models, how the area of any rectangle can be	[CN, PS, R, V]	* Illustrate and explain how the area of a rectangle can be used to determine the area of a parallelogram.	[C, CN, PS, R, V]	* Identify all the faces of a given right cylinder.		
	* Determine the shape that will result in the least area for any given		* Generalize a rule (formula) for determining the area of rectangles.				* Describe and apply strategies for determining the surface area of a		
	perimeter.				* Generalize a rule to create a formula for determining the area of parallelograms.		given right rectangular or right triangular prism.		
	* Provide a real-life context for when it is important to consider the		* Explain, using models, how the volume of any right rectangular prism can be determined.		* Illustrate and explain how to estimate the area of a circle without the		* Describe and apply strategies for determining the surface area of a given right cylinder.		
	relationship between area and perimeter.		* Generalize a rule (formula) for determining the volume of right		use of a formula.		* Solve a given problem involving surface area.		
3. Demonstrate an understanding of	* Provide a referent for one millimetre, and explain the choice.		rectangular prisms.		* Apply a formula for determining the area of a given circle.	2. Draw and construct nets for 3-D	* Match a given net to the 3-D object it represents.		
measuring length (mm) by: • selecting and justifying referents	* Provide a referent for one centimetre, and explain the choice.		Solve a given problem involving the perimeter of polygons, the area of		* Solve a given problem involving the area of triangles, parallelograms	objects.	* Construct a 3-D object from a given net.		
for the unit mm • modelling and describing the	* Provide a referent for one metre, and explain the choice.		rectangles and/or the volume of right rectangular prisms.		and/or circles.	[C, CN, PS, V]	* Draw nets for a given right cylinder, right rectangular prism and right		
relationship between mm and cm units, and between mm and m	* Show that 10 millimetres is equivalent to 1 centimetre, using concrete						triangular prism, and		
units, and between mm and m units.	materials; e.g., a ruler.						* verify by constructing the 3-D objects from the nets.		
[C, CN, ME, PS, R, V]	* Show that 1000 millimetres is equivalent to 1 metre, using concrete						* Predict 3-D objects that can be created from a given net, and verify the		
	materials; e.g., a metre stick.						prediction.		
	* Provide examples of when millimetres are used as the unit of measure.								
5. Demonstrate an understanding of	* Demonstrate that 1000 millilitres is equivalent to 1 litre by filling a 1 litre								
capacity by: • describing the relationship	container using a combination of smaller containers.								
between mL and L	* Provide a referent for a litre, and explain the choice.								
 selecting and justifying referents for mL or L units 	* Provide a referent for a millilitre, and explain the choice.								
 estimating capacity, using 	* Determine the capacity unit of a given referent.								
referents for mL or L measuring and recording capacity									
(mL or L).	* Estimate the capacity of a given container, using personal referents.								
[C, CN, ME, PS, R, V]	 Determine the capacity of a given container, using materials that take the shape of the inside of the container (e.g., a liquid, rice, sand, beads), 				1				
	and explain the strategy.				1				
L			1		I		1		

Alberta's Program of Studies (Curriculum) - Mathematics - Shape and Space (Strand and Sub-strands with Achievement Outcomes)

Note: These strands are not intended to be discrete units of instruction. The integration of outcomes across trands makes mathematical experiences meaningful. Students should make the connection between concepts both within and across strands. PROGRESSION IS HIGHLIGHTED IN THE FOLLOWING DOCUMENT VIA BOLDED TEXT.									
		There are a		MATHEMATIC	CAL PROCESSES fer to achieve the goals of mathematics education and		mathematice]
	MATHEMATICAL PROCESS	Communication [C]	Connections [CN]	Mental Mathematics and Estimation	Problem Solving [PS]	Reasoning [R]	Technology [T]	Visualization [V]	-
	Students are expected to	communicate in order to learn and express their understanding	connect mathematical ideas to other concepts in mathematics, to everyday experiences and to other disciplines	demonstrate fluency with mental mathematics and estimation	develop and apply new mathematical knowledge through problem solving	develop mathematical reasoning	select and use technologies as tools for learning and for solving problems	develop visualization skills to assist in processing information, making	
	Condu S	T	Crede S	ı	Sub-Strand: Transformations	ı	Conda 9		Create 0
stionships among them. Specific Outcome	Achievement Indicators	Specific Outcome	Achievement Indicators	Specific Outcome	Achievement Indicators	Specific Outcome	Achievement Indicators	Specific Outcome	Achievement Indicators
It is expected that students will:	The following set of indicators may be used to determine whether	It is expected that students will:	The following set of indicators may be used to determine whether	It is expected that students will:	The following set of indicators may be used to determine whether	It is expected that students will:	The following set of indicators may be used to determine whether	It is expected that students will:	The following set of indicators may be used to determine whether
Identify and sort quadrilaterals, including:	* Identify parallel, intersecting, perpendicular, vertical and horizontal edges and faces on 3-D objects.	4 Construct and compare triangles, including:	*Identify the characteristics of a given set of triangles according to their sides and/or their interior angles.	 Perform geometric constructions, including: 	* Describe examples of parallel line segments, perpendicular line segments, perpendicular bisectors and angle bisectors in the	Draw and interpret top, front and side views of 3-D objects	* Draw and label the top, front and side views for a given 3-D object on isometric dot paper.	Determine the surface area of composite 3-D objects to solve	 Determine the area of overlap in a given composite 3-D object, and explain the effect on determining the surface area (limited to right cylinders, right rectangular prisms and right triangular prisms).
squares trapezoids	* Identify parallel, intersecting, perpendicular, vertical and horizontal sides on 2-D shapes.	isosceles equilateral	* Sort a given set of triangles, and explain the sorting rule.	parallel line segments perpendicular bisectors	* Identify line segments on a given diagram that are parallel or	composed of right rectangular prisms.	* Compare different views of a given 3-D object to the object.	[C, CN, PS, R, V]	* Determine the surface area of a given composite 3-D object (limited to
parallelogramsrhombuses	* Provide examples from the environment that show parallel, intersecting, perpendicular, vertical and horizontal line segments.	• right • obtuse	* Identify a specified triangle from a given set of triangles; e.g., isosceles.	angle bisectors.	perpendicular.	[C, CN, R, T, V] [ICT: C6-3.4]	* Predict the top, front and side views that will result from a described rotation (limited to multiples of 90°), and verify predictions.		right cylinders, right rectangular prisms and right triangular prisms). * Solve a given problem involving surface area.
according to their attributes. [C, R, V]	* Find examples of edges, faces and sides that are parallel, intersecting,	acute in different orientations.	* Draw a specified triangle; e.g., scalene.	[CN, R, V]	* Draw a line segment perpendicular to another line segment, and explain why they are perpendicular.		Draw and label the top, front and side views that result from a given rotation (limited to multiples of 90°).		Solve a given problem involving surface area.
[0,14,4]	perpendicular, vertical and horizontal in print and electronic media, such as newspapers, magazines and the Internet.	[C, PS, R, V]	* Replicate a given triangle in a different orientation, and show that the two are congruent.		* Draw a line segment parallel to another line segment, and explain why they are parallel.		* Build a 3-D block object given the top, front and side views, with or without the use of technology.		
	* Draw 2-D shapes that have sides that are parallel, intersecting,				Draw the bisector of a given angle, using more than one method, and verify that the resulting angles are equal.		* Sketch and label the top, front and side views of a 3-D object in the		
	perpendicular, vertical or horizontal. * Draw 3-D objects that have edges and faces that are parallel,				Draw the perpendicular bisector of a line segment, using more than one method, and verify the construction.		environment, with or without the use of technology.		
	intersecting, perpendicular, vertical or horizontal.				, , , , , , , , , , , , , , , , , , , ,				
	*Describe the faces and edges of a given 3-D object, using terms such as parallel, intersecting, perpendicular, vertical or horizontal.								
7. Describe and provide examples of	* Describe the sides of a given 2-D shape, using terms such as parallel, intersecting, perpendicular, vertical or horizontal. 1 **Identify and describe the characteristics of a pre-sorted set of	5 Describe and compare the sides	* Sort a given set of 2-D shapes into polygons and non-polygons, and	1				Demonstrate an understanding of	* Determine if the polygons in a given pre-sorted set are similar, and
edges and faces of 3-D objects, and sides of 2-D shapes that are:	d quadrilaterals.	and angles of regular and irregular polygons.	explain the sorting rule.					similarity of polygons.	explain the reasoning.
parallel intersecting	* Sort a given set of quadrilaterals, and explain the sorting rule. * Sort a given set of quadrilaterals according to the lengths of the sides.	[C, PS, R, V]	Demonstrate congruence (sides to sides and angles to angles) in a regular polygon by superimposing.					[C, CN, PS, R, V]	Draw a polygon similar to a given polygon, and explain why the two are similar.
perpendicular vertical horizontal.	 Sort a given set of quadrilaterals according to the lengths of the sides. Sort a given set of quadrilaterals according to whether or not opposite 		* Demonstrate congruence (sides to sides and angles to angles) in a regular polygon by measuring.						* Solve a given problem, using the properties of similar polygons.
[C, CN, R, T, V] [ICT: C6-2.2, P5-2.3]	sides are parallel.		* Demonstrate that the sides of a given regular polygon are of the same length and that the angles of a regular polygon are of the same						
[ICT: C8-2.2, P5-2.3]			measure.						
			* Sort a given set of polygons as regular or irregular, and justify the sorting.						
			* Identify and describe regular and irregular polygons in the environment.						
			1	L	Sub-Strand: Transformations	L	<u> </u>		
Specific Outcome	Achievement Indicators	Ger Specific Outcome	neral Outcome: Describe and analyze ossition and motion of objects and a Achievement Indicators	shapes. Specific Outcome	Achievement Indicators	Specific Outcome	Achievement Indicators	Specific Outcome	Achievement Indicators
 Identify and describe a single transformation, including a 	Provide an example of a translation, rotation and reflection.	6 Perform a combination of translations, rotations and/or	Demonstrate that a 2-D shape and its transformation image are congruent.	 Perform and describe transformations (translations, 	(It is intended that the original shape and its image have vertices with integral coordinates.)	Demonstrate an understanding of the congruence of polygons.	Determine the coordinates of the vertices of an image following a given combination of transformations of the original figure.	 Draw and interpret scale diagrams of 2-D shapes. 	1 Identify an example of a scale diagram in print and electronic media, e.g., newspapers, the Internet, and interpret the scale factor.
translation, rotation and reflection of 2-D shapes.	n * Identify a given single transformation as a translation, rotation or reflection.	reflections on a single 2-D shape, with and without technology, and draw and describe the image.	Model a given set of successive translations, successive rotations or successive reflections of a 2-D shape.	rotations or reflections) of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral	Identify the coordinates of the vertices of a given 2-D shape on a Cartesian plane.	[CN, R, V]	* Draw the original figure and determine the coordinates of its vertices, given the coordinates of the image's vertices and a description of the	[CN, R, T, V] [ICT: C6-3.4]	* Draw a diagram to scale that represents an enlargement or a reduction of a given 2-D shape.
[C, T, V] [ICT: C6-2.1]	* Describe a given rotation about a vertex by the direction of the turn (clockwise or counterclockwise).	[C, CN, PS, T, V]	* Model a given combination of two different types of transformations of	number vertices).	* Describe the horizontal and vertical movement required to move from a		given the coordinates of the image's vertices and a description of the transformation (translation, rotation, reflection).	[01.00-04]	* Determine the scale factor for a given diagram drawn to scale.
	* Describe a given reflection by identifying the line of reflection and the distance of the image from the line of reflection.		a 2-D shape. * Draw and describe a 2-D shape and its image, given a combination of	[C, CN, PS, T, V] [ICT: C6-3.4]	given point to another point on a Cartesian plane. * Describe the positional change of the vertices of a given 2-D shape to				* Determine if a given diagram is proportional to the original 2-D shape, and, if it is, state the scale factor.
	* Describe a given translation by identifying the direction and magnitude		transformations.		the corresponding vertices of its image as a result of a transformation, or successive transformations, on a Cartesian plane.				* Solve a given problem that involves the properties of similar triangles.
1	or are movement.		* Describe the transformations performed on a 2-D shape to produce a given image.		Determine the distance between points along horizontal and vertical lines in a Cartesian plane.				
			* Model a given set of successive transformations (translations, rotations and/or reflections) of a 2-D shape.		* Perform a transformation or consecutive transformations on a given 2- D shape, and identify coordinates of the vertices of the image.				
			Perform and record one or more transformations of a 2-D shape that will result in a given image.]	* Describe the image resulting from the transformation of a given 2-D				
Perform, concretely, a single transformation (translation, rotation or reflection) of a 2-D	* Translate a given 2-D shape horizontally, vertically or diagonally, and draw the resultant image.	Perform and describe single transformations of a 2-D shape in the first quadrant of a Cartesian	will result in a given image. Identify the coordinates of the vertices of a given 2-D shape (limited to the first quadrant of a Cartesian plane).		shape on a Cartesian plane by identifying the coordinates of the vertices of the image.			 Demonstrate an understanding of line and rotation symmetry. 	* Classify a given set of 2-D shapes or designs according to the number of lines of symmetry.
shape, and draw the image.	* Rotate a given 2-D shape about a vertex, and describe the direction of rotation (clockwise or counterclockwise) and the fraction of the turn (limited to 1/4, 1/4, 3/4 or full turn).	plane (limited to whole number vertices).	* Perform a transformation on a given 2-D shape, and identify the coordinates of the vertices of the image (limited to the first quadrant).					[C, CN, PS, V]	* Complete a 2-D shape or design, given one half of the shape or design and a line of symmetry.
[C, CN, T, V] [ICT: C6-2.1]	* Reflect a given 2-D shape across a line of reflection, and draw the	[C, CN, PS, T, V] [ICT: C6-2:1]	* Describe the positional change of the vertices of a given 2-D shape to the corresponding vertices of its image as a result of a transformation						Determine if a given 2-D shape or design has rotation symmetry about the point at its centre, and, if it does, state the order and angle of
1	resultant image. * Draw a 2-D shape, translate the shape, and record the translation by	7 Perform a combination of	(limited to the first quadrant). * Analyze a given design created by transforming one or more 2-D	1					rotation. * Rotate a given 2-D shape about a vertex, and draw the resulting image.
	describing the direction and magnitude of the movement.	successive transformations of 2-D shapes to create a design, and identify and describe the	Anlayze a great design created by transforming one of more 2-15 shapes, and identify the original shape(s) and the transformations used to create the design.						* Identify a line of symmetry or the order and angle of rotation symmetry
1	* Draw a 2-D shape, rotate the shape about a vertex, and describe the direction of the turn (clockwise or counterclockwise) and the fraction of the turn (limited to ¼, ½, ¾ or full turn).	transformations.	* Create a design using one or more 2-D shapes, and describe the transformations used.						in a given tessellation. Identify the type of symmetry that arises from a given transformation on
1	* Draw a 2-D shape, reflect the shape, and identify the line of reflection and the distance of the image from the line of reflection.	IC CN T VI 8 Identify and plot points in the first quadrant of a Cartesian plane, using whole number ordered	*Label the axes of the first quadrant of a Cartesian plane, and identify the origin.	Identify and plot points in the four quadrants of a Cartesian plane,	Label the axes of a four quadrant Cartesian plane, and identify the	1			a Cartesian plane.
1	* Predict the result of a single transformation of a 2-D shape, and verify	 quadrant of a Cartesian plane, using whole number ordered pairs. 	the origin. * Plot a point in the first quadrant of a Cartesian plane, given its ordered	using integral ordered pairs.	ongin. * Identify the location of a given point in any quadrant of a Cartesian				* Complete, concretely or pictorially, a given transformation of a 2-D shape on a Cartesian plane; record the coordinates; and describe the type of symmetry that results.
	the prediction.	[C, CN, V]	pair. * Match points in the first quadrant of a Cartesian plane with their	[C, CN, V]	plane, using an integral ordered pair. * Plot the point corresponding to a given integral ordered pair on a				* Identify and describe the types of symmetry created in a given piece of artwork.
			corresponding ordered pair.		Plot the point corresponding to a given integral ordered pair on a Cartesian plane with units of 1, 2, 5 or 10 on its axes.				* Determine whether or not two given 2-D shapes on a Cartesian plane
			Plot points in the first quadrant of a Cartesian plane with intervals of 1, 2, 5 or 10 on its axes, given whole number ordered pairs.		* Draw shapes and designs in a Cartesian plane, using given integral ordered pairs.				are related by either rotation or line symmetry. Draw, on a Cartesian plane, the translation image of a given shape,
			 Draw shapes or designs, given ordered pairs, in the first quadrant of a Cartesian plane. 		* Create shapes and designs, and identify the points used to produce the shapes and designs, in any quadrant of a Cartesian plane.				using a given translation rule such as R2, U3 or $\rightarrow \rightarrow$, $\uparrow \uparrow \uparrow$; label each vertex and its corresponding ordered pair; and describe why the translation does not result in line or rotation symmetry.
			Determine the distance between points along horizontal and vertical lines in the first quadrant of a Cartesian plane.						*Create or provide a price of artwork that demonstrates line and rotation