DEVELOPING MATHEMATICAL INQUIRY COMMUNITIES

Geometry – Shape and Space

Level 1 (Year 1/2)

Teacher Booklet

Level 1 Year 1/2: Geometry – Space and Shape

Task 1	Can you use your square tiles to make the same shape? What about if I turn it like this? Can you use your squares to make this shape? Talk with you buddy about how this new shape you have made is the same as the first one you made. How is it different? What about this shape? I wonder what it reminds you of? Can you use your shapes to make this shape? As you make the shape talk with your buddy about how you are making it and what you notice about it.
Big ideas	Two-and-three dimensional objects with or without curved surfaces can be described, classified, and analysed by their attributes. Shapes have sides that are parallel, perpendicular, or neither. Shapes have line symmetry, rotational symmetry, or neither. Shapes are similar, congruent, or neither.
Curriculum links	**GM1-2:** Sort objects by their appearance. **GM2-3:** Sort objects by their spatial features, with justification. **GM2-4:** Identify and describe the plane shapes found in objects. **GM3-3:** Classify plane shapes and prisms by their spatial features. **GM3-4:** Represent objects with drawings and models.
Learning Outcomes: Students will be able to:	• Recognise shapes in their environment. • Identify and sort objects in a variety of ways. • Group and classify similar shapes together and explain and justify why they are similar using non-geometrical and geometrical language. • Group and classify different shapes together and explain why they are different using non-geometrical and geometrical language. • Use geometrical language to describe two-and-three-dimensional shapes according to their attributes.
Mathematical language	Square, rectangle, attribute, 2-dimensional, 3-dimensional, shape, sort, describe, side, equal, size, colour, big, small, bigger than, smaller than, straight, congruent, half, collinear, corners, angles, sides, vertical, horizontal, symmetrical, halves, quarters, column, row, array.
Sharing back/Connect	After the first activity select students to share who have laid the squares horizontally with edges touching to construct a rectangle. After the second activity select students to share who have reconstructed the rectangle vertically and can describe the similarities and differences. After the third iteration select students to share who can explain in different ways how they made the larger square

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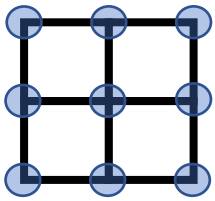
	Connect: Now can you draw each shape. As you draw the shapes keep checking with your buddy that your drawings are the same.
Teacher Notes	• During the launch, use square and rectangular 2D shapes and have the students discuss their attributes as well as naming them as squares and rectangles. Then present them with a template of a rectangular shape made of two squares and have the students discuss and describe it (See Copy Masters booklet). • Use the first template cut out to have the students construct the same shape using their squares to complete the first activity. Use the second template cut out to have the students complete the second activity. In the third activity present the students with a square made of four smaller squares. Discuss with them what it makes them think of (e.g., windows, lego blocks, ceiling, or floor tiles). Lead into how it might be called a 2 by 2 block in Lego and ask them why (it can be seen as an array). • Following immediately after this large group discussion and before the connect have the students place counters on the corners of their 2 by 2 rectangle. Discuss how this has made a 3 by 3 array.  • For the connect remove the materials and provide each student with a drawing of the rectangle you used to have them make a representation with their materials. Have them re-represent the rectangle as a drawing. Repeat until the drawings are more accurate. Draw student attention to the fact that there is only one line between the two squares which make the rectangle. Then provide each child with a drawing of the larger square made of 4 smaller squares and have them draw it as many times as needed until they are able to get a close representation of it (See Copy Masters booklet). • Have 2D squares and rectangles. These could be wooden blocks, carpet squares, floor tiles, foam tiles or cardboard or paper squares. Give each child 3 or 4 identical square shapes for the first two iterations. • Facilitate the students to notice that the template of a rectangular shape made of two squares is made from two

	equal sized squares and that they make a rectangle. Ensure that they notice that the shapes are same although the direction has changed. In third iteration support students to notice that all four squares are touching. Ensure that students can see that the larger square has 2 rows of 2 squares as well as 2 columns of 2 squares and that the vertical and horizontal lines divide it into 2 halves and that together they divide it into quarters. • Notice how students use their squares to make the rectangle. Discuss with them how they place the squares to make the shape (from what direction, right to left or left to right, turn, or flip them). • Monitor for students using everyday vocabulary when discussing the rectangle during the launch. These might include the following generalised ideas; The lines as straight; the 2 squares are congruent, that is the same size and shape; the squares are beside each other and touching; they are collinear because their sides match and their top and bottom edges are in line; a square has 4 equal corners and 4 equal sides; some lines are vertical and some are horizontal, the 2 squares which make the rectangle are symmetrical, the rectangle is the same size whether horizontal or vertical. • For the independent task, have available paper copies of rectangles made from two squares for students to re-represent from memory and short sticks of the same length.
Independent Tasks	1. Have a look at the rectangle made of two squares. Now hide the rectangle and draw the shape from memory. Check if your drawing was the same. Keep repeating this activity until your drawing is close to the rectangle on the sheet. 2. Make 2 squares with your sticks. How many sticks did you need? 3. Make a rectangle with the sticks which is made up of 2 squares joined together. 4. Make 4 squares with your sticks. How many sticks did you need? 5. Make a 2 by 2 large square with the sticks which is made of 4 squares joined together to make one large square. How many sticks did you need this time? Why do you need less? 6. On your paper draw without looking at the picture a rectangle made of 2 squares. 7. On your paper draw without looking at the picture a 2 by 2 large square made up of the 4 smaller squares.

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Task 2	Look at this picture. What do you notice about it? Use your shapes to make this? Make sure you are talking with your buddy about what you are doing when you are making it. Draw the shape. What about if we turn it this way? Talk with your buddy about how many squares you can see. How is this shape the same or different from the first one? Now with your buddy you are going to explore all the different shapes you can make with your squares. What do you notice? Draw each shape you make. Keep checking that your drawing looks like the shape you have made.
Big ideas	Two-and-three dimensional objects with or without curved surfaces can be described, classified, and analysed by their attributes. Shapes have sides that are parallel, perpendicular, or neither. Shapes have line symmetry, rotational symmetry, or neither. Shapes are similar, congruent, or neither.
Curriculum links	**GM1-2:** Sort objects by their appearance. **GM2-3:** Sort objects by their spatial features, with justification. **GM3-4:** Represent objects with drawings and models.
Learning Outcomes: Students will be able to:	• Recognise shapes in their environment. • Identify and sort objects in a variety of ways. • Connect and decompose shapes to make other shapes or images. • Group and classify similar shapes together and explain and justify why they are similar using non-geometrical and geometrical language. • Group and classify different shapes together and explain why they are different using non-geometrical and geometrical language. • Use geometrical language to describe two-and-three-dimensional shapes according to their attributes.
Mathematical language	Square, rectangle, attribute, 2-dimensional, 3-dimensional, shape, sort, describe, side, equal, size, colour, big, small, bigger than, smaller than, straight, congruent, half, collinear, corners, angles, sides, vertical, horizontal, symmetrical, halves, quarters, column, row, array
Sharing back/Connect	Select students to share who can explain in different ways how they constructed rectangles using squares and can describe the attributes they notice. **Connect:**

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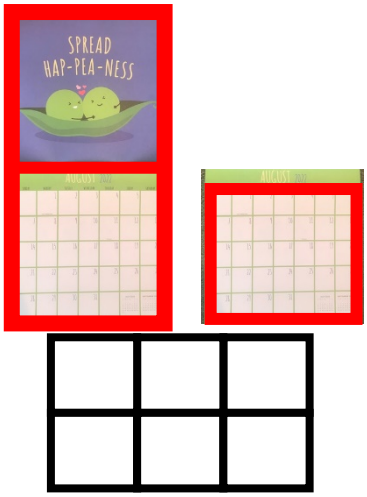
	Use the sticks to make different size shapes using congruent squares.
Teacher Notes	• During the launch, have students explore every day and contextual pictures of shapes in their environment which are made of congruent squares. Have them draw around the shape so that it is annotated and make a wall display e.g.  • Begin by presenting the students with a picture of a 2 x 3 drawing of a 2 by 3 rectangle made of 6 smaller squares. Have students count by twos horizontally and then by 3s vertically and express as 2 threes are 6 and 3 twos are 6. Use this as an opportunity to see it as an array. Discuss why the shapes could be called a 2 by 3 array or a 3 by 2 array. In the second part of the lesson give them dotty paper and squared paper and allow them to explore shapes they can make using squares. • In the connect have students count how many squares they have made using structured counting (by twos or threes etc) and then describe them as 3 by 3 etc. Have them place counters on the corners of each shape and redescribe them as arrays. • Have the 2 by 3 shape cut out to use to explore it vertically and horizontally. • Facilitate the students to notice that the shape is called a rectangle and it is composed of 6 congruent squares and that there are 3 rows of 2 columns. Emphasise that both rectangles are made of lines and that the various lines are equally spaced both horizontally and vertically. • Notice students who are able to draw a close approximation of their shapes and those who need more support and repetition to achieve this. • Facilitate the students to notice how the horizontal and vertical lines form the smaller squares and larger square or rectangle.

	• For the independent task, have available large pieces of paper and drawing materials. Sandboxes, dotty paper and grid paper could also be available (See Copy Masters booklet). Hide all other materials (pictures and other objects) and only make them available after they have drawn their representation.
Independent Tasks	1. Draw what you think a 2 by 3 shape looks like which is made of 6 squares which are all the same. Check whether you are right. If you need to, keep drawing it until you are right. 2. Use the grid and/or dotty paper to draw the 2 by 1 shape, the 2 by 2 shape and the 2 by 3 shape. Can you make these larger and smaller? 3. Use the dotty and/or squared paper to draw squares and rectangles which are made up of many different smaller squares. Keep talking with a buddy about what you notice about the lines.
Anticipations	

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Task 3	Talk with your buddy about what you notice about the shape of these different things. Can you sort them into groups which you think are the same? Can you sort them into groups which you think are different?
Big ideas	Two-and-three dimensional objects with or without curved surfaces can be described, classified, and analysed by their attributes. Shapes have sides that are parallel, perpendicular, or neither. Shapes have line symmetry, rotational symmetry, or neither. Shapes are similar, congruent, or neither.
Curriculum links	**GM1-2**: Sort objects by their appearance. **GM2-3**: Sort objects by their spatial features, with justification. **GM3-4**: Represent objects with drawings and models.
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Sharing back/Connect	Select students to share who can explain and justify using everyday language and the language of geometry how the different objects are the same and/or different. **Connect:** Explore with the students the properties of the different objects through asking questions which explore for example, large and small, solid and hollow, roll, sharp edges etc.
Teacher Notes	• During the launch, use structured counting, to count objects which they see every day, which are represented as arrays (e.g., eggs in an egg carton, chocolates in a box) (See Copy Masters booklet). • Provide students in pairs with a collection of common objects from their environment and have them talk with each other about what they notice about them.

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	Then have the students sort the objects into groups that are the same and have them justify why they are the same. Repeat with how they are different. • Have available a large collection of common objects including some that are similar to cubes, cuboids, cylinders and spheres (e.g., boxes, dice, cans, balls, glad wrap roll, building blocks, Lego) • Facilitate the students to notice 3D aspects of the shapes including flat faces, curved faces, faces form an edge, corner, vertices when they come together, horizontal and vertical lines etc • Monitor for students using vocabulary related to 3D shapes. • For the independent task, have available a wide collection of different 3D shapes.
Independent Tasks	Work with a buddy to sort your objects. Make sure that you are talking about why they are the same or why they are different. After you have finished sorting them into their groups draw pictures of each different shape.
Anticipations	

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Task 4	With your buddy can you find some shapes that are the same as this? Talk about what you notice about this shape. Now with your buddy can you find some shapes that are the same as this? Talk about what you notice about this shape. With your buddy can you find some shapes that are the same as this? Talk about what you notice about this shape.
Big ideas	Two-and-three dimensional objects with or without curved surfaces can be described, classified, and analysed by their attributes. Shapes have sides that are parallel, perpendicular, or neither. Shapes have line symmetry, rotational symmetry, or neither. Shapes are similar, congruent, or neither.
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Sharing back/Connect	Select students to share who can explain and justify their groupings of objects according to the criteria set. **Connect:** Explore different cuboids and discuss how many faces they have, their shape, size of the faces, edges, and their length in comparison to the other edges.
Teacher Notes	• During the launch, have students examine selected objects more closely and identify whether they have rectangles, squares, or circles on their surface (or face) • In the first section of the lesson hold up a ball and use that as the first prompt, then a can as the second prompt and then a box as the last exploration. At the end of each

	iteration ask the students; What do you notice is the same about all the objects you have put together? In the connect have students identify 6 rectangular faces, and the congruency of the faces and the edges. • Facilitate the students to notice that objects which are shaped like balls have a single curved surface. They are called a sphere; objects shaped like a can or glass jar have two circular ends and a curved surface between them and are called cylinders; objects shaped like bricks and dice have 6 rectangular faces and are called cuboids. • For the independent task, have a collection of cuboids, cylinders and spheres.
Independent Tasks	• Sort your objects into cuboids, cylinders, and spheres. Talk with a buddy about why they are cuboids, cylinders, and spheres. • Play a game with your buddy of "guess what I have behind my back". Hide one of your shapes behind your back. Describe it to your buddy and they have to draw it and say whether it is a cuboid, cylinder or sphere.
Anticipations	

Task 5	Can you sort these shapes into different groups? As you sort them, talk with your buddy about what you notice about them. Be ready to explain and justify how the shapes in each group are the same and how they are different from the shapes in the other groups.
Big ideas	Two-and-three dimensional objects with or without curved surfaces can be described, classified, and analysed by their attributes. Shapes have sides that are parallel, perpendicular, or neither. Shapes have line symmetry, rotational symmetry, or neither. Shapes are similar, congruent, or neither.
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Sharing back/Connect	Select students to share who are able to explain and justify their groupings of the shapes. **Connect:** Show the students a triangle which has a sharp corner and ask them to find other sharp corners on their shapes. Then show them a shape (like a rhombus) which has a blunt corner and ask them to find shapes with a blunt corner.
Teacher Notes	• During the launch, provide the students with cuboids and ask them to draw them. Repeat as often as needed to allow them to develop close 3D representations. • Have the students sort and re-sort until they are sorting the shapes by number of sides. Introduce the correct terms of triangle, quadrilateral and hexagon as 3-sided, 4-sided and 6-sided shapes.

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	• Have available for each pair of students a variety of triangle, quadrilateral, and hexagon shapes. These can be either as 2D wooden blocks or card representations (See Copy Masters booklet). • Facilitate the students to notice that shapes can have a different number of sides and that their shapes have either 3, 4 or 6 sides. They also have different sized corners (angles) and that these can be sharp or blunt corners (angles). • Monitor for students using vocabulary which is everyday maths language and revoice using the language of geometry. • For the independent task, provide students with solid shapes of a sphere, cuboid and a cylinder (maths material blocks are preferable to home type objects so there is no distraction from the shapes).
Independent Tasks	Draw each of these shapes. You might need to make a lot of drawings of them until your picture really looks like the shape.
Anticipations	

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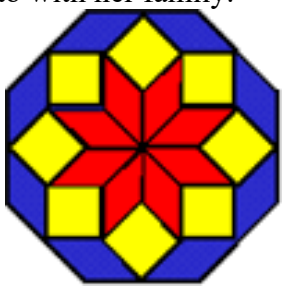
Task 6	Zahra is looking closely at the clever geometric patterns in the tile at the mosque she goes to with her family.  Talk with your buddy about what she notices. Zahra tells her mother that the artist who designed the tile used only quadrilaterals. Her mother says that she can see squares, rectangles, rhombus but they are all quadrilaterals. Can you explain why her mother said that? Can you find the different sorts of quadrilaterals her mother named? How are they the same? How are they different?
Big ideas	Two-and-three dimensional objects with or without curved surfaces can be described, classified, and analysed by their attributes. Shapes have sides that are parallel, perpendicular, or neither. Shapes have line symmetry, rotational symmetry, or neither. Shapes are similar, congruent, or neither.
Curriculum links	**GM1-2:** Sort objects by their appearance. **GM2-3:** Sort objects by their spatial features, with justification. **GM3-4:** Represent objects with drawings and models.
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Sharing back/Connect	Select students to share who are able to explain and justify their groupings of the shapes and identify relationships between them. **Connect:**

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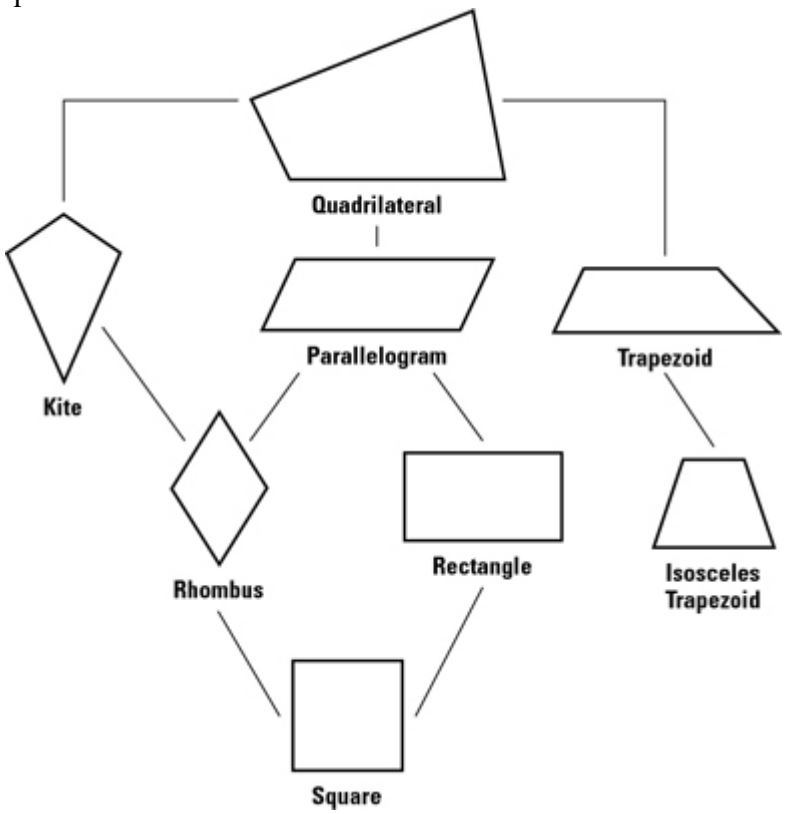
	Using 2 hoops make Venn diagrams to sort and classify different types of quadrilaterals to show the relationships between them.
Teacher Notes	• Have available a variety of quadrilateral shapes limited to those previously taught. These can be either as 2D wooden blocks or card representations (See Copy Masters booklet). Use these for the students to explain the relationships between them (same and different). Use two hoops to make the Venn diagrams. Use labels for example like 4 angles (corners) that are the same; two sides that are congruent (same) and two sides that are different. When the quadrilaterals are sorted into these sets have the students explain the relationships between the two sets identifying both similarities and differences. • Facilitate the students to notice that all quadrilaterals have 4 sides, and 4 angles but these are different according to their special case of quadrilateral. Here are the 8 types of quadrilaterals.  • For the independent task, have sets of cut out squares and rectangles ready for students to use, or use sets of tangram shapes and modify task to include making a picture from the tangram shapes or cut out shapes.
Independent Tasks	With your buddy you are going to explore all the different shapes you can make with your squares. After you have finished making a shape talk with your buddy about what you notice.

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	Now both you and your buddy need to draw it. Keep checking that your drawing looks like the shape you have made.
Anticipations	

Task 7	Can you sort these shapes into different groups? As you sort them, talk with your buddy about what you notice about them. Be ready to explain and justify how the shapes in each group are the same and how they are different from the shapes in the other groups.
Big ideas	Two-and-three dimensional objects with or without curved surfaces can be described, classified, and analysed by their attributes. Shapes have sides that are parallel, perpendicular, or neither. Shapes have line symmetry, rotational symmetry, or neither. Shapes are similar, congruent, or neither.
Curriculum links	**GM1-2:** Sort objects by their appearance. **GM2-3:** Sort objects by their spatial features, with justification. **GM3-4:** Represent objects with drawings and models.
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Sharing back/Connect	Select students to share who are able to explain and justify the groupings they have used. **Connect:** Siautu is looking at this beautiful piece of siapo. She notices that the artists have used congruent triangles to make the pattern.  Can you explain why she says they are congruent triangles?

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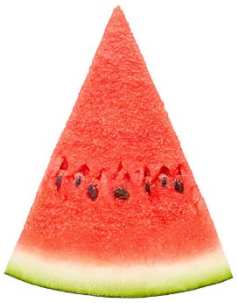
Teacher Notes	• During the launch, have a set of pictures of artefacts including tapa (See Copy Masters booklet) and have the students identify the different shapes (squares, rectangles, rhombus, quadrilaterals, triangles, etc). • Have sets of different triangles available for the students to sort and group (see Copy Masters booklet). • In the lesson have the students sort and re-sort the different triangles while discussing what is the same and what is different about them. • In the connect ensure that the students qualify what makes a triangle. Explore with them whether a triangle is a triangle no matter what way up it is. • Facilitate the students to notice that some triangles have same length sides, others have 2 sides the same, or none the same length. Use the terms congruent and equilateral and have students notice that these have 3 sharp corners (angles) that are all the same. Another group of triangles have a square corner (angle). • For the independent task, have available the pictures below.
Independent Tasks	Some children are talking about their food in their lunchbox. Sam says that they are all triangles, but Matthew argues that only some of them are triangles.     Do you think they are all triangles? Why or why not? Write why and why not you think each one is a triangle.
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Task 8	When the box makers were designing these cuboids, they drew a 2D representation of their net. Look carefully at one of the cuboids and imagine what it would look like flattened out as a net. Talk to your buddy about how many faces it will have and how many will be congruent. Draw what you think it will look like as a net. Remember that when you fold the net up it needs to make a 3D cuboid and so you need to draw all the faces.
Big ideas	Two-and-three dimensional objects with or without curved surfaces can be described, classified, and analysed by their attributes. Shapes have sides that are parallel, perpendicular, or neither. Shapes have line symmetry, rotational symmetry, or neither. Shapes are similar, congruent, or neither.
Curriculum links	**GM1-2:** Sort objects by their appearance. **GM2-3:** Sort objects by their spatial features, with justification. **GM3-4:** Represent objects with drawings and models.
Learning Outcomes: Students will be able to:	• Recognise shapes in their environment. • Identify and sort objects in a variety of ways. • Draw objects which can take the form of plane views or nets. • Create two-dimensional drawings of three-dimensional models. • Recreate the model or net. • Group and classify similar shapes together and explain and justify why they are similar using non-geometrical and geometrical language. • Group and classify different shapes together and explain and justify why they are different using non-geometrical and geometrical language. • Use geometrical language to describe two-and-three-dimensional shapes according to their attributes.
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Sharing back/Connect	Select students to share who are able to explain and justify the attributes of a cuboids and can approximate these as a net. **Connect:** Flatten out the cuboids they drew and compare the nets.

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Teacher Notes	• During the launch, explore the orientation of a triangle by showing them triangles upside down etc. Discuss with them whether they are still triangles. Have them draw different types of triangles at different positions. • Have available a wide range of cuboid shaped boxes collected from home. • Tell the students not to draw the flaps just the faces. This activity will need to be repeated so that they have the opportunity to get closer and closer to drawing the net. As they complete an iteration have them open the box and compare their net with the net of the box. • Facilitate the students to notice that despite the different dimensions of the boxes they all have six rectangular faces, and the opposite faces are congruent (the same). Note also that all corners are square (right angles). • Notice the students who are able to draw six faces and approximate a net for a cuboid. These students will often be different from those who are able to compute. Also notice the students who use gesturing for the number of faces needed. • For the independent task, have available cardboard boxes for the students to use to draw nets from.
Independent Tasks	Look closely at the box you have chosen. Draw what you think it will look like as a net. Do not draw the flaps just the faces. Remember that when you fold the net up it needs to make a 3D cuboid and so you need to draw all the faces. When you have finished drawing the net undo your box and compare its net with the net you drew. Keep redrawing the net until you have got it correct.
Anticipations	

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Task 9	Your turn to be a designer of a box. Draw the net for a cuboid (your box) and then discuss and compare it with your buddy. Together, before you cut it out decide whether it has all the attributes a net for a cuboid need. You may need to draw your net again until you agree that it will fold to make a cuboid. Now you are ready to cut it out and Sellotape it together. Congratulations, you are now a designer!
Big ideas	Two-and-three dimensional objects with or without curved surfaces can be described, classified, and analysed by their attributes. Shapes have sides that are parallel, perpendicular, or neither. Shapes have line symmetry, rotational symmetry, or neither. Shapes are similar, congruent, or neither.
Curriculum links	**GM1-2:** Sort objects by their appearance. **GM2-3:** Sort objects by their spatial features, with justification. **GM3-4:** Represent objects with drawings and models.
Learning Outcomes: Students will be able to:	• Recognise shapes in their environment. • Identify and sort objects in a variety of ways. • Draw objects which can take the form of plane views or nets. • Create two-dimensional drawings of three-dimensional models. • Recreate the model or net. • Group and classify similar shapes together and explain and justify why they are similar using non-geometrical and geometrical language. • Group and classify different shapes together and explain and justify why they are different using non-geometrical and geometrical language. • Use geometrical language to describe two-and-three-dimensional shapes according to their attributes.
Mathematical language	Square, rectangle, attribute, 2-dimensional, 3-dimensional, shape, sort, describe, side, equal, size, colour, big, small, bigger than, smaller than, straight, congruent, half, collinear, corners, angles, sides, vertical, horizontal, symmetrical, halves, quarters, column, row, array, face, curved, edge, corner, sphere, cylinder, cube, cuboid, triangle, quadrilateral, hexagon, sharp corners, blunt corners, equilateral triangle, square corner, rhombus.
Sharing back/Connect	Select students to share who have drawn nets which will fold into a cuboid. **Connect:**

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	Which of these will fold to make a cuboid
Teacher Notes	• Have cardboard, scissors, and Sellotape available. Have different templates for cuboids, some which will work and some which will not work (See Copy Masters booklet). • Notice students who use gesturing to represent the six faces and their attention to ensuring that they have congruent faces. • For the independent task, have a range of cubes or pictures of cubes or boxes available.
Independent Tasks	Try your hand again at drawing nets. Draw the net for a cuboid and cut it out and test it. Now look at a cube. Draw a net for a cube and test whether you are right. How is the net for a cube different from that of a cuboid?
Anticipations	

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Task 10	Today you are going to be a designer again for a building. But this time you must use your imagination first. Imagine that you have five cubes. The cubes are blue, red, yellow, black, and white. Now imagine making the building. Start with the yellow cube and put the black cube just behind it. Put the white cube on top of the black cube. Put the yellow cube on the left of the yellow cube. Put the blue cube on the right of the black cube. What does your building look like? Use some cubes to check whether you imagined it correctly. When you are sure that you did, draw a picture of what it looks like.
Big ideas	Two-and-three dimensional objects with or without curved surfaces can be described, classified, and analysed by their attributes. Shapes have sides that are parallel, perpendicular, or neither. Shapes have line symmetry, rotational symmetry, or neither. Shapes are similar, congruent, or neither.
Curriculum links	**GM1-2:** Sort objects by their appearance. **GM2-3:** Sort objects by their spatial features, with justification. **GM3-4:** Represent objects with drawings and models.
Learning Outcomes: Students will be able to:	• Recognise shapes in their environment. • Identify and sort objects in a variety of ways. • Draw objects which can take the form of plane views or nets. • Create two-dimensional drawings of three-dimensional models. • Recreate the model or net. • Group and classify similar shapes together and explain and justify why they are similar using non-geometrical and geometrical language. • Group and classify different shapes together and explain and justify why they are different using non-geometrical and geometrical language. • Use geometrical language to describe two-and-three-dimensional shapes according to their attributes.
Mathematical language	Square, rectangle, attribute, 2-dimensional, 3-dimensional, shape, sort, describe, side, equal, size, colour, big, small, bigger than, smaller than, straight, congruent, half, collinear, corners, angles, sides, vertical, horizontal, symmetrical, halves, quarters, column, row, array, face, curved, edge, corner, sphere, cylinder, cube, cuboid, triangle, quadrilateral, hexagon, sharp corners, blunt corners, equilateral triangle, square corner, rhombus.

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Sharing back/Connect	Select students to share who can imagine, construct, and draw the building as described. **Connect:** Draw the building from a bird's eye view looking down. What about from the end?
Teacher Notes	• Have multilink or similar blocks available. • Facilitate the students to notice that the view changes depending on the direction viewed. Have them notice that the shapes also change. • For the independent task, make available a range of three-dimensional objects. Do NOT provide printed nets for the students.
Independent Tasks	Try your hand again at drawing nets. Select a three-dimensional object. Draw the net for that object and cut it out and test it. Try your hand again at drawing nets. Select a three-dimensional object. Draw the net for that object and cut it out and test it.
Anticipations	

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Task 11 (optional)	Today we are going to use our 2D shapes to make a train. Each person is going to get a turn to add a carriage. Listen to what the person before you say about their shape. Then choose another shape to add which has all the attributes the same and only one attribute which is different.
Big ideas	Two-and-three dimensional objects with or without curved surfaces can be described, classified, and analysed by their attributes. Shapes have sides that are parallel, perpendicular, or neither. Shapes have line symmetry, rotational symmetry, or neither. Shapes are similar, congruent, or neither.
Curriculum links	**GM1-2:** Sort objects by their appearance. **GM2-3:** Sort objects by their spatial features, with justification. **GM3-4:** Represent objects with drawings and models.
Learning Outcomes: Students will be able to:	• Recognise shapes in their environment. • Identify and sort objects in a variety of ways. • Group and classify similar shapes together and explain and justify why they are similar using non-geometrical and geometrical language. • Group and classify different shapes together and explain and justify why they are different using non-geometrical and geometrical language. • Use geometrical language to describe two-and-three-dimensional shapes according to their attributes.
Mathematical language	Square, rectangle, attribute, 2-dimensional, 3-dimensional, shape, sort, describe, side, equal, size, colour, big, small, bigger than, smaller than, straight, congruent, half, collinear, corners, angles, sides, vertical, horizontal, symmetrical, halves, quarters, column, row, array, face, curved, edge, corner, sphere, cylinder, cube, cuboid, triangle, quadrilateral, hexagon, sharp corners, blunt corners, equilateral triangle, square corner, rhombus.
Sharing back/Connect	**Connect:** Choose a shape which has two attributes which are different from this shape. Be ready to explain and justify why they are different.
Teacher Notes	• Have 2D shapes available to use and put them in the middle of the circle of students. Build the train across the floor each student taking a turn by naming the attributes of the shape and how their shape differs and is the same. • Facilitate the students to notice that they can name the attributes of different shapes and that shapes can differ by one attribute or more. • For the independent task, have a range of two-and-three-dimensional shapes available.
Independent Tasks	Draw each of these shapes.

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	You might need to make a lot of drawings of them until your picture really looks like the shape. Describe each shape by labelling it as accurately as you can or using geometrical language.
Anticipations	

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Task 12 (optional)	Ravi has bought this piece of tapa to school to show all his friends. He notices that the Fijian artists in his family have used a lot of geometric patterns in their design.  What are some of the geometric shapes he shows them? What do you notice about them? Can you identify some shapes which look like triangles but are not? Be ready to explain and justify why you think they are not triangles.
Big ideas	Two-and-three dimensional objects with or without curved surfaces can be described, classified, and analysed by their attributes. Shapes have sides that are parallel, perpendicular, or neither. Shapes have line symmetry, rotational symmetry, or neither. Shapes are similar, congruent, or neither.
Curriculum links	**GM1-2:** Sort objects by their appearance. **GM2-3:** Sort objects by their spatial features, with justification. **GM3-4:** Represent objects with drawings and models.
Learning Outcomes: Students will be able to:	• Recognise shapes in their environment. • Sort objects in a variety of ways. • Explain and justify how shapes are similar using non-geometrical and geometrical language. • Explain and justify how shapes are different using non-geometrical and geometrical language. • Use geometrical language to describe two-dimensional shapes according to their attributes.
Mathematical language	Square, rectangle, attribute, 2-dimensional, 3-dimensional, shape, sort, describe, side, equal, size, colour, big, small, bigger than, smaller than, straight, congruent, half, collinear, corners, angles,

	sides, vertical, horizontal, symmetrical, halves, quarters, column, row, array, face, curved, edge, corner, sphere, cylinder, cube, cuboid, triangle, quadrilateral, hexagon, sharp corners, blunt corners, equilateral triangle, square corner, rhombus.
Sharing back/Connect	Select students to share who are able to identify and annotate the different shapes on the tapa. **Connect:** In pairs make a train using only triangles or quadrilaterals with carriages with only one different attribute.
Teacher Notes	• Have available pictures of the tapa that students can annotate (See Copy Masters booklet). Also have sets of triangles and quadrilaterals for the students to use to make trains. • Facilitate the students to notice that the corners stay the same size, but the sides change lengths and that all sides are straight. • For the independent task, students complete the assessment task.
Independent Tasks	Complete the following assessment tasks (attached at the end of the document) as the independent activity: • GS2 : Geometry – Shape GS3
Anticipations	

DMIC

DEVELOPING MATHEMATICAL INQUIRY COMMUNITIES
ASSESSMENT TASK

GEOMETRY: SHAPE: LEVEL 1 Task GS3

Sort these shapes into groups. Explain why you grouped them together using the language of geometry.