DEVELOPING MATHEMATICAL INQUIRY COMMUNITIES

Geometry – Shape and Space

Level 2 (Year 3/4)

Teacher Booklet

Level 2 Year 3/4: Geometry – Space and Shape

Task 1	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. **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, face, curved, edge, corner, sphere, cylinder, cube, cuboid, triangle, quadrilateral, hexagon, sharp corners, blunt corners, equilateral triangle, square corner, rhombus, parallelogram, kite, trapezoid, isosceles trapezoid.
Sharing back/Connect	Select students to share who are able to explain and justify their groupings of the shapes and identify similarities and differences in relationships across the shapes. **Connect:** Can you explain the similarities and differences between triangles, quadrilaterals and hexagons?
Teacher Notes	• 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 angles. • Monitor for students using vocabulary which is everyday maths language and revoice using the language of geometry. • 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. 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.

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	7. On your paper draw without looking at the picture a 2 by 2 large square made up of the 4 smaller squares. On your paper draw without looking at the picture a 2 by 2 large square made up of the 4 smaller squares.
Anticipations	

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Task 2	Mary is playing a game with her sister Anne. She says "I drew a shape with 4 sides. You draw what my shape might look like." Draw the shape you think Anne drew and compare it with other children in your group. What do you notice about what is the same? What is different? Now Mary says, "I used two smaller shapes both the same to cover my larger shape." If her shape looks like this what might the smaller shapes look like?  Compare your two shapes with other children in your group. What do you notice about what is the same? What 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.
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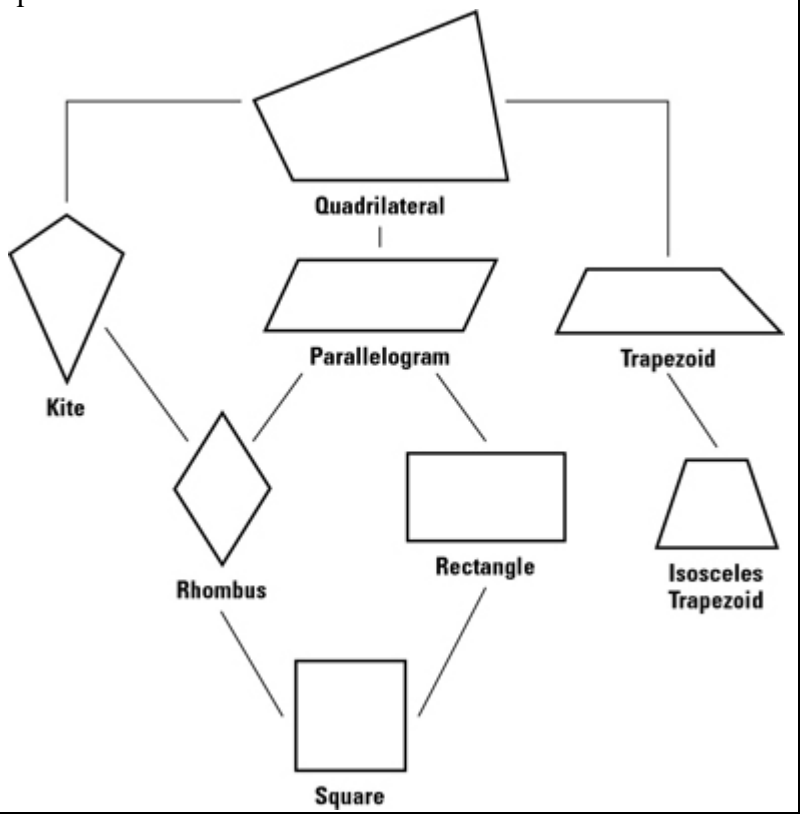
Sharing back/Connect	Select students to share who can identify the attributes of quadrilaterals and explain the relationships between the different types. **Connect:** If Anne asked you to explain what a square was, what would you say? What about if she asked you what the difference was between a square and a rectangle. What would you say?
Teacher Notes	• Have available cut out rectangles for the second part of the problem and scissors. • In the first section of the lesson notice students who draw different 4-sided representations. Identify what type of quadrilateral they have drawn and their attributes. Discuss the common attributes and draw attention to the relationships across them. In the second part of the lesson note the students who cut the rectangle into squares. Discuss with students the concept of a square as a special case of rectangles. Discuss the common attributes and draw attention to the relationships across them. • 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. 

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	• For the independent task, have available large pieces of paper and drawing materials. Sandboxes, dotty paper and grid paper could also be available. 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 4 by 3 shape looks like which is made of 12 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 4 by 1 shape, the 4 by 2 shape and the 4 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	

Task 3	Georgia is looking at the geometric patterns on some wrapping paper her mother is using.  What do you think she notices about all the shapes on the wrapping paper that are the same? That are different? Georgia tells her mother that the artist who designed both pieces of wrapping paper used only quadrilaterals. Her mother says that she can see lots of different shapes and they all have different names, but they are also all called 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 from other quadrilaterals?
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.

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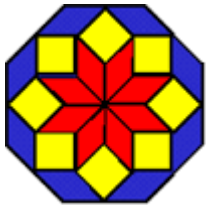
Mathematical language	Square, rectangle, attribute, 2-dimensional, 3-dimensional, shape, sort, describe, side, equal, size, colour, big, small, bigger than, smaller than, straight, congruent, half, collinear, corners, angles, sides, vertical, horizontal, symmetrical, halves, quarters, face, curved, edge, corner, sphere, cylinder, cube, cuboid, triangle, quadrilateral, hexagon, sharp corners, blunt corners, equilateral triangle, square corner, rhombus, parallelogram, kite, trapezoid, isosceles trapezoid.
Sharing back/Connect	Select students to share who can identify the attributes of quadrilaterals and explain the relationships between the different types. **Connect:** Draw two different types of quadrilaterals which share two common attributes. Be ready to use the language of geometry to explain their relationship and how they are the same and how they are different.
Teacher Notes	• During the launch, ask the students to write down everything they know about squares. Discuss and explore their responses. • Have available a chart of the 8 types of quadrilaterals for students to use as required. Also have the pictures of the wrapping paper available for students to annotate as needed (See Copy Masters booklet). • Facilitate the students to notice the relationships between the different types of quadrilaterals in terms of their differences and similarities. • Monitor for students using everyday vocabulary and revoice using the language of geometry.
Independent Tasks	Zahra is looking closely at the clever geometric patterns in the tile at the mosque she goes to with her family.  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. 1. Can you write why her mother said that? Make sure that you write everything you know about quadrilaterals. 2. Can you find the different sorts of quadrilaterals her mother named? Write how they are the same? Write how they are different.

	Draw pictures of the quadrilaterals she did not see. Write how they are the same? Write how they are different.
Anticipations	

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Task 4	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. **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, face, curved, edge, corner, sphere, cylinder, cube, cuboid, triangle, quadrilateral, hexagon, sharp corners, blunt corners, equilateral triangle, square corner, rhombus, parallelogram, kite, trapezoid, isosceles trapezoid.
Sharing back/Connect	Select students to share who can explain and justify the groupings they have used and identify relationships across them. **Connect** (See Copy Masters booklet for enlarged image of pattern)**:** The design of pattern on this Polynesian material uses three sided shapes. Are they all triangles? Why or why not?

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	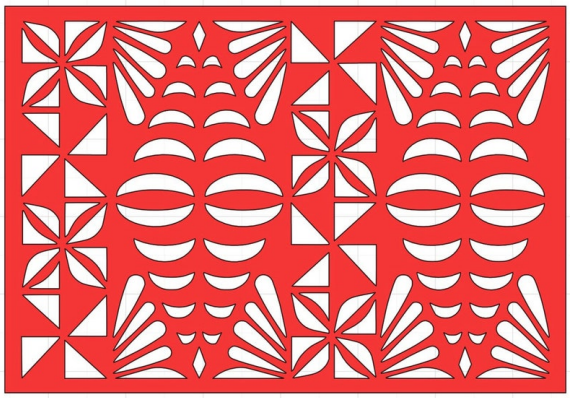 What makes a triangle a triangle?
Teacher Notes	• Have sets of different triangles available for the students to sort and group (See Copy Masters booklet). • In the lesson have the students sort and re-sort the different triangles while discussing what is the same and what is different about them. • 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 a collection of cuboids, cylinders and spheres.
Independent Tasks	Sort your objects into cuboids, cylinders, and spheres. Talk with a partner about why they are cuboids, cylinders, and spheres. Play a game with your partner of "guess what I have behind my back". Hide one of your shapes behind your back. Describe it to your partner. They have to draw it and say whether it is a cuboid, cylinder or sphere. Take turns doing this/ What do you notice?
Anticipations	

Task 5	Designers who make patterns for material sometimes use different geometric shapes. In these different samples of material, the designers have used different types of triangles.  Can you identify the different triangles they have used in their design? In your group discuss the attributes of each triangle you identify. What attributes are the same? What attributes are different? Have some triangles only got one attribute the same? Have some triangles only more than one attribute the same?
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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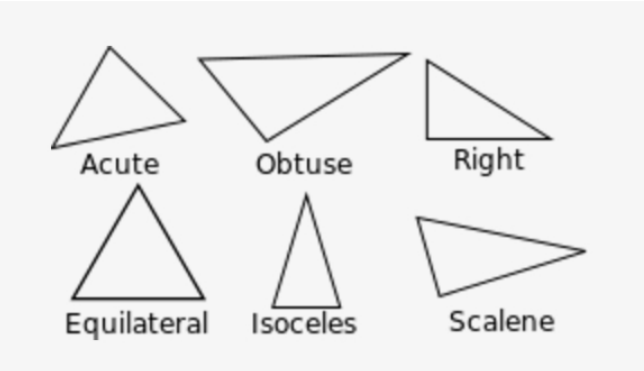
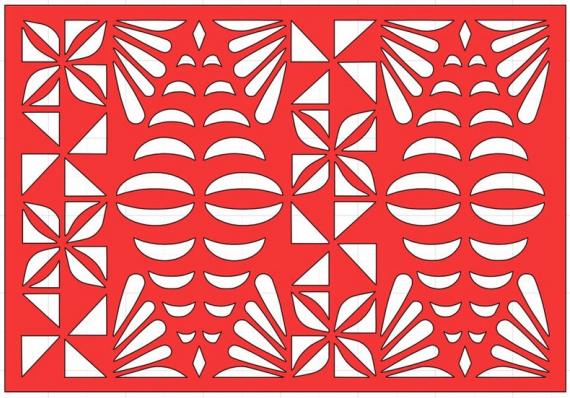
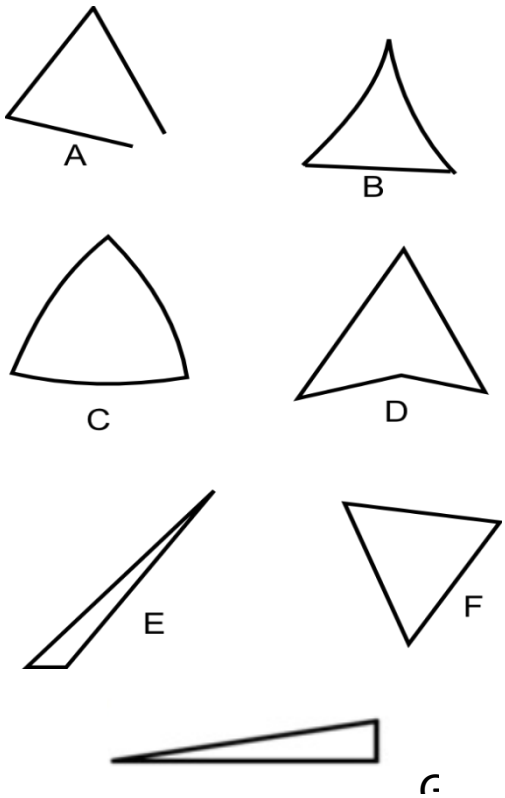
Sharing back/Connect	Select students to share who can explain and justify the attributes of the different triangles and can identify and describe the relationships across them. **Connect:** Use a cardboard corner to explore whether the angles in the different triangles are bigger or smaller than a corner angle (90 degrees). What can you say about how bigger or smaller angles change the triangle?
Teacher Notes	• During the launch, use triangles and quadrilaterals to make a train. Students in turn select a 2D shape and add a carriage which has one attribute in common with the one in front. • Have sets of different triangles available for the students to sort and group (See Copy Masters booklet). • Facilitate the students to notice that there are 6 main types of triangles. These include the following: 

	Each triangle has a distinct shape and properties. • For the independent task, students will need the picture below, or a similar picture.
Independent Tasks	The design of pattern on this Polynesian material uses three sided shapes. Are they all triangles? Why or why not?  What makes a triangle a triangle? Write down everything else you know about the other shapes on this material.
Anticipations	

Task 6	Another task for you great shape sorters. Here is a set of shapes. In your group can you decide which shapes are triangles? Be ready to explain and justify why they are triangles. Use your clever thinking to come up with a list of attributes that is shared by all triangles. 
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	• Group and classify different shapes together and explain why they are different using 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 can explain and justify the attributes which make up the different triangles and can identify and justify why some are not triangles **Connect:** Can you describe what makes all triangles, triangles.
Teacher Notes	• Facilitate the students to notice that all triangles have identical attributes. • For the independent task, have available a wide variety of 3D shapes.
Independent Tasks	Choose two different shape objects and explain the relationships between them. Record the similarities and differences between the shapes. Choose another two different shape objects and explain the relationships between them. Record the similarities and differences between the shapes.
Anticipations	

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Task 7	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? Be ready to explain and justify why you sorted them into the different 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 can explain and justify using everyday language and the language of geometry how the different objects are the same and/or different. **Connect:**

	Choose two different shaped objects and explain the relationships between them. Make sure that you can describe the similarities and the differences.
Teacher Notes	• Provide students in groups with a collection of common objects from their environment and have them talk with each other about what they notice about them. 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. Also 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. • Monitor for students using vocabulary related to 3D shapes. • For the independent task, have available a wide collection of different 3D shapes and dot or grid paper (See Copy Masters booklet for dot and grid paper).
Independent Tasks	Look at these three-dimensional objects. Draw each of the objects until they are exact. Write down everything you know about each object you have drawn. Write down what makes the object three-dimensional.
Anticipations	

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Task 8	Make up a chart (See Copy Masters booklet for printable version) to describe each of these 3D shapes. Record on your chart the name of the solid and a 3D drawing of it, the number of faces it has, the number of edges it has, the number of corners it has.
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 have identified the attributes of the 3D shapes. **Connect:** Draw the 3D solid I am describing: It has 6 faces, 12 edges and 8 corners. It has 2 flat faces, 1 curved face, 2 curved edges.
Teacher Notes	• During the launch, have students choose a 2D shape and describe its attributes. • Have solid 3D shapes including some common objects found in the home (cans, balls, boxes etc.) • Facilitate the students to notice and describe the relationships between the 3D shapes.

	• For the independent task, the students will need a copy of the siapo below (See Copy Masters booklet).
Independent Tasks	Anshuma 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? Record your thinking.
Anticipations	

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Task 9	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.
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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 geometrical language. • Group and classify different shapes together and explain and justify why they are different using 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:**

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	Predict which of these nets will fold and make a cuboid. What attributes are important to make a net for a box shaped like a cuboid?
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 10	Your turn to be a designer. Your first task on your new job as a designer is to draw the net for a cube. Do not put flaps or anything else just draw the net you think can be folded to make a cube. When you have finished cut the net out and test it. Does it fold to make a cube? When you have completed one net act like the true designer you are and test out whether there is more than one way to draw the net for a cube.
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. • 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 geometrical language. • Group and classify different shapes together and explain and justify why they are different using 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, face, curved, edge, corner, sphere, cylinder, cube, cuboid, rectangular prism, triangle, quadrilateral, hexagon, sharp corners, blunt corners, equilateral triangle, square corner, rhombus, parallelogram, kite, trapezoid, isosceles trapezoid.

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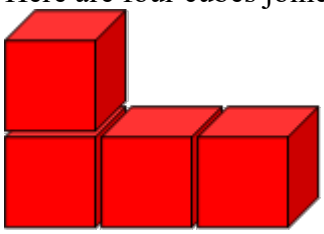
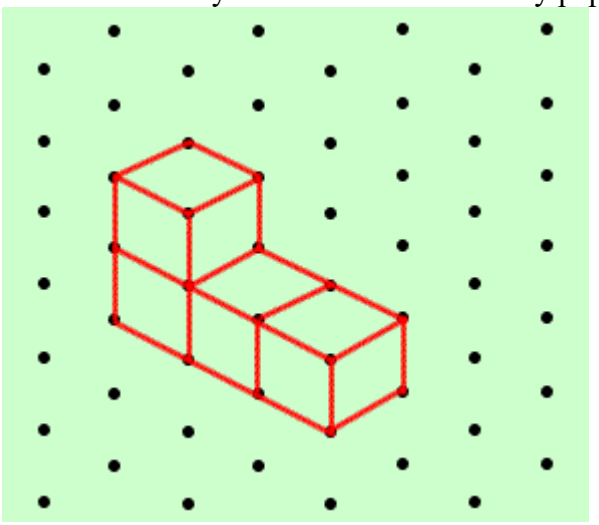
Sharing back/Connect	Select students to share who can describe the attributes of a net for a cube. **Connect:** Predict which of these nets will fold and make a cube. Describe the attributes that are important to make a net for a box shaped like a cube?
Teacher Notes	• Have cardboard, scissors, and Sellotape available. Have different templates for cubes, 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 available a selection of three-dimensional objects.
Independent Tasks	Choose a 3-D object. Draw the object and label its attributes. Design the net for the object. Use the net to make the model. Test the model to see if it is exactly the same as the object you have selected.
Anticipations	

Level 2 Year 3/4: Geometry – Space and Shape

Task 11 (optional)	Let's work in the Third Dimension. Here are four cubes joined together.  Here is what they look like drawn on dotty paper  How many other ways can you arrange the cubes? When you complete the arrangement draw what they look like on dotty paper.
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. • 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.

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	• Group and classify similar shapes together and explain and justify why they are similar using geometrical language. • Group and classify different shapes together and explain and justify why they are different using 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, face, curved, edge, corner, sphere, cylinder, cube, cuboid, rectangular prism, triangle, quadrilateral, hexagon, sharp corners, blunt corners, equilateral triangle, square corner, rhombus, parallelogram, kite, trapezoid, isosceles trapezoid.
Sharing back/Connect	Select students to share who are able to rearrange the cubes within three dimensional ways and represent these as 3D drawings **Connect:** Draw a 3D representation of an arrangement of 5 cubes and then arrange the cubes to match. What did you consider as you drew the arrangement in the third dimension?
Teacher Notes	• Have available isometric paper (See Copy Masters booklet) and cubes. • Facilitate the students to notice that all faces are square, and all angles are right angles and that there are 6 faces. • For the independent task, have different colour multilink or similar blocks available.
Independent Tasks	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.
Anticipations	

Level 2 Year 3/4: Geometry – Space and Shape

Task 12 (optional)	Mahine has bought this beautiful piece of siapo to school today to show her class. Her teacher asks the children to describe all the attributes of the different geometric shapes they can see. Can you write all the different things they described? 
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. • 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, face, curved, edge, corner, sphere, cylinder, cube, cuboid, rectangular

	prism, triangle, quadrilateral, hexagon, sharp corners, blunt corners, equilateral triangle, square corner, rhombus, parallelogram, kite, trapezoid, isosceles trapezoid.
Sharing back/Connect	Select students to share who are able to describe the attributes of all the different shapes using the language of geometry **Connect:** Explore the angles on the repeating shapes on the siapo and discuss whether they get bigger as the sides increase.
Teacher Notes	• Facilitate the students to notice that as the sides of the triangle increase (get longer) but the degree of the angle remains the same. • Monitor for students using vocabulary which is related to the mathematical language of geometry • 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: • GS1A : Geometry – Shape
Anticipations	

DMIC

DEVELOPING MATHEMATICAL INQUIRY COMMUNITIES
ASSESSMENT TASK

GEOMETRY - SHAPE: LEVEL 2 Task GS1A

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