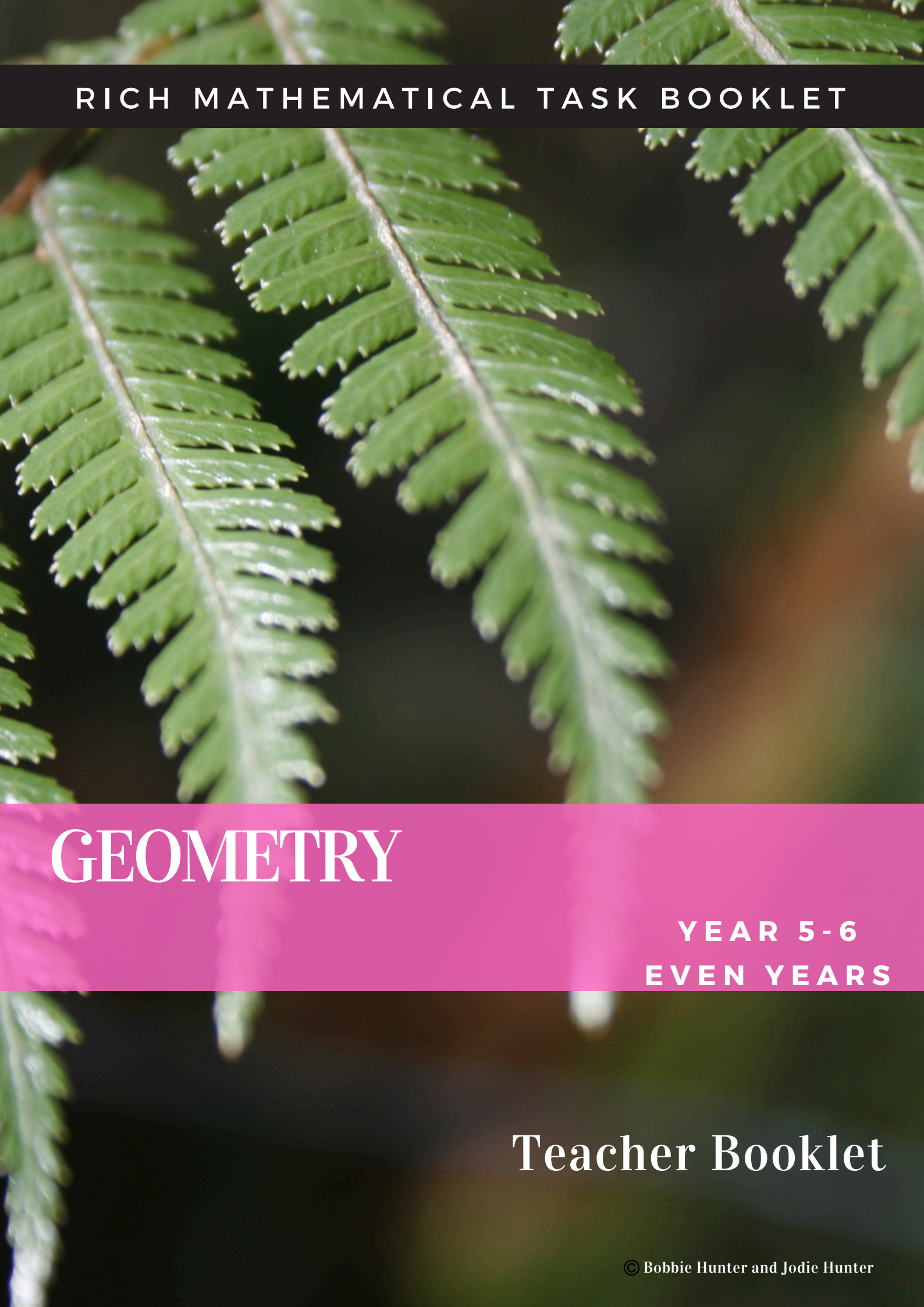


RICH MATHEMATICAL TASK BOOKLET

# GEOMETRY

YEAR 5-6
EVEN YEARS

## Teacher Booklet

## Task 1

Decide on a criteria to sort these shapes.

What other criteria could you use to sort the shapes?

## Teacher Notes

Have available for each pair of students a variety of 2D shapes including different types of triangles. NOTE: These first tasks are similar to last years booklet, use your teacher judegement to decided what shapes to use in the first three tasks. You may use this task to explore what studens already know about shapes and then adjust the following tasks to teach new shapes and new language.

Facilitate the students to notice that shapes can be sorted by different attributes. For this task students could sort by: odd + even number of sides, edges, vertices, angles, quadrilaterials + non quadrilaterals etc.

Monitor for students who use sophisticated descriptions of shapes and revoice using geometric terms.

Refer to the quadrilateral chart (copy masters) if needed to support the sorting.

For the independent task, allow the students access to devices or use the information sheet attached in copy masters to explore the different types of triangles.

## Shareback

Select students to share who have used different properties to group the shapes.

## Connect

What do you notice are the similarities and differences in the categories used to sort the shapes.

Ensure language such as polygons, quadrilaterals are correctly used in explanations.

## 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

***End of Year Six***
*Identify, classify, and explain similarities and differences between:*
*2D shapes, including different types of triangle prisms and pyramid*

## Suggested Learning Outcomes

Identify and sort shapes in a range of different ways using geometrical language to explain and justify grouping.

## Independent Tasks

Look at the ngatu.
Are all the three-sided shapes on this piece of ngatu triangles?
Why or why not?
Using the triangle information sheet, explain and justify using all the three sided figures on this piece of ngatu.

## Mathematical Language

*Properties, square, rectangle, attribute, 2-dimensional, 3-dimensional, shape, side, equal, size, smaller than, straight, parallel, congruent, collinear, angles, vertices, vertex, sides, vertical, horizontal, diagonal, symmetrical, face, curved, edge, corner, sphere, cylinder, cube, cuboid, rectangular prism, triangle, quadrilateral, hexagon, equilateral triangle, square corner, right angle, rhombus, parallelogram, kite, trapezoid, isosceles trapezoid.*

# Anticipations

Solutions, Misconceptions

## Task 2

Sort these polygons into different groups by their properties.

What do you notice about their properties?
Come up with a list of attributes you have decided are shared by all the polygons each set?

Explain and justify your list of attributes shared by the polygons in each set.

What are the common properties across the whole set of polygons?
What differences are there in the properties across the whole set of polygons?

## Teacher Notes

As a starter, challenge the students with a "Can you make it?" activity in which they draw what is described.
A shape with four sides, no parallel lines, and at least one square corner.
A shape with one pair of parallel lines and no lines of symmetry.
A shape with two pairs of parallel lines and exactly two square corners.
A shape with only acute angles
A shape with no square corners but at least one line of symmetry.

During the launch give each group some popsicle sticks, ask them to make a shape with three sides and draw it. Then add another posicle stick and draw the shape (compare shapes across groups), repeat this adding an additional stick each time.

Have sets of the polygons ready for sorting and grouping. These can be either as 2D wooden blocks or card representations (from task one)

Facilitate the students to notice that all polygons are 2D closed plane figures with three or more sides that are all straight. Poly means many and that there are infinite number of polygons.

Notice students who identify the number of sides of the polygon, the angles between the sides of the polygon and the length of the sides of the polygon. Use their observations to name them as regular or irregular.

For the independent task students will create polygon posters describing shapes.

## 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

***End of Year Six***
*Identify, classify, and explain similarities and differences between:*
*2D shapes, including different types of triangle prisms and pyramid*

## Shareback

Select students to share who are able to sort and classify according to the properties of polygons.

## Connect

We know that polygons are 2D shapes but what would you say if someone told you that all 2D shapes are polygons?

As part of your argument be ready to explain and justify a description of polygons.

## Suggested Learning Outcomes

Use geometrical language to explain and justify classification and properties of shapes.

Use commonly shared rules to communicate ideas about defining shapes.

Identify and explain relationships between shapes, including similarities and differences

## Independent Tasks

Regular polygons are shapes that have all sides equal in length and all inside angles are equal.

Irregular polygons are 2-D shapes that have straight sides that are not equal to each other and angles that are not equal to each other.

Make a poster or information sheet to show some of the many polygon. Include drawings of the shapes.

## Mathematical Language

*Properties, square, rectangle, attribute, 2-dimensional, 3-dimensional, shape, side, equal, size, smaller than, straight, parallel, congruent, collinear, angles, vertices, vertex, sides, vertical, horizontal, diagonal, symmetrical, face, curved, edge, corner, sphere, cylinder, cube, cuboid, rectangular prism, triangle, quadrilateral, hexagon, equilateral triangle, square corner, right angle, rhombus, parallelogram, kite, trapezoid, isosceles trapezoid, polygon, regular, irregular, pentagon, hexagon, heptagon, octagon.*

# Anticipations

Solutions, Misconceptions

## Task 3

What do you notice about the shape of these different things?

Sort the things into groups which are the same.

Sort the things into groups which are different.

Explain and justify how you have sorted the things into different groups.

## Teacher Notes

Provide students in groups with a collection of structured 3D shapes and a collection of common objects from their environment and have them talk with each other about what they notice about them (See Copy Masters booklet).

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.

Facilitate the students to group and sort the shapes based on the cross section shape. Cross section is the shape that you see when you slice through a 3D object. The shape of the cross-section depends on the shape of the 3D object and the angle at which it's sliced.

## Shareback

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.

## 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

***End of Year Six***
*Identify, classify, and explain similarities and differences between:*
*2D shapes, including different types of triangle prisms and pyramid*

## Connect

Someone said that all 3D shapes are made from 2D shapes. How would you respond to that? Think about the attributes of a square and the attributes of a cube. How are these related? Could any other 2D shape be used to construct a cube? Why or why not?

## Suggested Learning Outcomes

Use geometrical language to explain and justify classification and properties of shapes.

Explain how solid shapes have fixed-cross sections and can be classified by their cross-section.

## Independent Tasks

Cross Section: This is the shape you get when you slice through a 3D object. For example, if you slice a loaf of bread, the flat surface you see is a cross section.

Draw the cross section that that would result from the slice described.

a) cube sliced parallel to the base
b) sphere sliced through the centre
c) cone sliced parallel to the base
d) cylinder sliced lengthwise
e) pyramid sliced parallel to the base
f) rectangular prism sliced diagonally

## Mathematical Language

*Properties, square, rectangle, attribute, 2-dimensional, 3-dimensional, shape, side, equal, size, smaller than, straight, parallel, congruent, collinear, angles, vertices, vertex, sides, vertical, horizontal, diagonal, symmetrical, face, curved, edge, corner, sphere, cylinder, cube, cuboid, rectangular prism, triangle, quadrilateral, hexagon, equilateral triangle, square corner, right angle, rhombus, parallelogram, kite, trapezoid, isosceles trapezoid, polygon, regular, irregular, pentagon, hexagon, heptagon, octagon, equilateral, scalene, acute angle, obtuse angle*

# Anticipations

Solutions, Misconceptions

## Task 4

Poppy noticed that “the interior (inside) angles in a triangle adds up to 180 degrees and the angles in a quadrilateral adds up to 360 degrees"

She said she could prove this by cutting the angles within the shapes and gluing them in a line to show 180 degrees and 360 degrees.

Using all of the triangles and quadrilaterals, test this theory. What do you notice?

## Teacher Notes

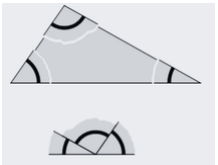
During the launch. Have the students stand with an arm out and rotate 180 degrees and 360 degrees.

Represent this on the board to demonstrate 180 =  and 360 degrees.

Prompt the students to take a triangle and rip the corners off.

Taking the corners (angles) the students are to glue them on a line.

Repeat this with the variety of traingles.



Then move onto the quadrilaterals. Taking the corners off to show the angles add to 360 degrees.

## Shareback

Select students to share that can explain how the angles in their shapes equal 180 degrees or 360 degrees.

## Connect

Show the image of the triangle.

Prompting the students: if we know that the internal angles add together to be 180 degrees, what is the size of the unknown angle?

## 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

***End of Year Six***
*Identify and describe the interior angles of triangles and quadrilaterals.*

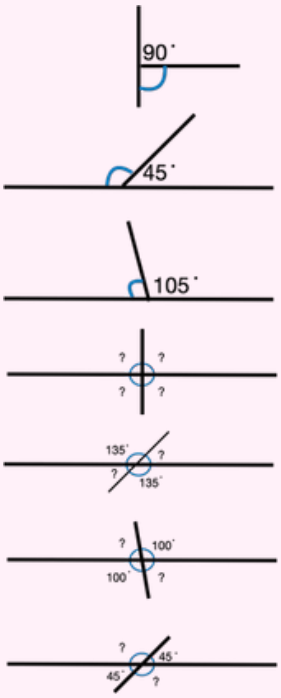
## Suggested Learning Outcomes

Explain interior angles of quadrilateral and triangle.

## Independent Tasks

Finish the statements.
On a straight line angles add up to ____
Angles around a point add up to _____

Now calculate the missing angles.




## 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.*

# Anticipations

Solutions, Misconceptions

## Task 5

When the box makers were designing these cuboids, they drew a 2D representation of their net. What 2D shapes did they draw?

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.

## Teacher Notes

During the launch, use the geometric quick images (See quick images PDF for ideas).

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 3d shapes available.

## Shareback

Select students to share who are able to explain and justify the attributes of a cuboids and can approximate these as a net.

## Connect

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?

## Big Ideas

*Two-and-three dimensional objects with or without curved surfaces can be described, classified, and analysed by their attributes.*

## Curriculum Links

***During Year 5***
*visualise 3D shapes and connect them with nets, 2D diagrams, verbal descriptions, and the same shapes drawn from different perspectives.*

***During Year 6***
*visualise and draw nets for rectangular prisms.*

## Suggested Learning Outcomes

Create 2-dimensional drawings of 3-dimensional models.

Draw objects which can take the form of plane views of nets.

Use commonly shared rules to communicate ideas about defining shapes.

## Mathematical Language

*3D, 3 dimensional, cube, box, sides, flaps, net, plane view, 2 dimensional.*

## Independent Tasks

Make up a chart to describe each of these 3D shapes.
Record on your chart:

1) the name of the solid and a 3D drawing of it
2) the number of faces it has
3) the number of edges it has
4) the number of corners it has.
5) the 2D shapes that make the 3D shape

# Anticipations

Solutions, Misconceptions

# Task 6

A chocolate company have a competition currently running for schools around New Zealand. Schools are competing to see who can design the best packaging for a new series of chocolate that they have created.

Work in your group to design at least two different nets for each chocolate bar below.

Make sure that you can all explain and justify why the nets you designed would be suitable for each different chocolate bar.

## Teacher Notes

Facilitate the students to notice that you need to consider the height, length and width of 2D shapes to make 3D shapes. Have students consider how the angles change according to the shapes.

Have cardboard, scissors, and Sellotape available and encourage the students to use the inside of these to test out their different nets.

For the connect have students discuss what they notice. A ball is spherical, it's shaped like a sphere-a 3D version of a 2D circle. Traditional soccer balls are made from two 2D shapes, pentagons and hexagons as part of their 32 panel design.

For the independent task, have dotty paper available and interlinking cubes or similar

## Shareback

Select students to share who are able to explain and justify the attributes of the different nets for the different shapes they have constructed.

## Connect

Here are some soccer balls.

Imagine you had to draw the net of a soccer ball. What 2D shapes would you use? How many of each would there be?

## Big Ideas

*Two-and-three dimensional objects with or without curved surfaces can be described, classified, and analysed by their attributes.*

## Curriculum Links

***During Year 5***
*visualise 3D shapes and connect them with nets, 2D diagrams, verbal descriptions, and the same shapes drawn from different perspectives.*

***During Year 6***
*visualise and draw nets for rectangular prisms.*

## Suggested Learning Outcomes

Create 2-dimensional drawings of 3-dimensional models.

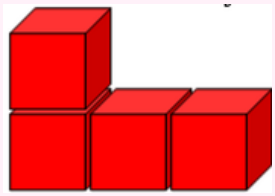
Draw objects which can take the form of plane views of nets.

## Mathematical Language

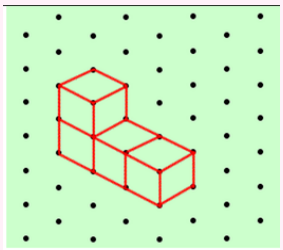
*3D, 3 dimensional, cube, box, sides, flaps, net, plane view, 2 dimensional.*

## Independent Tasks

Here are four cubes joined together.



Here is what they look like drawn on dotty paper



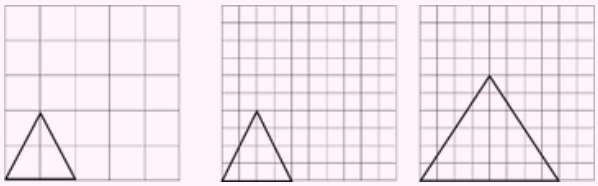
How many other ways can you arrange the cubes? When you complete the arrangement draw what they look like on dotty paper.

Explore other 3d shapes that you draw using dotty paper.

# Anticipations

Solutions, Misconceptions

## Task 7



How can the first triangle be enlarged by remain as a triangle?

Enlarge the second triangle by a scale factor 2.

How can the thrid triangle be reduced but remain as a triangle?

## Teacher Notes

Have available grid paper and the different sized triangles (see copy masters).

Facilitate students to notice that when you resize a shape it gets bigger or smaller, but it still looks similar (not congruent). All angles stay the same, relative sizes are the same (in proportion)

Notice students who recognise that enlarging and reducing uses specific factors (factor of 2 as an example).

## Shareback

Select to share students who are able to explain and justify their enlargements using correct factors.

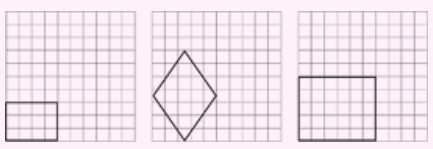
## Connect

What are the important factors related to resizing (enlarging and reducing) a shape? Why?

## Suggested Learning Outcomes

Explain enlargement as how an object/image can be made bigger or smaller using a scale factor.

## Independent Tasks



Enlarge each shape by a scale factor of 2.

Reduce each shape by a scale factor of ½.

## Big Ideas

*Transformations provide a significant way to think about the ways properties change or do not change when a shape is moved on a plane.*

## Curriculum Links

***During Year 5***
*resize (enlarge or reduce) a 2D shape*

***During Year 6***
*visualise, create, and describe 2D geometric patterns and tessellations, using rotation, reflection, and translation and identifying the properties of shapes that do not change*

## Mathematical Language

*enlarge, factor, reduce, scale grid.*

# Anticipations

Solutions, Misconceptions

## Task 8

Some children are playing with a box of capital alphabet letters. Their job is to explore what happens when they each do a different movement with them. One child needs to put their letter on the table right way up, the next one rotates their letter a half turn, the next flip it sideways, the last child flips it from top to bottom.

Your challenge as a group is to use three of the same alphabet letter and repeat their movements. Draw the letter after each movement and discuss the angle turn you have used.

Explore other letters and be ready to explain and justify what your group discovered.

## Teacher Notes

Have available multiple sets of alphabet letters which the students can cut out and use - See Copy Master.

Facilitate the students to notice that rotational symmetry is the property a shape has when it looks the same after some rotation by a partial turn. The number of times it looks the same through a full 360-degree turn is called the order of rotational symmetry. For example, a regular hexagon has a rotational symmetry of order 6.

Notice students who recognise that rotation means turning around a centre point while the distance from the centre to any point on the shape stays the same. Some students might also recognise that there is point symmetry. That means it looks the same upside down or from any two opposite directions. Point symmetry is when every part has a matching part: the same distance from the central point but in the opposite direction.

For the independent task have irregular shapes available for students to use (use shape masters from an earlier task).

## Shareback

Select students to share who are able to use representations to explain and justify their reasoning.

## Connect

What happens to one of your letters if you do a half turn and then a flip?

Do any of the alphabet letters return to how they were originally? Why and how?

## Big Ideas

*A transformation is a way of moving a shape, and a shape that remains unchanged under a transformation is said to have symmetry.*

*Transformations provide a significant way to think about the ways properties change or do not change when a shape is moved on a plane.*

## Curriculum Links

***During Year 5***
*resize (enlarge or reduce) a 2D shape*

***During Year 6***
*visualise, create, and describe 2D geometric patterns and tessellations, using rotation, reflection, and translation and identifying the properties of shapes that do not change*

## Suggested Learning Outcomes

Explain transformation as a way of moving a shape

Describe how a shape that stays the same under transformation has symmetry.

Recognise that turns around a point can be described and recorded as a quarter, half, full turn or rotation or an angle.

Explain that angles are linked with slides (translations) to create paths.

## Independent Tasks

Explore these different movements using irregular shapes.

First put a shape on the table right way up, then rotate the shape a half turn, the next flip it sideways, then flip it from top to bottom.

Choose three irregular shapes. Draw the shape after each movement and discuss the angle turn you have used.

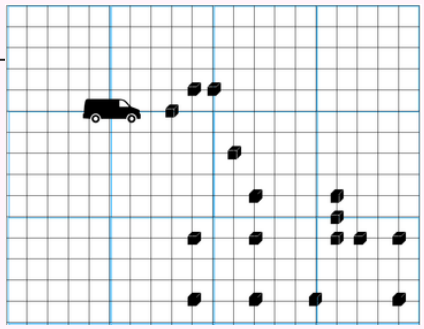
## Mathematical Language

*Reflection, mirror line, mirror symmetry, reflectional symmetry, line of symmetry, flipping, congruent, translation, sliding, rotation, turning, revolution, transformation, forward, backwards, right, left, front, back, clockwise, anticlockwise, full turn, half turn, quarter turn, 4-turn symmetry, congruence, path, angle, perspectives, bird's eye view, reverse, invert, obtuse, acute.*

# Anticipations

Solutions, Misconceptions

## Task 9



You are planning a delivery route to collect packages and return to the depot.

Using the grid, draw straight-line paths that travel only North, South, East, or West. You may use a maximum of ten lines to complete your journey.

Experiment with different routes to collect more packages.

Is it possible to collect every package?

Record the directions taken and explain how you improved your route.

## Teacher Notes

During the launch introduce the use of compasses. Have students develop benchmarks for where each direction is in relation to parts of their classroom and beyond. Link to the face of a clock and the angles of the hands on the face of the clock.

Have available small hand-held compasses.

Facilitate students to understand that they need to place the compass on the floor before getting a reading and that North is always North and that compass points are 90 degree turns.

## Shareback

Select students to share who can explain and justify the most direct route the children took to gather the most gems using the compass points.

## Connect

If you turn from North to West, what angle turn do you take? If you turn North to South, what angle turn do you take? What do you notice? How are compass points related to angles?

## Big Ideas

*Shapes can be described in terms of their location in a plane or space.*

*Coordinate systems can be used to describe these locations precisely.*

*The coordinate view of shape offers another way to understand certain properties of shapes.*

## Curriculum Links

***by the end of year Six***

*Interpret and create grid references and simple scales on maps › use directional language, including the four main compass points, turn (in degrees), and distance (in m, km) to locate and describe positions and pathways.*

*Create and use algorithms for making decisions that involve clear choices.*

## Suggested Learning Outcomes

Use a map to describe directions or map out a path on a map.

Follow and give directions involving turns (left and right) and compass directions (N,E,W,S).

## Independent Tasks

Make your own grid map of home and packages which need to be collected.

Make sure that it is solvable and then give it to your buddy to complete.

## Mathematical Language

*north, south, east, west, forward, rotate, turn, start, end*

# Anticipations

Solutions, Misconceptions

## Task 10

Using grid paper draw a map of an area you know well. Make sure that you have numbers down the side of your grid and use alphabet letters across the top. Put the names of all your group members in different places.

Mark on your map key points of interest. To the side of your map put a key (or legend) using simple symbols, signs, and colours to give others information about your map in a small space. Don't forget to put in where the compass directions are. These could include more specific compass points (for example, North-West).

Write a set of 10 statements about your map using the grid references, and compass points or angles and turns to indicate paths each person might take to go from one point of interest to another.

## Teacher Notes

Facilitate the students to know that map makers use signs and symbols on maps to enable a lot of information in a small space. This is termed a legend.

Notice students who realise the importance of the use of consistent scaling and signs and symbols.

Expect students at year five to use compass points in their statements, and year six students to begin to use degrees to describe turns.

For the independent task have a variety of maps with different legends and scales available. These could be electronic or physical. Alternatively, students could use their maps from this task to add more detail or complete their statements as the independent task.

## Shareback

Select students to share who are able to explain and justify their legend and their statements using a range of different abbreviated instructions.

## Connect

Explain the key points which mapmakers consider when constructing a map. Be ready to explain and justify why these are important?

Discuss the use of turning in angles, importance of using an accurate scale and distances.

## Big Ideas

*Coordinate systems can be used to describe these locations precisely.*

*The coordinate view of shape offers another way to understand certain properties of shapes.*

## Curriculum Links

***By the end of Year Five***
*interpret and create grid maps to plot positions and pathways, using grid references and directional language, including the four main compass points*

***By the end of Year Six***
*interpret and create grid references and simple scales on maps › use directional language, including the four main compass points, turn (in degrees), and distance (in m, km) to locate and describe positions and pathways.*

*Create and use algorithms for making decisions that involve clear choices*

## Suggested Learning Outcomes

Use a map to describe directions or map out a path on a map.

Follow and give directions involving turns (left and right) and compass directions (N,E,W,S)

## Mathematical Language

*north, south, east, west, forward, rotate, turn, start, end*

## Independent Tasks

Explore as many different types of maps as you can. With a buddy talk about their legend and scale.

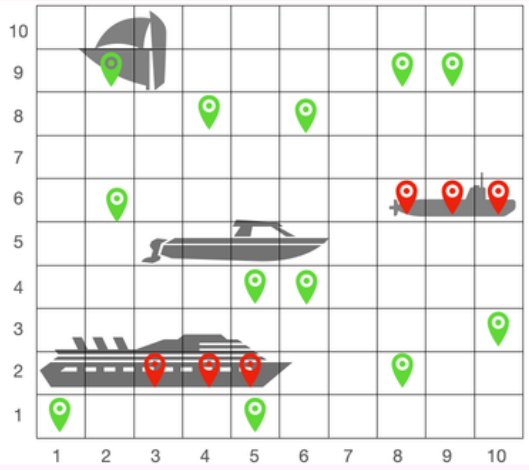
Make a list of all the different symbols in the different legends and the different scales.
Links to maps:
Northland https://www.topomap.co.nz/NZTopoMap?v=2&ll=-35.17555,173.14659&z=14
Auckland
https://www.topomap.co.nz/NZTopoMap?v=2&ll=-36.977807,174.785357&z=13
Christchurch
https://www.topomap.co.nz/NZTopoMap?v=2&ll=-43.571067,172.831764&z=12
Gisborne
https://www.topomap.co.nz/NZTopoMap?v=2&ll=-38.596248,178.019028&z=11
Taranaki
https://www.topomap.co.nz/NZTopoMap?v=2&ll=-39.571413,174.277968&z=15

# Anticipations

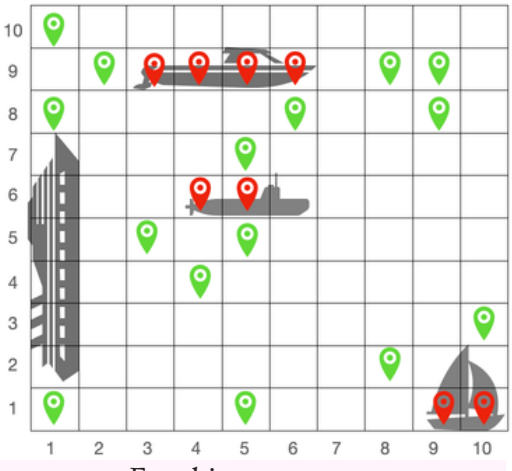
Solutions, Misconceptions

# Task 11

Cooper and Frankie are playing battleships.



Cooper



Frankie

Cooper thinks because he has hit and almost sunk three of Frankies boats he will win.
What are the remaining co-ordinates needed to both clear the boards?
Who is more likely to win and why?

## Teacher Notes

After launching the task, allow the students the time to explore co-ordinates (rather than telling them how to "read" co-ordinates).

Notice students who are able to correctly use co-ordinates correctly – going along the horizontal and then up the vertical. You may need to pause the class and get one group to share back how they are reading the co-ordinates before continuing further.

Introduce the students to the language of longitude and latitude.

For the independent task, provide students with grid paper.

## Shareback

Select students to share who are able to explain and justify the objects and different grid references they used.

## Connect

How are scale and grid references connected?

## Big Ideas

*Shapes can be described in terms of their location in a plane or space.*

*Coordinate systems can be used to describe these locations precisely. The coordinate view of shape offers another way to understand certain properties of shapes.*

## Curriculum Links

***By the end of Year Five***
*interpret and create grid maps to plot positions and pathways, using grid references and directional language, including the four main compass points*

***By the end of Year Six***
*interpret and create grid references and simple scales on maps › use directional language, including the four main compass points, turn (in degrees), and distance (in m, km) to locate and describe positions and pathways.*

## Mathematical Language

*north, south, east, west, longditute, latitude, co-ordinations*

## Suggested Learning Outcomes

Use coordinates (either letters or numbers) on maps to specify a location and direction

## Independent Tasks

You are going to play battleships using the 10x10 grid.

To play - each person take two grids (one to plot your ships, another to record your attempts).

Position your ships on your grid (colour in your squares grey) - these can only go vertically or horizontally. Your ships are 1x2, 1x3, 1x3, 1x4, 1x5 in size.

Once both partners have their ships on the course, take turns to read out co-ordinates to determine where each other's ships are.

Record your misses by colouring the square green and hits red.

First person to sink all their partners ships wins.

## Mathematical Language

*north, south, east, west, longditute, latitude, co-ordinations*

# Anticipations

Solutions, Misconceptions

# Task 12

You are an explorer. You can choose your own setting but you need to use a numbered grid, decide on a scale and have a legend.
You can also decide if you are exploring on land or on water.

Mark where you begin exploring on your map.

Provide 10 instructions to navigate your way across your map using your scale, legend and the grid labels.

## Teacher Notes

Before launching the task, ask students to provide an explanation for scale, legend and grid labels. Reinforce their prior learning from previous tasks.

Remind students of their co-ordination work the task prior.

Students could use technology to generate their Map.

Facilitate the students to notice the importance of clear instructions.

Once maps are created, swap between groups to allow students to trial each others routes.

## Shareback

Select students to share who are able to explain their maps or how they followed others directions.

## Connect

Write a question for someone else to answer using the map.
What was important about how you wrote your instructions? Why?

## Suggested Learning Outcomes

Identify and describe a location using coordinates, directions and distances.

## Independent Tasks

Assessment Tasks:
One: Shape Sorting
Two: Translations
Three: Maps

## Big Ideas

*Shapes can be described in terms of their location in a plane or space.*

*Coordinate systems can be used to describe these locations precisely. The coordinate view of shape offers another way to understand certain properties of shapes.*

## Curriculum Links

***By the end of Year Five***
*interpret and create grid maps to plot positions and pathways, using grid references and directional language, including the four main compass points*

***By the end of Year Six***
*interpret and create grid references and simple scales on maps › use directional language, including the four main compass points, turn (in degrees), and distance (in m, km) to locate and describe positions and pathways*

*Create and use algorithms for making decisions that involve clear choices .*

## Mathematical Language

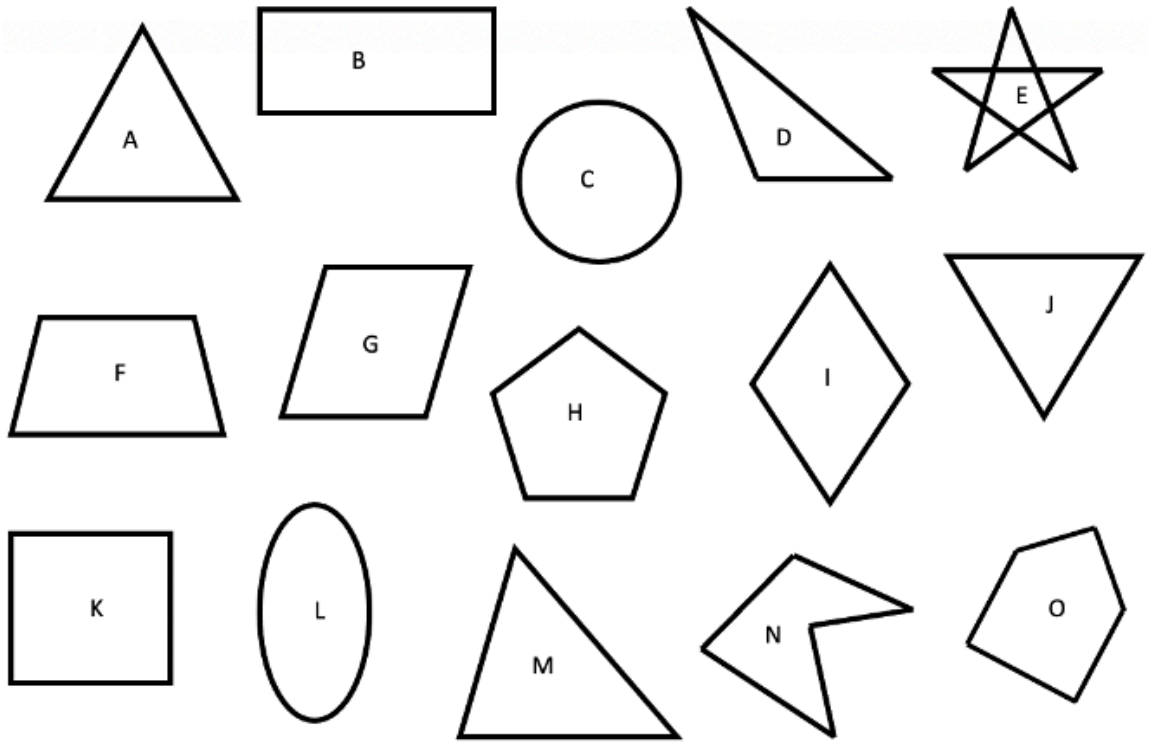
*north, south, east, west, longditute, latitude, co-ordinations*

# Anticipations

Solutions, Misconceptions

# Assessment Task  1 - Shape - Year 5-6

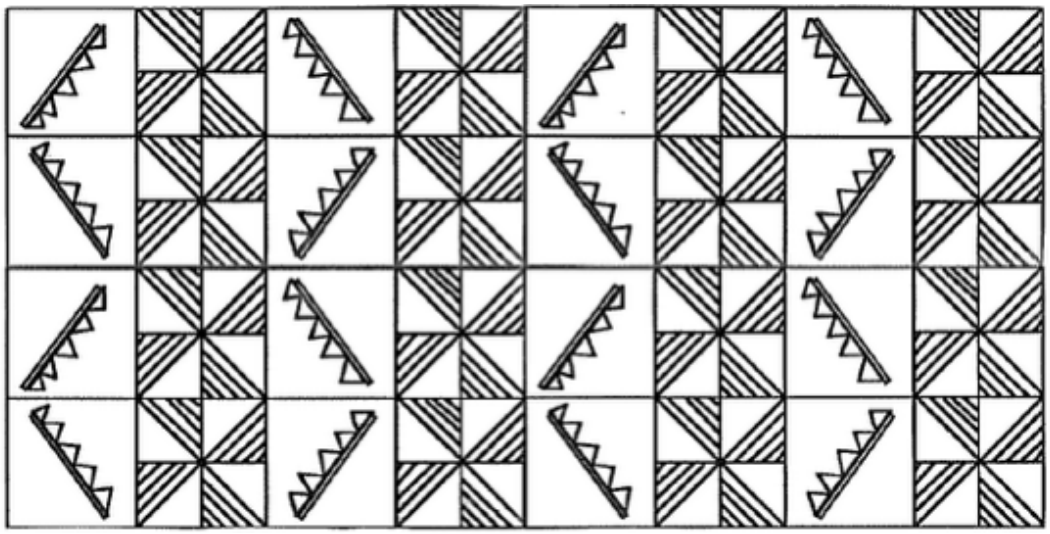
GEOMETRY: SHAPE:
Here is a set of shapes. Sort them into groups and provide a description of the properties of the groups using geometrical language. This could include types of lines, angles, and sides.



# Assessment Task  2 - Spatial Reasoning - Year 5-6

GEOMETRY: Spatial Reasoning:

Use the language of geometry to describe the picture below. Use words like reflection, rotation, translation, and symmetry. You may draw or label the picture to highlight parts of your description.



## Assessment Task  3 - Pathways - Year 5-6

Choose 3 - 4 different attractions to visit. Develop a set of instructions using geometrical language (e.g., turns, angles, distances) to get to the different attractions.