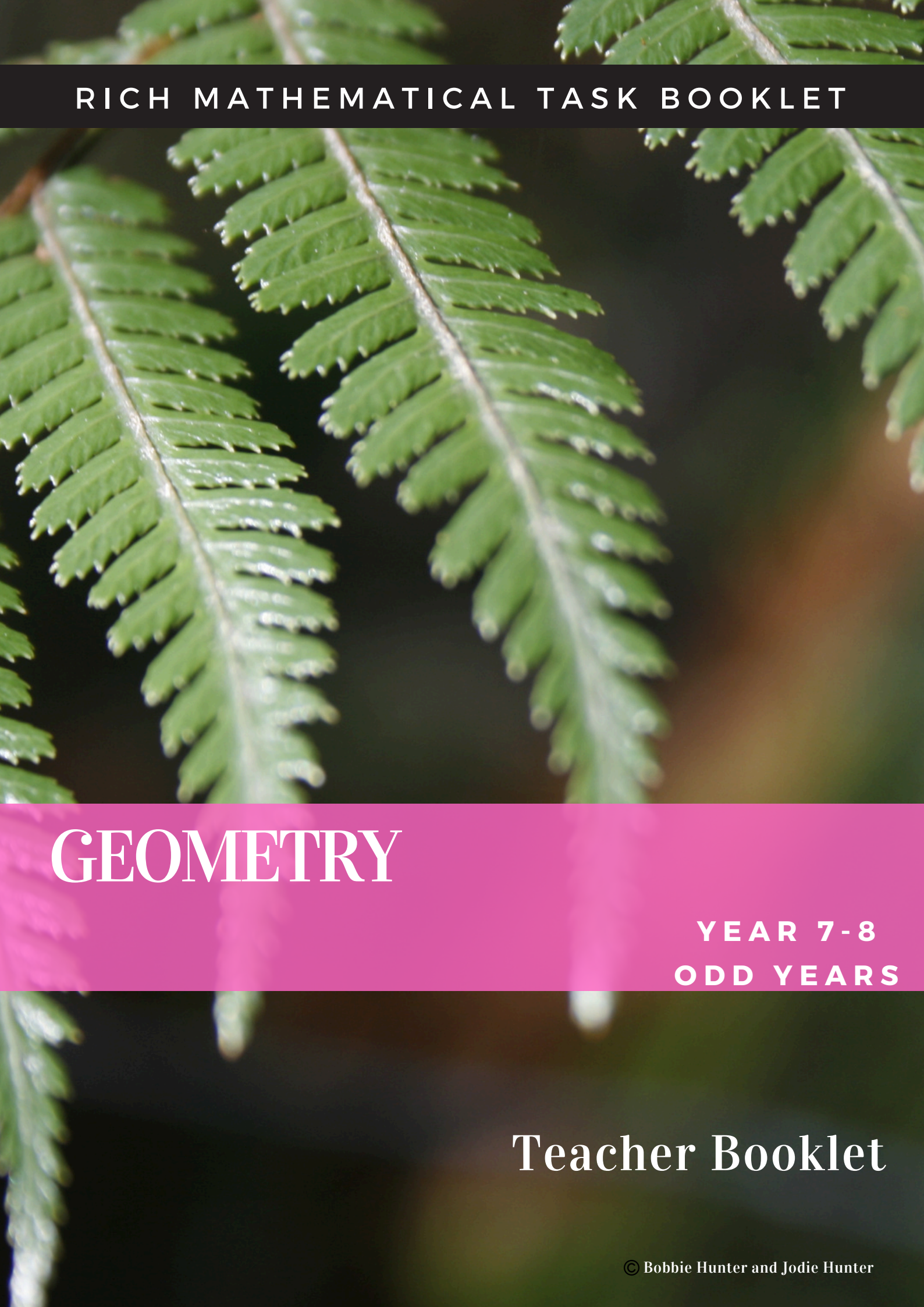


RICH MATHEMATICAL TASK BOOKLET

GEOMETRY

YEAR 7-8
ODD YEARS

Teacher Booklet

Task 1

The word polygon is from Greek, poly means many.

Sort these polygons into different groups by their properties.
Use tools to check such things as angles, side lengths, angle congruence, and line symmetry.

What do you notice about their properties?
Create a list of attributes that are shared by all the polygons in each set.

Explain and justify your list of attributes shared by the polygons in each set. Hint: Use the terms 'at least...', 'only...', 'at most...', and 'because...'.

Make statements about the whole set of polygons?

Teacher Notes

As a starter, begin by asking students to develop a mathematical argument based on the following statement:

Cutting a corner off a square makes a pentagon

Students have to decide if the statement could be described as:

Always true. Sometimes true. Never true.

Encourage students to justify their reasoning for each decision they make.

For the task, have available the cut out sets of polygon (copy masters) for each group of students to group and sort. Facilitate students to notice that all polygons are 2D closed plane figures with three or more sides that are all straight. Poly means many and there are an infinite number of polygons.

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, quadrilaterals + non quadrilaterals etc.
Refer to the quadrilateral chart (copy masters) if needed to support the sorting of quadrilaterals beyond one group of "4 sided shapes"

Have available cards to check right angles and protractors for interior angles, rulers to check lengths of sides, mirrors to check symmetry, and tracing paper to check for angle congruence.

Have students prepare their property lists using these specific headings: Sides, Angles, Diagonals, Symmetries. Use their observations to name them as regular or irregular polygons.

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 Seven
Classify and name shapes based on their attributes

End of Year Eight
Describe triangles, quadrilaterals, and other polygons in relation to their sides, diagonals, and angles

Reason about interior angles of triangles and quadrilaterals

Teacher Notes Continued

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

For the independent task, have dotty and/or squared paper available.

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? What if statement can you make about polygons.

Support students to generalise about polygons by drawing a mix of irregular polygons, non polygons (shapes with a curved side, or a shape that is not closed) and asking "Is this a polygon? Why or why not?"

Suggested Learning Outcomes

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

Use commonly shared rules to communicate ideas about defining shapes.

Independent Tasks

Mathematics and art are closely related.

Use 2-dimensional shapes to design and make a drawing.

Describe your drawing using the properties of shapes.

For example: In my drawing of a cat, I have used two circles for the eyes. I inserted two rectangles for the pupils of each eye. I used a hexagon for the main body of the cat. This hexagon has 6 sides and 2 right-angles...etc.

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 2

Sort these shapes into three groups.
Rule: No shape is allowed to belong to two groups.

When you have sorted them into three groups record the properties of each group.

Now start again. Re-sort the set into another three groups which are different from your first set. Record the properties of this new group.

Write some "if" statements.

Teacher Notes

As a starter, begin by asking students to develop a mathematical argument based on the following statement:

A hexagon has six equal length sides.

Students have to decide if the statement could be described as:

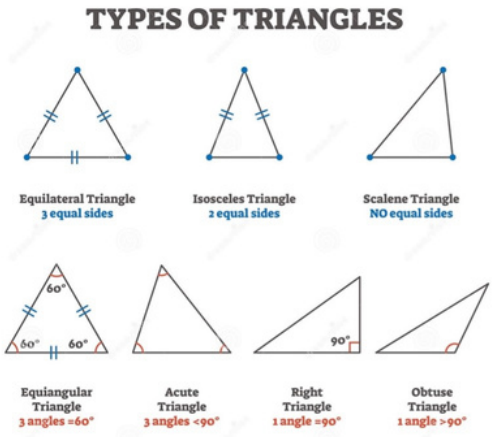
Always true. Sometimes true. Never true.

Encourage students to justify their reasoning for each decision they make.

Have the sets of the different triangles cut out and available for the students to sort (copy masters).

Facilitate the students to notice that triangles are classified by their sides and/or their angles.

Notice students who use the term triangles rather than the singular triangle. The use of the plural denotes that they are able to generalise what makes all triangles, triangles.



For the independent task, have the following sheet prepared (copy masters).

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 Seven
Classify and name shapes based on their attributes

End of Year Eight
Describe triangles, quadrilaterals, and other polygons in relation to their sides, diagonals, and angles

Reason about interior angles of triangles and quadrilaterals

Shareback

Select students to share who can explain and justify their groupings of triangles according to their properties.

Connect

How could you give a description that covers all the properties of triangles? Make an if statement that covers all the properties of triangles?

What about making an if statement that concerns isosceles triangles?

Suggested Learning Outcomes

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

Use commonly shared rules to communicate ideas about defining shapes.

Identify and explain relationships between shapes, including similarities and differences

Independent Tasks

What do you notice about all the shapes on the placemat that are the same? That are different?
Look closely. What do you notice?

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, scalene triangle, isosceles, 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 items?

Sort them into groups which you think are the same.

Sort them into groups which you think are different.
Use a table or Venn diagram to record your observations.

Explain and justify your reasoning.

Teacher Notes

As a starter, begin by asking students to develop a mathematical argument based on the following statement:
Triangles have a line of symmetry.
Students have to decide if the statement could be described as:
Always true. Sometimes true. Never true.
Encourage students to justify their reasoning for each decision they make.

For the task, 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. Have them sort by special categories including edges and vertices; faces and surfaces; cylinders; cones.

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)

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. Students could create tables or Venn diagrams to record how they are classifying the various shapes.

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. Have students sort by properties including edges and vertices, faces and surfaces as well as 2D features.

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.

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 Seven
Classify and name shapes based on their attributes

End of Year Eight
Describe triangles, quadrilaterals, and other polygons in relation to their sides, diagonals, and angles

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.

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?

What is the cross section of a cube? What about a cylinder? What do you notice?

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

Draw the cross section of these different shapes.

Mathematical Language

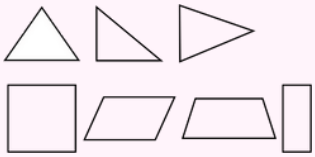
Properties, square, rectangle, attribute, 2-dimensional, 3-dimensional, shape, side, equal, size, smaller than, straight, parallel, congruent, collinear, angles, vertices, vertex, sides, vertical, horizontal, diagonal, symmetrical, face, curved, edge, corner, sphere, cylinder, cube, cuboid, rectangular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

Anticipations

Solutions, Misconceptions

Task 4

Use a protractor to investigate the interior angles of these triangles and quadrilaterals.



What do you notice about:

The sum of the interior angles of each shape?

The size of opposite angles?

Make statements about interior angles and opposite angles for triangles and quadrilaterals? Are the statements always true?

Teacher Notes

As a starter, have the students stand with an arm out and rotate 180 degrees and 360 degrees.
Represent this on the board to demonstrate 180° = 
Emphasise the use of the ° symbol to represent degrees. Show a full circle to represent 360°.

Ask students to hold one arm straight up and then rotate 180° and then 360° Start in different positions to emphasise that the starting point can be anywhere within the full circle.

During the task, support students to correctly use a protractor. Notice who is turning the protractor to fit within the angle, who is reading the protractor in the correct direction etc.

Expect students to make conjectures and generalisations about what they are noticing about the interior and opposite angles as they measure.
Have they noticed which quadrilaterals have equal opposite angles and why?

Shareback

Select students to share that can explain how the angles in their shapes equal 180 degrees or 360 degrees, and who has noticed that opposite angles can be equal in some 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

End of Year Seven
Identify and describe angles at a point, angles on a straight line, and vertically opposite angles

End of Year Eight
Reason about unknown angles at a point, angles on a straight line, vertically opposite angles and interior angles of triangles and quadrilaterals

Connect

Show the image of the triangle.

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

Show the image of the parallelogram.

Ask the students: What conjectures can we use to work out the size of this unknown angle in this parallelogram?

Suggested Learning Outcomes

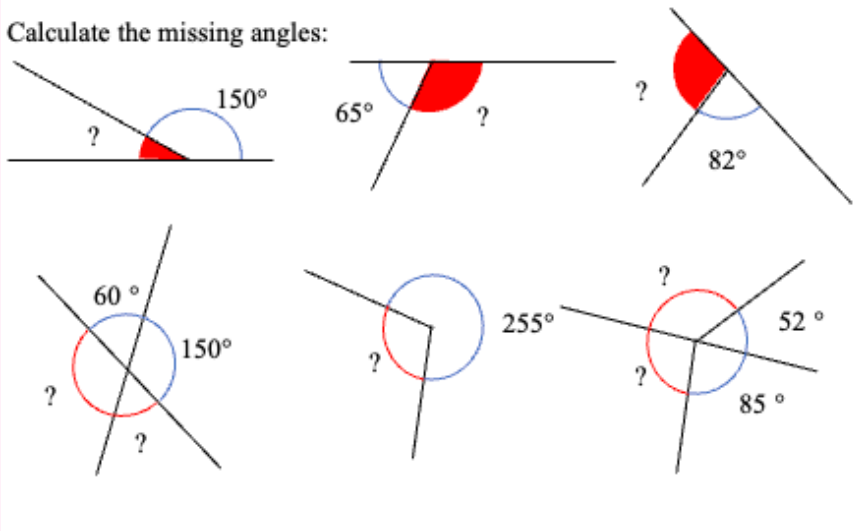
Make conjectures about interior angles of quadrilaterals.

Make conjectures about interior angles of triangles.

Find unknown angles in quadrilaterals.

Find unknown angles in triangles.

Independent Tasks



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?

Draw what you think it will look like as a net.

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.

Before students start to draw the net prompt the students: Think about what the cubiod would look like flattened out as a net. Discuss how many faces the cubiod would have.

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.

If needed prompt the students: Remember that when you fold the net up it needs to make a 3D cuboid and so you need to draw all the faces.

For the independent task have 3D shapes available.

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 Seven

Visualise, construct and draw plan views for front, back, left, right, and top views of 3D shapes

Transform 2D shapes, including composite shapes, by resizing by a whole number or unit fraction

During Year Eight

Visualise, construct and draw nets for prisms with a fixed cross section

Recognise the invariant properties of 2D and 3D shapes under different transformations

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?

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.

Independent Tasks

Draw a net for a pyramid.
Draw a net to make a triangular packet to hold six tennis balls.
Draw a net for these chocolate boxes.

What other nets can you draw?

Mathematical Language

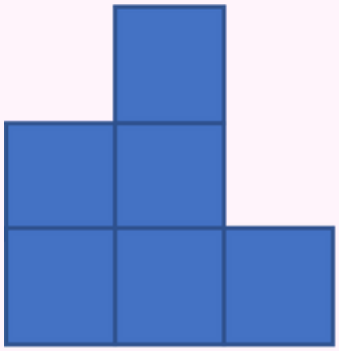
3D, 3 dimensional, cube, box, sides, flaps, net, plane view, 2 dimensional.

Anticipations

Solutions, Misconceptions

Task 6

Here is a shape made with linking cubes. When you look at it from one side, it looks like this.



What does the whole structure looks like?

Visualise what you think it looks like. Draw this structure on isometric paper and then build it with the cubes.

Look at your construction from a different view. Draw this view on isometric paper.

Draw different views of the construction onto the isometric paper.

Teacher Notes

Have linking cubes or other cubes available.
Provide isometric paper (copy masters) for students to draw their representations of the 3D model.

Facilitate the students to notice the multiple perspectives of structures. Some students will assume that the structure has only the six obvious cubes in it whereas others will realise that there are more possibilities with additional cubes which cannot be seen from this view.

Monitor for students using vocabulary which identifies relationships between the different perspectives.

Facilitate discussion about what the cross section of the shape would look like, depending on what side of the shape you are looking at.

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

During Year Seven
Visualise, construct and draw plan views for front, back, left, right, and top views of 3D shapes

Transform 2D shapes, including composite shapes, by resizing by a whole number or unit fraction

During Year Eight
Visualise, construct and draw nets for prisms with a fixed cross section

Recognise the invariant properties of 2D and 3D shapes under different transformations

Shareback

Select students to share who have realised that there can be more than six cubes and have drawn and built structures to match.

Connect

Draw two pictures of this shape that look different (see copy masters).

Be ready to describe each view using the language of geometry.

Support students to visualise and draw what this shape would look like from different views (top, front, back, left, right).

Suggested Learning Outcomes

Draw objects that can take the form of plane views.

Use commonly shared rules to communicate ideas about defining shapes.

Create 2-dimensional drawings of 3-dimensional models.

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

Independent Tasks

Here is a shape made with linking cubes. When you look at it from one side, it looks like this.
What do you think the whole structure looks like?

Make a drawing of what you think it might look like on isometric paper and then build it with the cubes.

Now look at your construction from a different view. Draw this view on isometric paper.

How many different views of the construction can you draw on isometric paper?

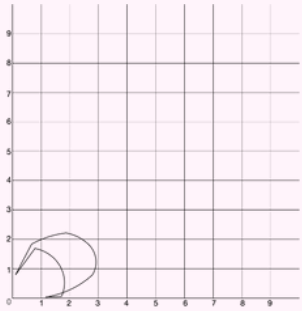
Mathematical Language

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 7



Explore how to enlarge the kiwi to twice its size.

What is the area of the large kiwi compared to the area of the kiwi at the original size?

Draw a simple house on the grid paper.
Reduce the size of the house while maintaining the exact same house.

What is the area of the larger house compared to the area of the house reduced to a smaller size?

Teacher Notes

Have available grid paper (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 enlargement and reduction using correct factors.

Connect

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

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 Seven
Transform 2D shapes, including compositie shapes, by resizing by a whole number or unit fraction

During Year Eight
Recognise the invariant properties of 2D and 3D shapes under different transformations

Suggested Learning Outcomes

Describe an enlargement on a simple shape.

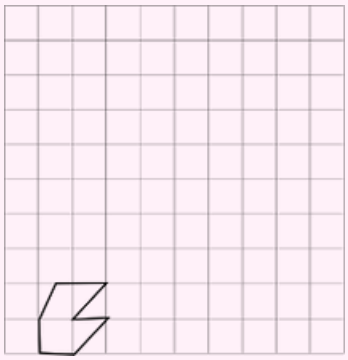
Recognise how to reduce a shape keeping to scale.

Mathematical Language

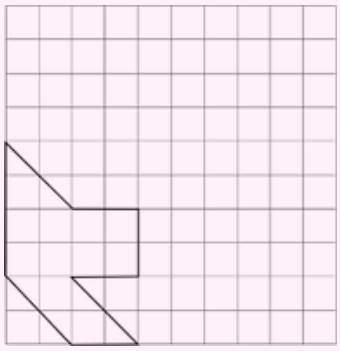
enlarge, factor, reduce, scale grid.

Independent Tasks

Enlarge the shape to a scale factor of 2.



Reduce the shape by a scale factor of 0.5



Anticipations

Solutions, Misconceptions

Task 8

Patterned tiles in public buildings often appear to look the same. Here is an example of an entrance way.

Look closer at the patterns below which are along the centre of the tiles.
Discuss and identify what is the same and what is different about them.

Look again at the first picture of the main tiled area. What patterns is it made from? What are at the ends?

Describe the pattern. How many of each type of tile are included in the pattern? How might you extend the pattern sideways?

Look closely at how angles have been used. Be ready to explain the types of angles you can identify.

Teacher Notes

Facilitate the students to notice that in mirror symmetry a shape matches itself when it is reflected in a specific mirror line but in slide symmetry the shape matches itself when it is slid in a particular direction by a particular distance thus making it translational symmetry.

Translation is sliding a figure in any direction without changing its size, shape or orientation.

Notice students who can describe rotation and reflection elements within their pattern.

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.

Line symmetry is a component of the transformation called a reflection.

Curriculum Links

During Year Seven
Transform 2D shapes, including compositie shapes, by resizing by a whole number or unit fraction

During Year Eight
Recognise the invariant properties of 2D and 3D shapes under different transformations

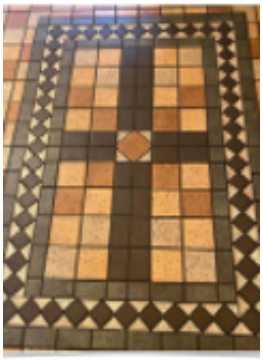
Shareback

Select students to share who can explain and justify the similarities and differences in the way the repeating patterns are a process of slide symmetry.

Select students who can identify different rotations or reflections within the patterns.

Connect

Here is another patterned entranceway. What do you notice?



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

Take a 2-D shaped pattern block and use it repeatedly to construct a patterned tile entrance. How many different aspects of the pattern can you use in your overall set of tiles to create an interesting but balanced pattern. Include the use of colour. Make sure you include aspects of slide symmetry and mirror symmetry.

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

In a board game you must collect as many diamonds as possible and then bring them back to your home base before anyone else.

The rules say that you can draw straight lines through the diamonds using the four points of the compass (North, South, East, West). You are only allowed to use up to ten straight lines of any length to create your pathway from your home base and back again.

Are you able to improve your pathway so that you collect even more diamonds? Is it possible to collect all the diamonds each time?

Make sure you record the directions you took so that you can explain and justify this as the best way.

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?

What about if you went between North and West? What direction would that be? Why? What angle turn would that be? Why?

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

During Year Seven
Interpret and communicate the location of positions and pathways using coordinates, angle measures, and the 8 main and halfway compass points

During Year Eight
Use map scales, compass points, distance, and turn to interpret and communicate systems and grid reference systems.

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 gems which you need to gather. 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

Cooper lives in Christchurch and flies a small plane.

In which direction does he fly to get from:

1. Christchurch to Dunedin?
2. Dunedin to Ashburton?
3. Christchurch to Blenheim?
4. Westport to Christchurch?
5. Queenstown to Dunedin?
6. Queenstown to Invercargill?
7. Blenheim to Wellington?

Teacher Notes

For the launch use the compass and have students explore when they are facing different compass points.

Facilitate students to draw on knowledge of angles from previous tasks. Encourage discussion about how this links to direction.

For the independent task, provide the students with or allow them to choose an area of New Zealand to explore.

Shareback

Select students to share who are able to describe the angles and compass points used to travel from one point to another.

Connect

What did you notice about the angles between one compass point and another?

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

During Year Seven
Interpret and communicate the location of positions and pathways using coordinates, angle measures, and the 8 main and halfway compass points

During Year Eight
Use map scales, compass points, distance, and turn to interpret and communicate systems and grid reference systems.

Suggested Learning Outcomes

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

Use a compass to precisely explain the direction heading.

Mathematical Language

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

Independent Tasks

Use a map of one area of New Zealand.
Write a set of questions for someone else to answer about what direction you travel in to drive from one place to another.

Anticipations

Solutions, Misconceptions

Task 11

Make your own computer game map involving finding objects. You can choose your own setting, but you need to use a grid with the sides numbered and the top lettered and decide on a scale and have a legend.

Mark where the hunt begins on your map.

Provide at least 10 clues of where to find the hidden objects using your scale, legend and the grid labels.

Teacher Notes

Provide students with grid paper to create their computer game map.

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 and encourage use of this alongside directional language when writing their clues. Encourage the use of angles also.

Expect students to create clues that utilise their scale. Notice who can use proportional reasoning when calculating distances using the scale.

For the independent task, provide students with grid paper.

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

During Year Seven
Interpret and communicate the location of positions and pathways using coordinates, angle measures, and the 8 main and halfway compass points

During Year Eight
Use map scales, compass points, distance, and turn to interpret and communicate systems and grid reference systems.

Shareback

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

Select students who have used scale and directional language in their clues.

Connect

What was the same and what was different about your grid, scale and legend? Why? What do you notice?

Suggested Learning Outcomes

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

Independent Tasks

Investigate how Māori and Pacific voyagers were able to locate their position and navigate the direction they travelled. What special navigation techniques did they develop and use as they explored the Pacific Ocean?

Mathematical Language

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

Anticipations

Solutions, Misconceptions

Task 12

Create your own tourist map for somewhere in your local area.
This could be natural attractions such as bush or river walks or a local attraction map such as a town map showing shopping malls, indoor playgrounds or other places of interest.
You can use a geographic online map as your base (such as a screen shot from google maps) or draw your own map.
You need to use a grid with the sides numbered and the top lettered, decide on a scale and have a legend.

Mark where the tourist trail begins on your map.

Provide 10 instructions for a tourist to follow so that they can see the sights on your map.

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.

Facilitate the students to notice the importance of clear instructions.

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

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?

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.

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Suggested Learning Outcomes

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

Mathematical Language

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

Independent Tasks

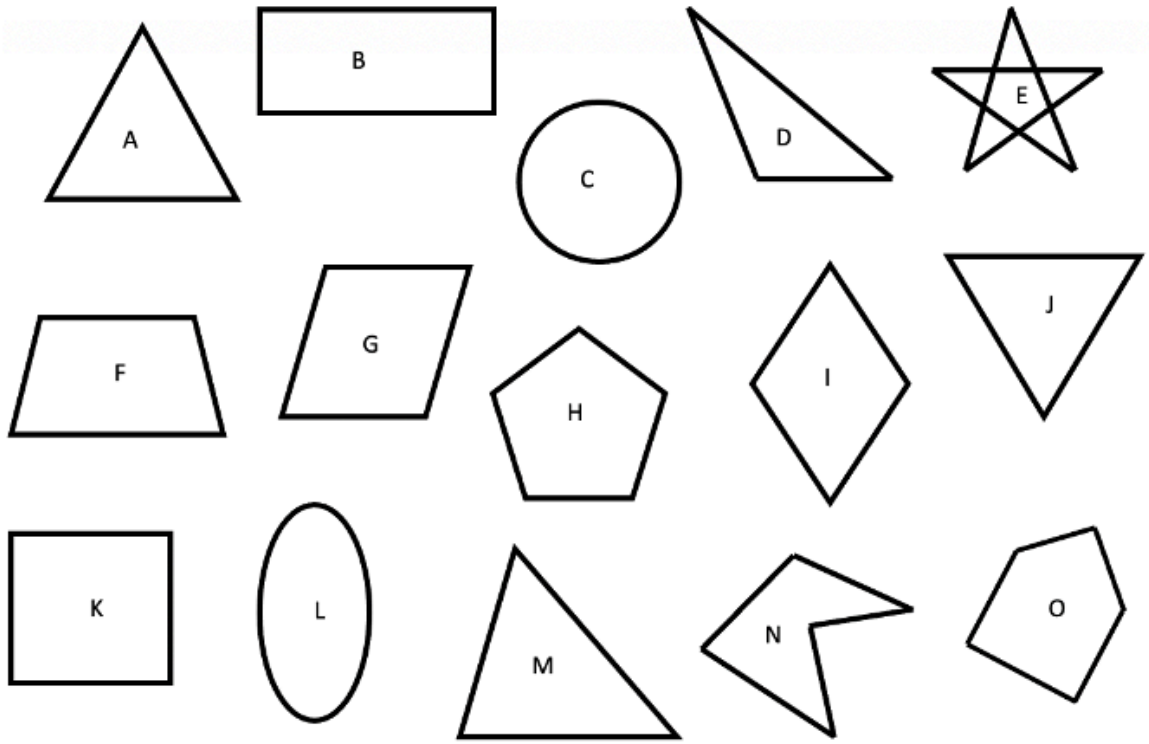
Assessment Tasks:
One: Shape Sorting
Two: Creating Nets
Three: Translations
Four: Maps

Anticipations

Solutions, Misconceptions

Assessment Task 1 - Shape - Year 7-8

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 - Shape - Year 7-8

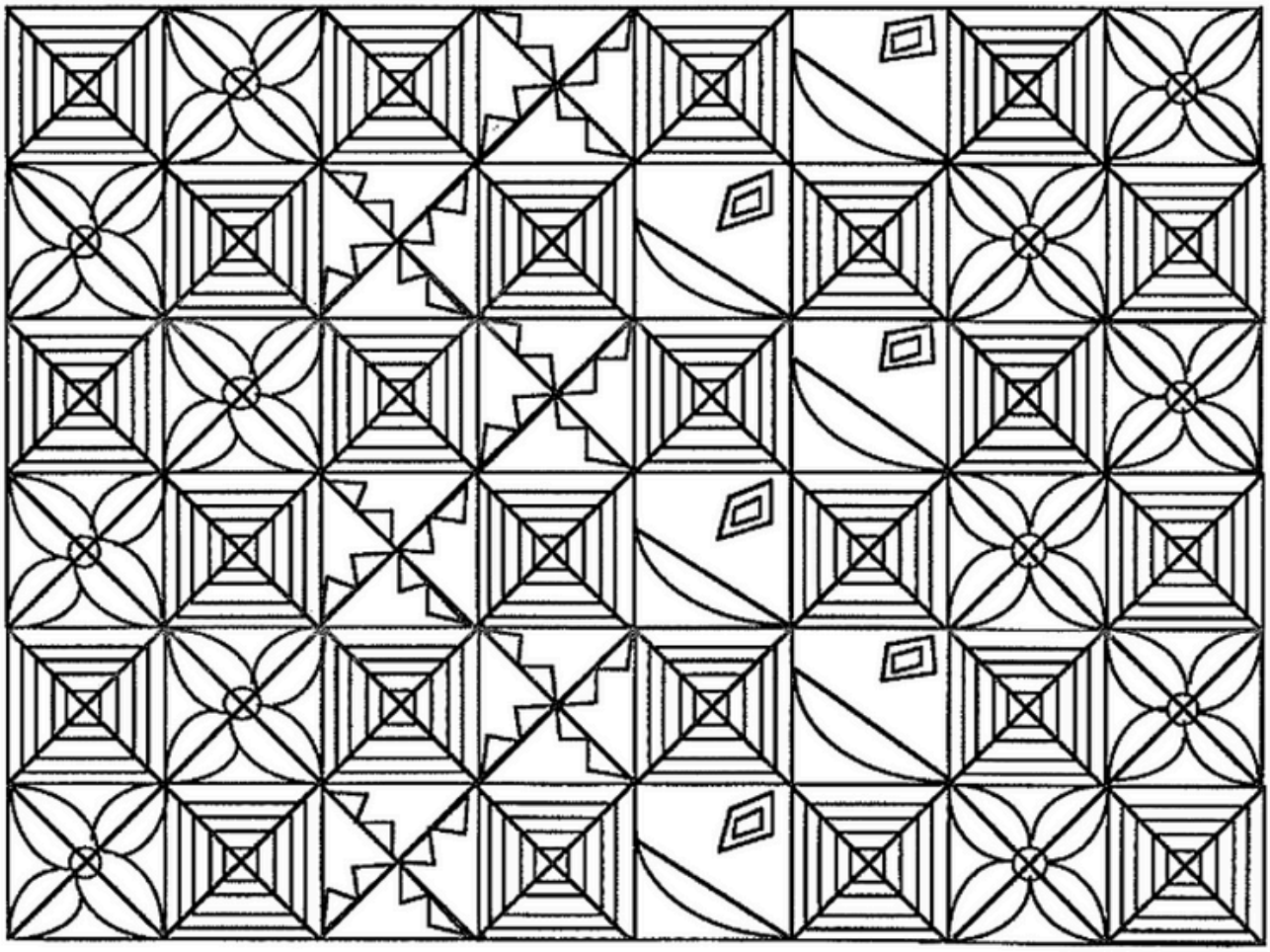
GEOMETRY: SHAPE:

At school prize-giving all the students will receive a gift presented in a square or rectangle box.
Draw as many different nets as you can for the boxes.

Assessment Task 3 - Spatial Reasoning - Year 7 - 8

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 4 - Pathways - Year 7 - 8

GEOMETRY: Pathways

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.