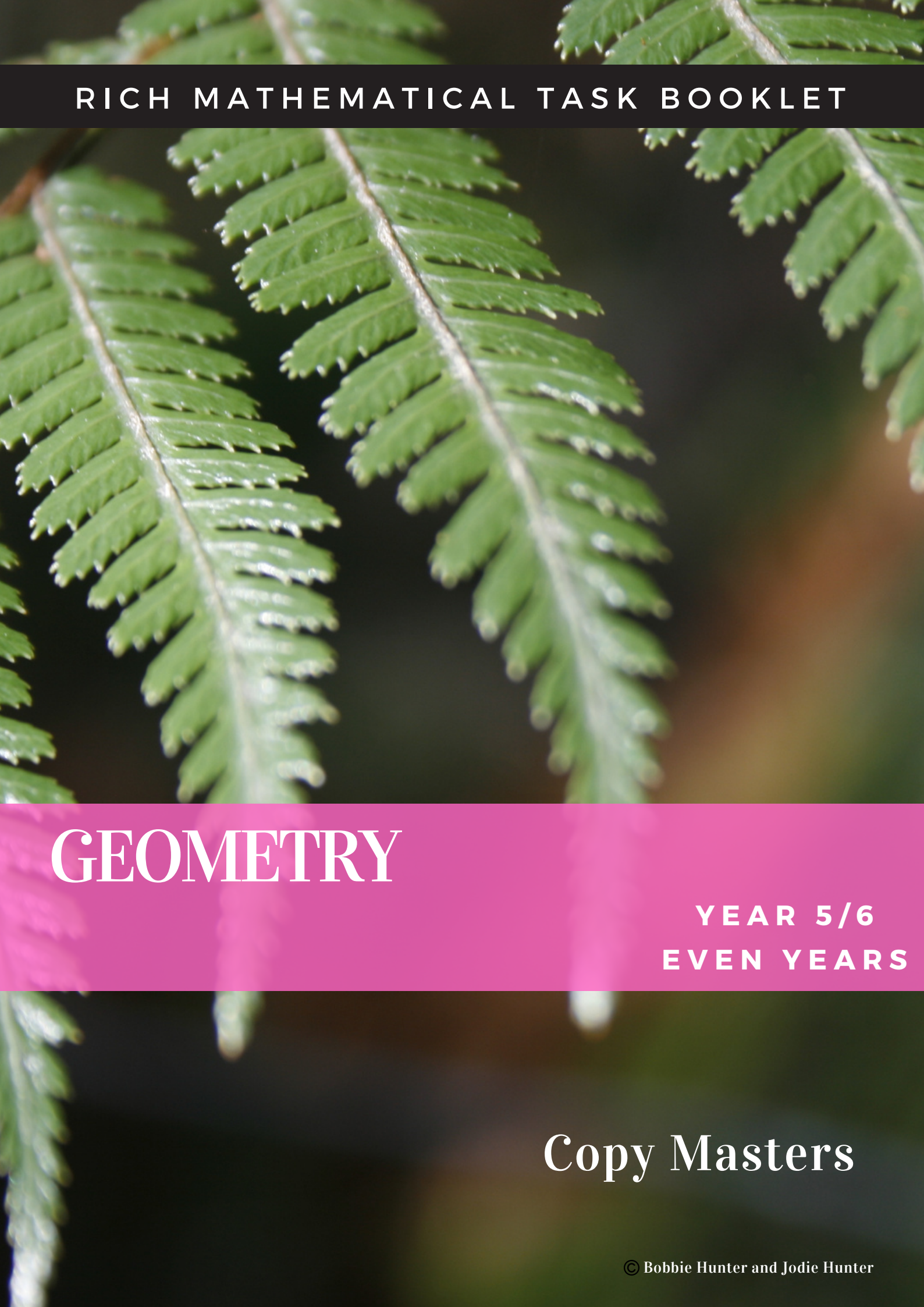


A close-up photograph of several green fern fronds. The fronds are long and feathery, with many small, pointed leaflets. They are set against a dark, blurred background, which makes the green color of the ferns stand out. The lighting is soft, highlighting the texture of the leaflets.

RICH MATHEMATICAL TASK BOOKLET

GEOMETRY

YEAR 5/6
EVEN YEARS

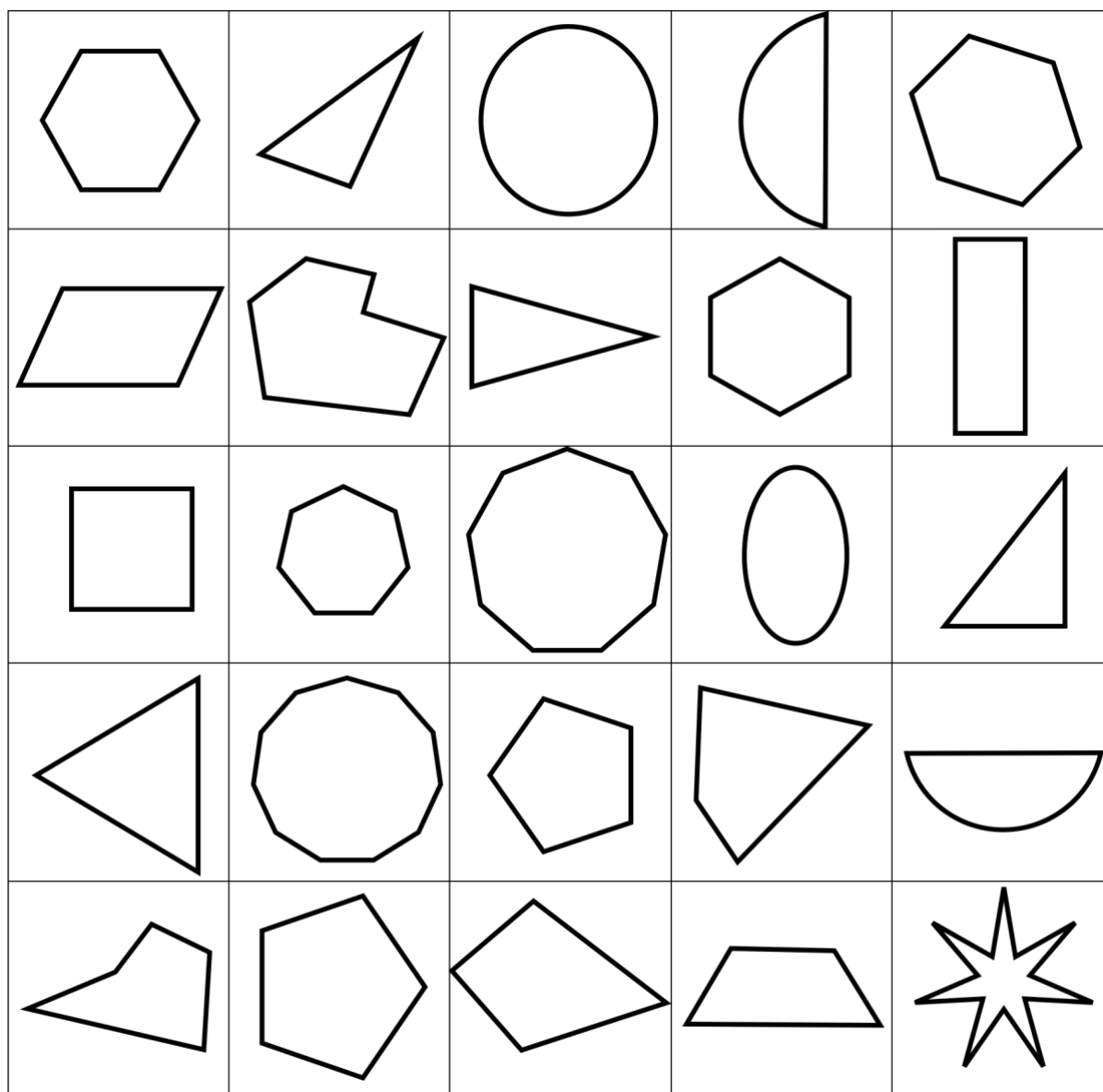
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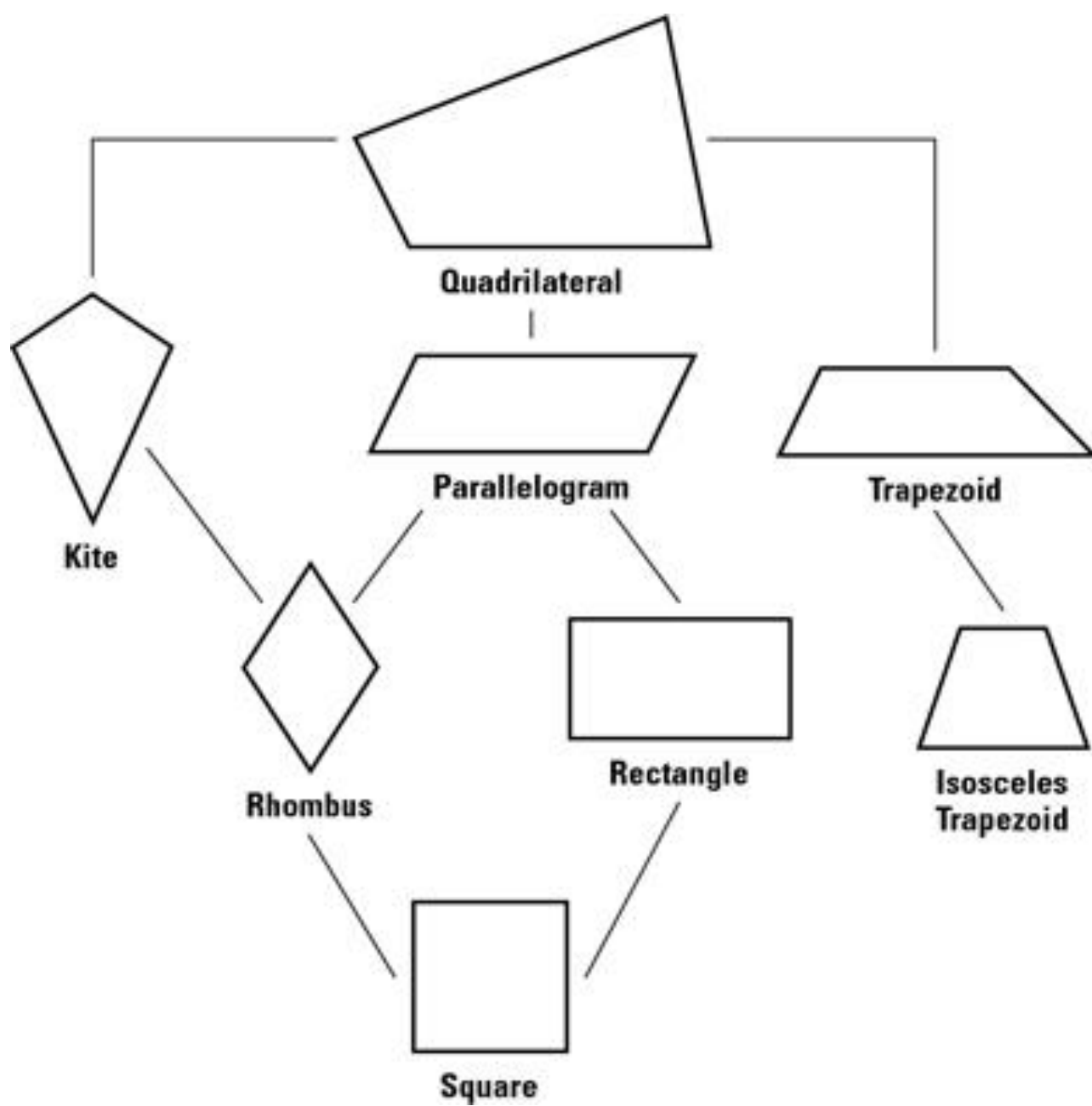
Task 1

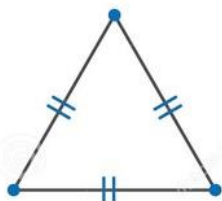
Decide on a criteria to sort these shapes.

	Regular Polygons	Irregular Polygons

What other criteria could you use to sort the shapes?

Task 1 Resource

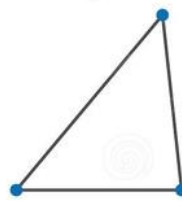
Quadrilaterals Chart

Triangle Information Sheet**TYPES OF TRIANGLES**

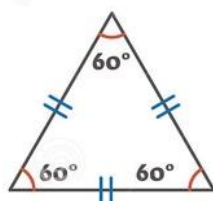
Equilateral Triangle
3 equal sides



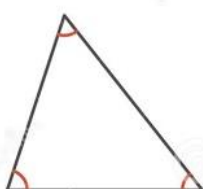
Isosceles Triangle
2 equal sides



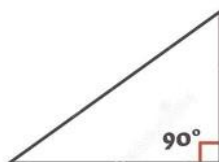
Scalene Triangle
NO equal sides



Equiangular Triangle
3 angles = 60°



Acute Triangle
3 angles $< 90^\circ$



Right Triangle
1 angle = 90°



Obtuse Triangle
1 angle $> 90^\circ$

Task 1 (independent)

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.

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?

Task 2 (independent)

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.

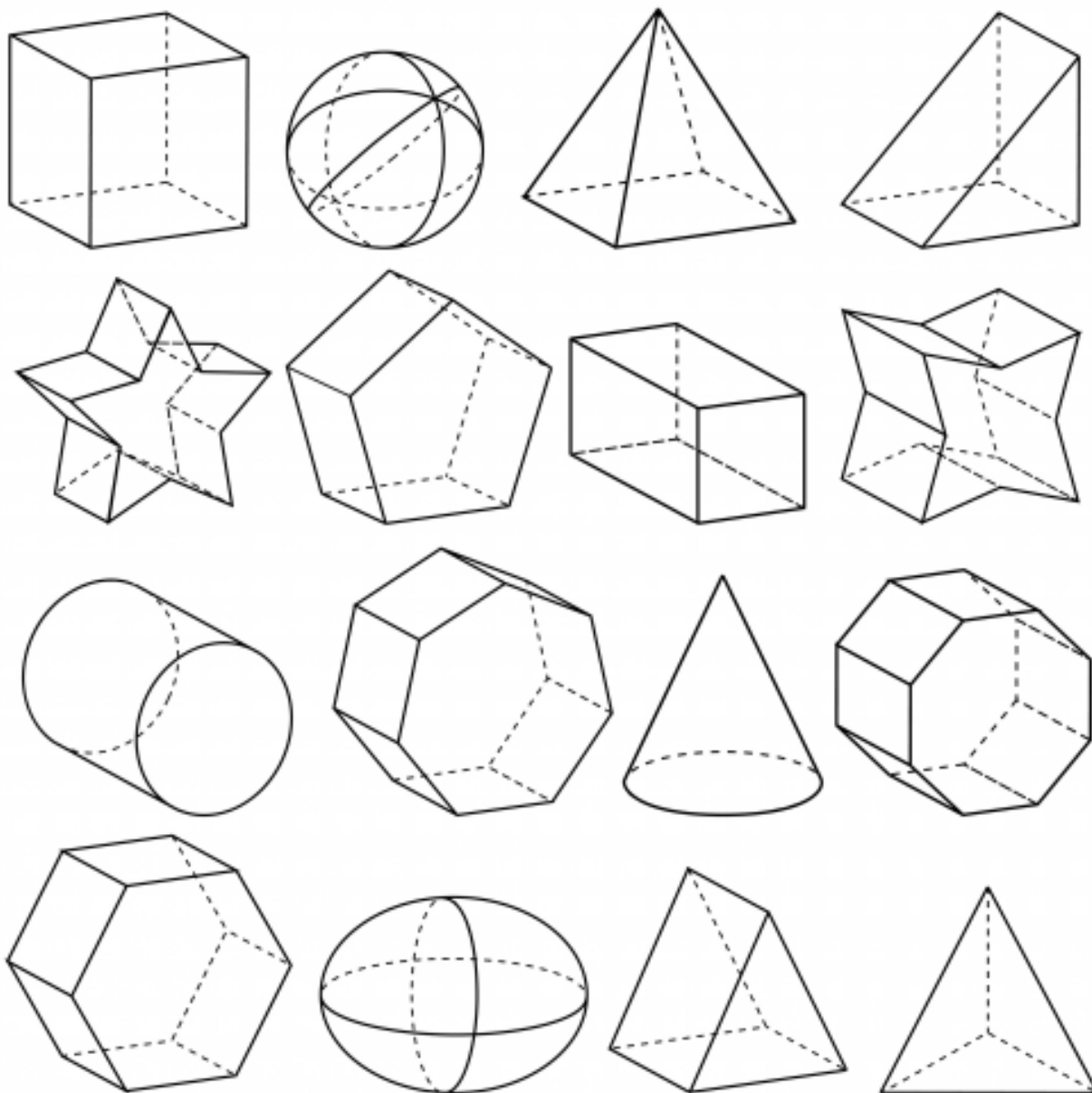
Task 3

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.

Task 3 - 3D Shapes

Task 3 (independent)

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

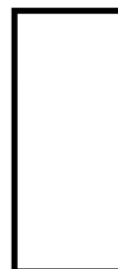
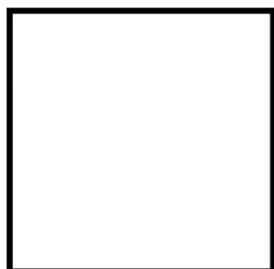
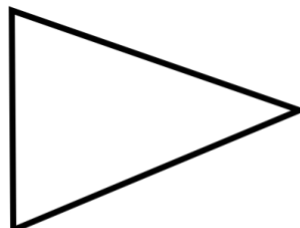
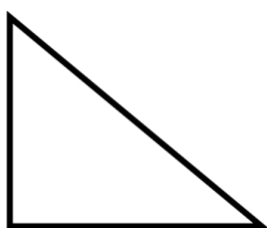
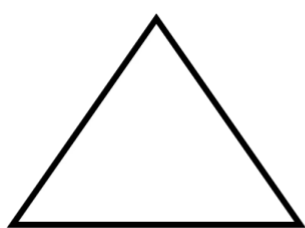
Task 4

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 below, test this theory.

What do you notice?



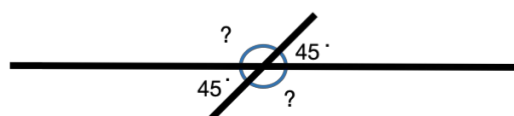
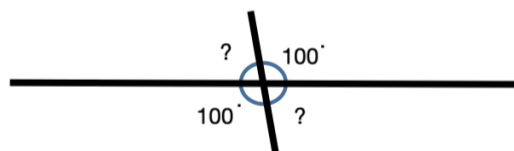
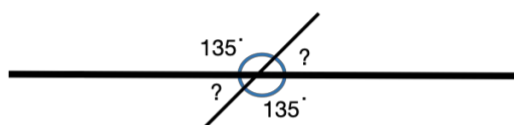
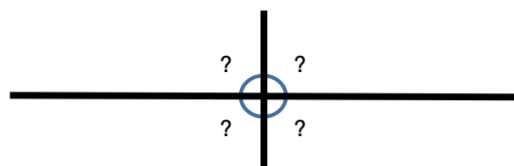
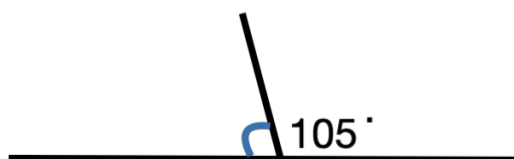
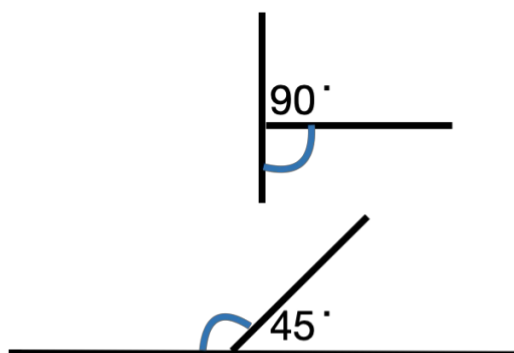
Task 4 (independent)

Finish the statements.

On a straight line angles add up to _____

Angles around a point add up to _____

Now calculate the missing angles.

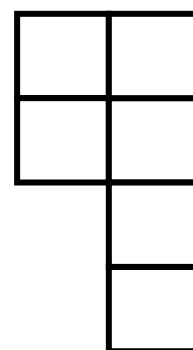
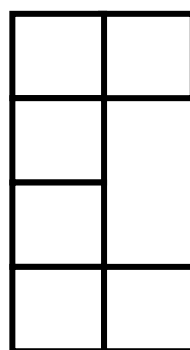
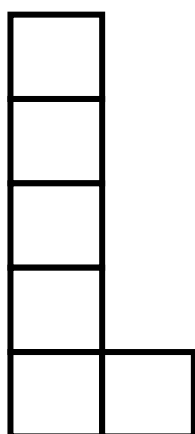
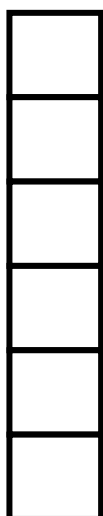
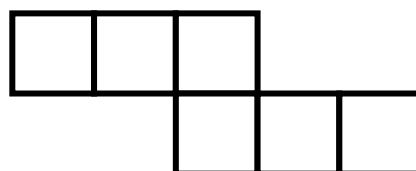
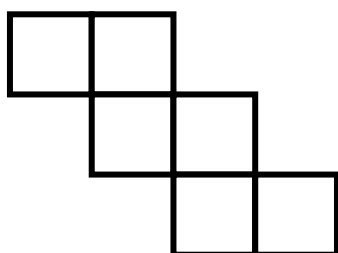
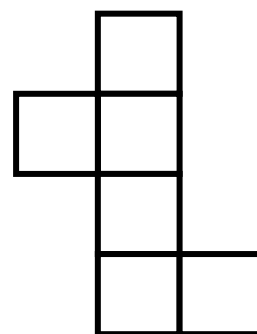
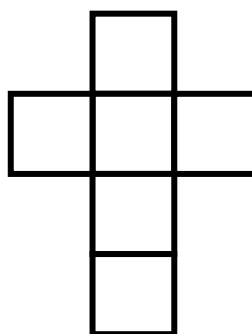
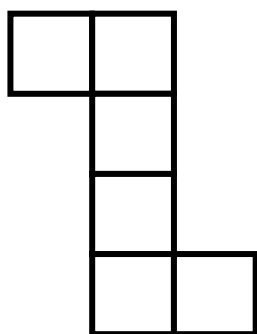
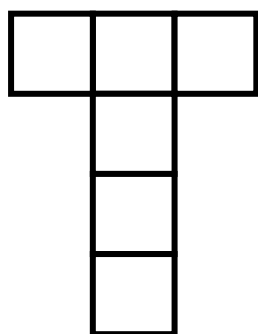


Task 5

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.

Task 5 Net Resource - Connect

Task 5 (independent)

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

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.

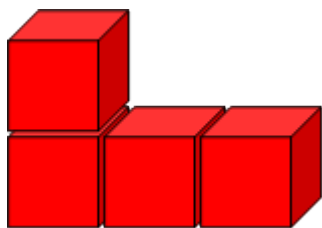


Make sure that you can all explain and justify why the nets you designed would be suitable for each different chocolate bar.

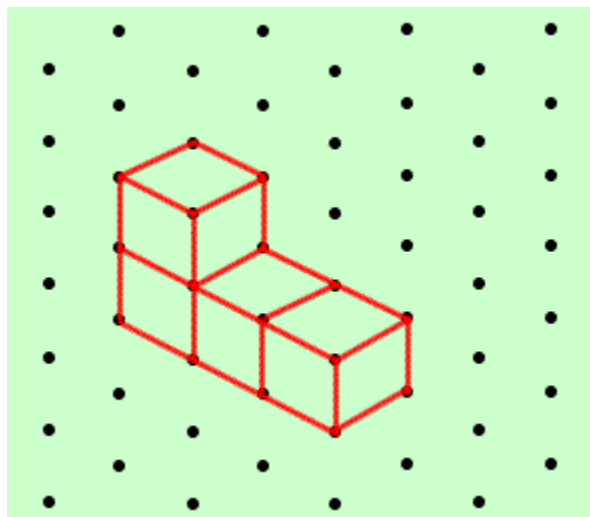
Connect Image

Task 6 (independent)

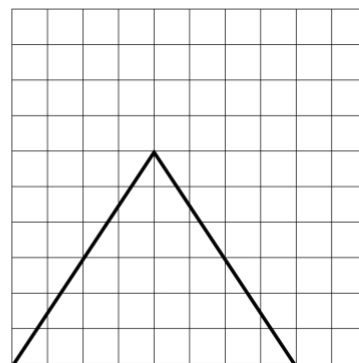
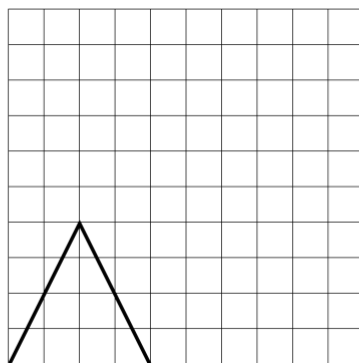
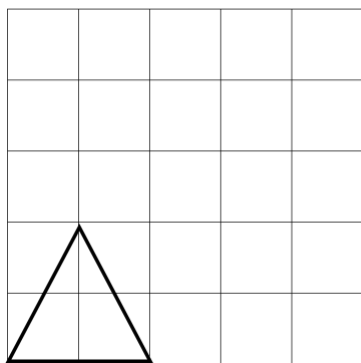
Here are four cubes joined together.



Here is what they look like drawn on dotty paper



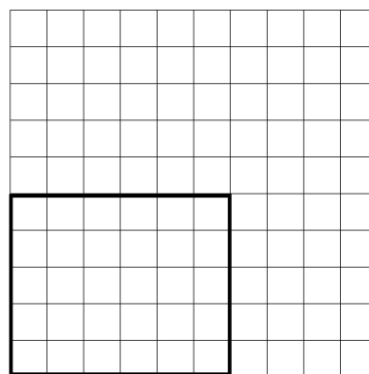
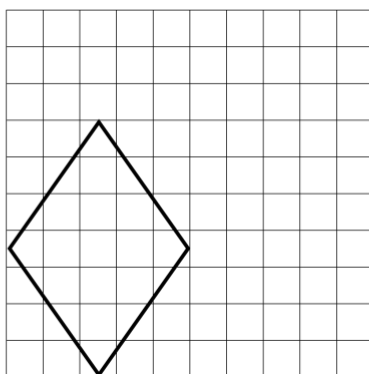
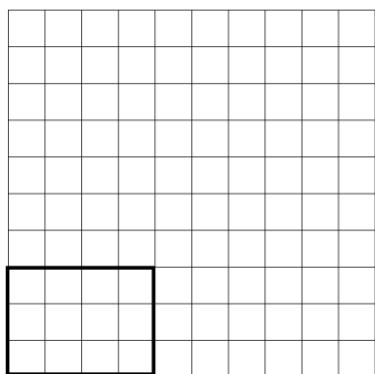
How many other ways can you arrange the cubes? When you complete the arrangement draw what they look like on dotty paper.

Task 7

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

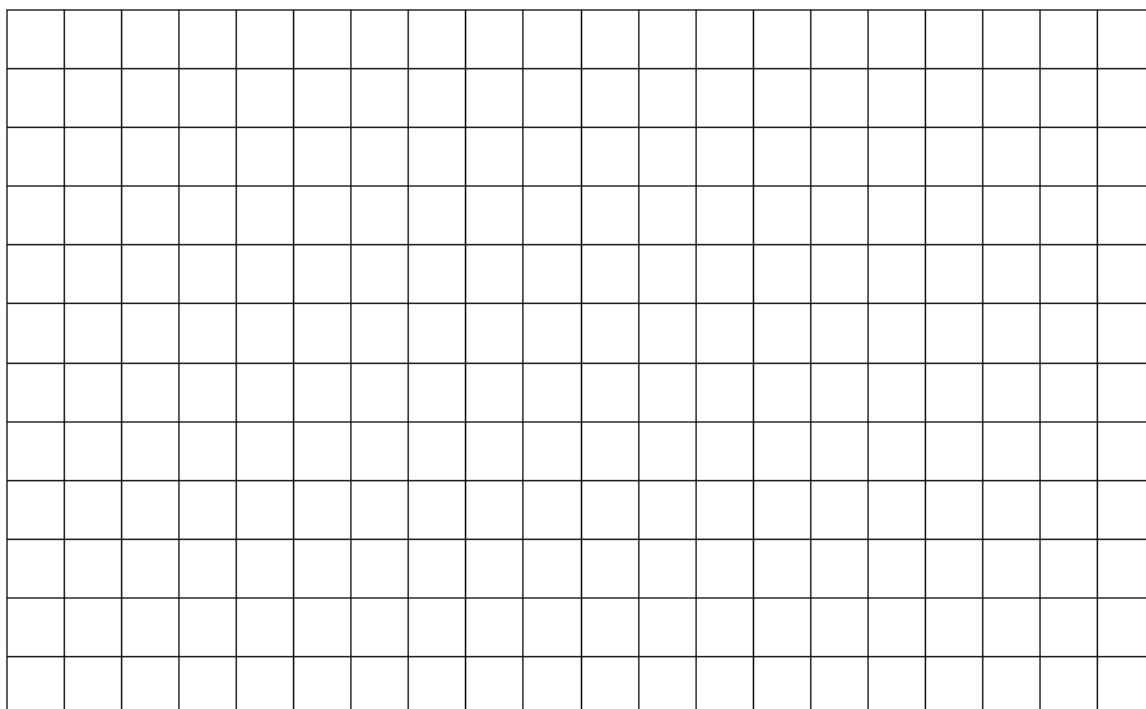
Enlarge the second triangle by a scale factor 2.

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

Task 7 (Independent)

Enlarge each shape by a scale factor of 2.

Reduce each shape by a scale factor of $\frac{1}{2}$.



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.

A	B	C	D
E	F	G	H
I	J	K	L
M	N	O	P
Q	R	S	T
U	V	W	X
Y	Z		

Task 8 (independent)

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.

Task 9

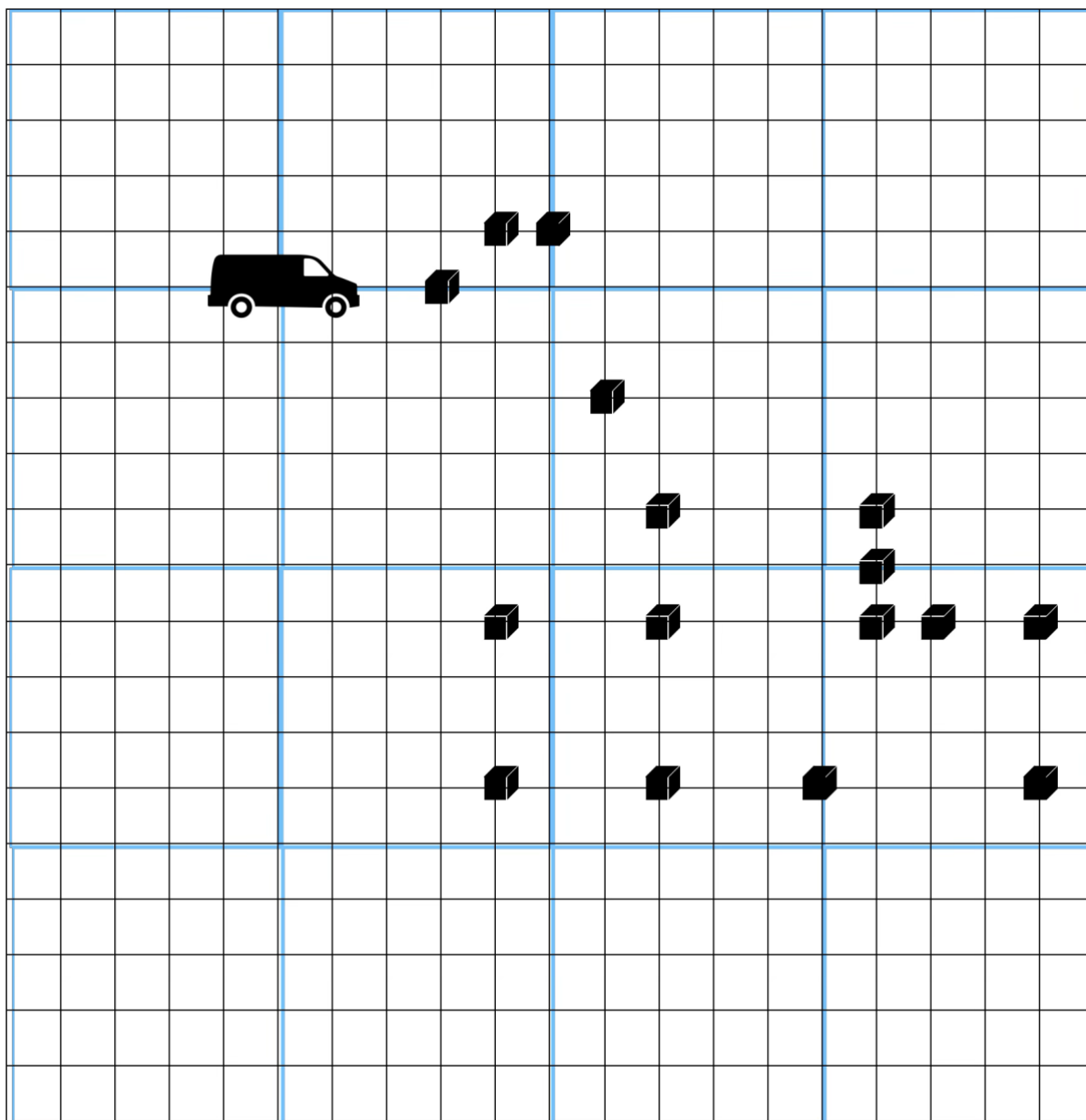
You are planning a delivery route to collect packages and return to the depot.

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?

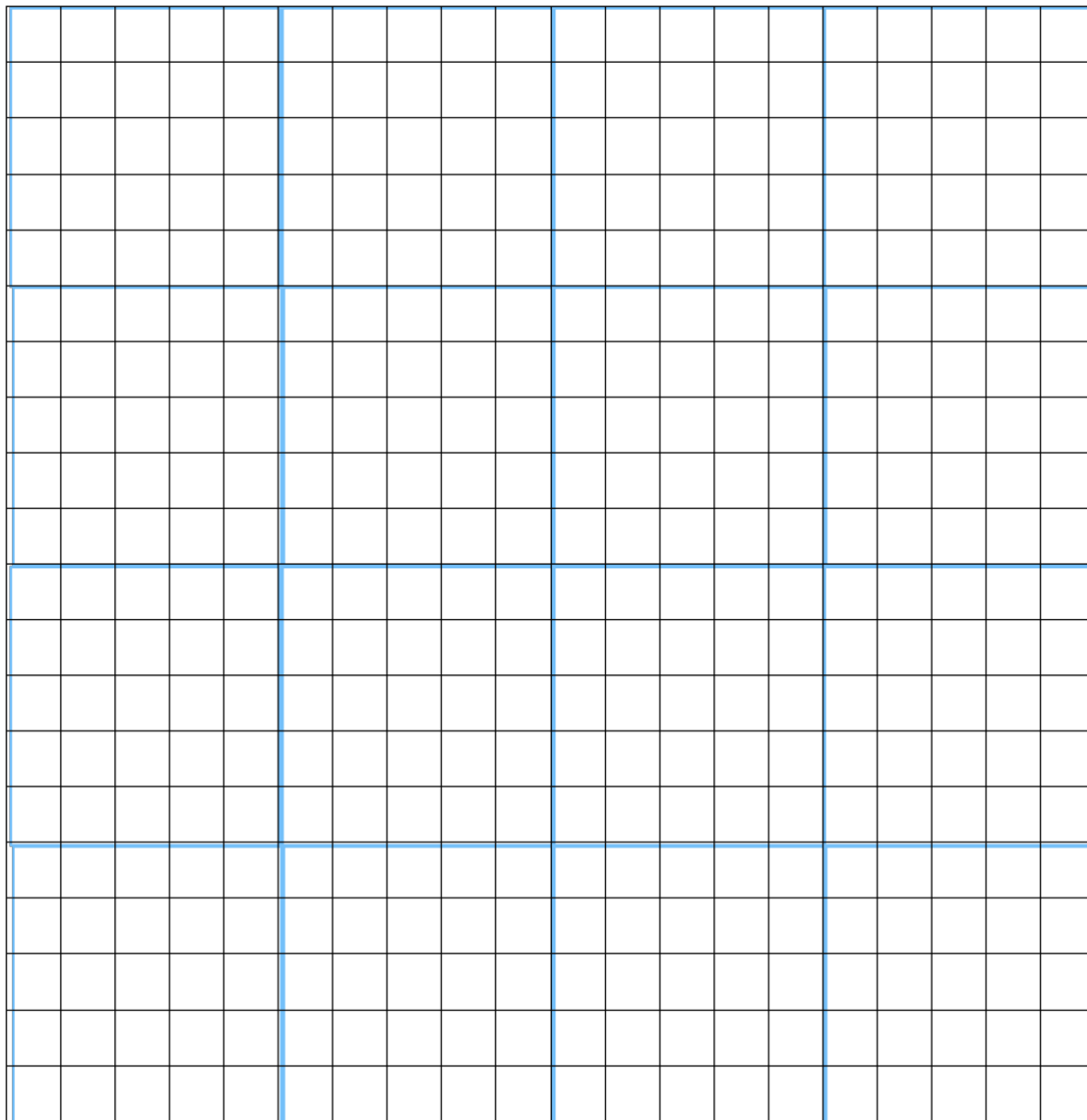
Record the directions taken and explain how you improved your route.

Task 9 – Map

Task 9 (independent)

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.



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.

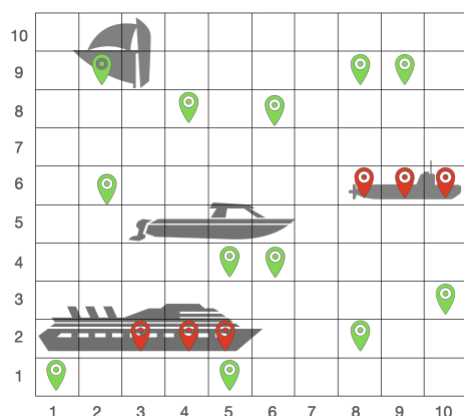
Task 10 (independent)

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

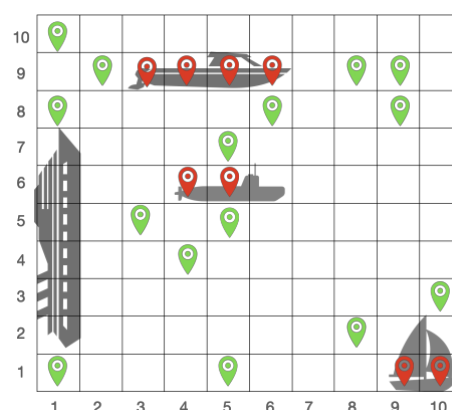
Make a list of all the different symbols in the different legends and the different scales.

Task 11

Cooper and Frankie are playing battleships.



Cooper



Frankie

Cooper thinks because he has hit and almost sunk three of Frankie's boats he will win.

What are the remaining co-ordinates needed to both clear the boards?

Who is more likely to win and why?

Task 11 (independent)

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.

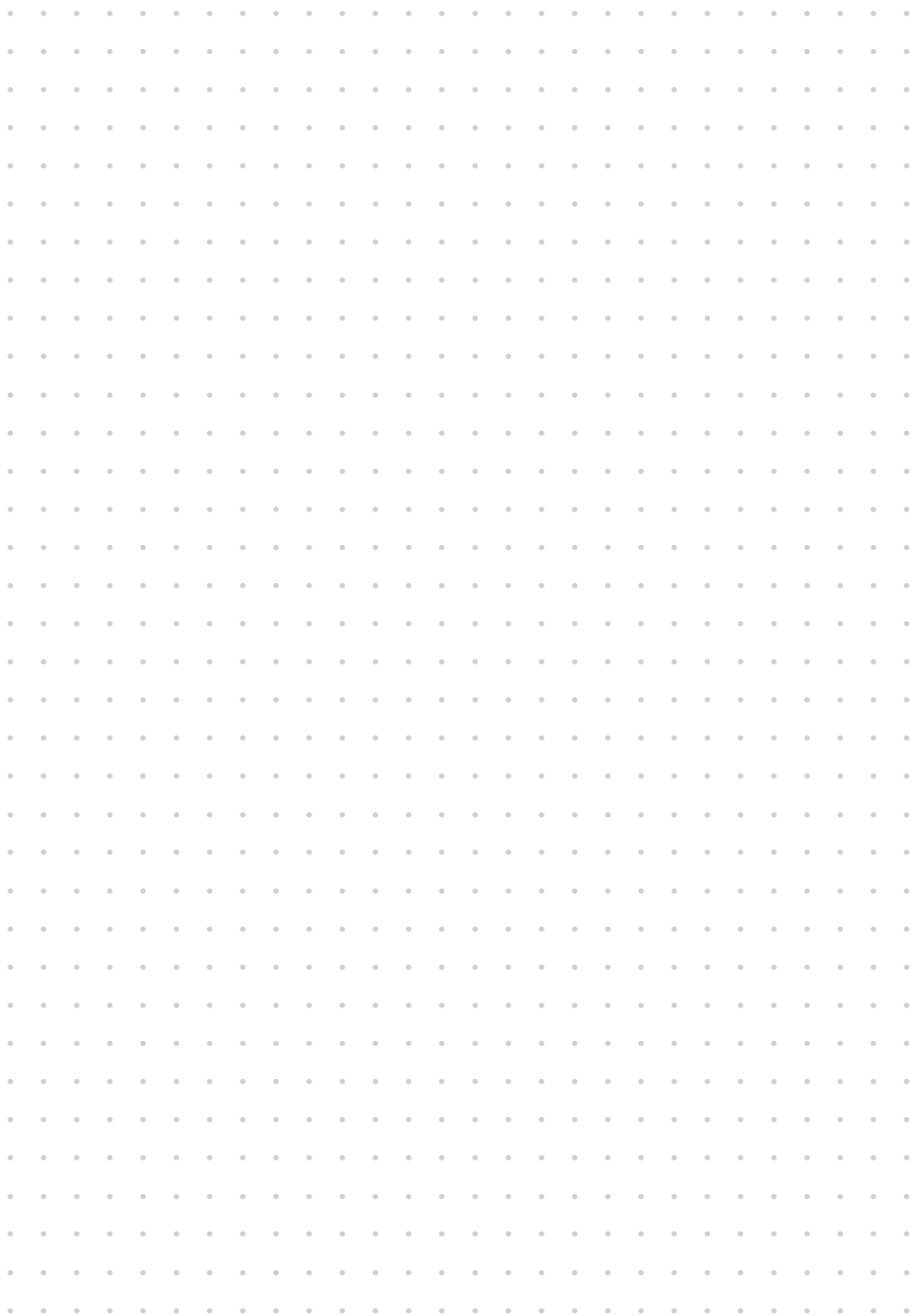
Task 12 (independent)

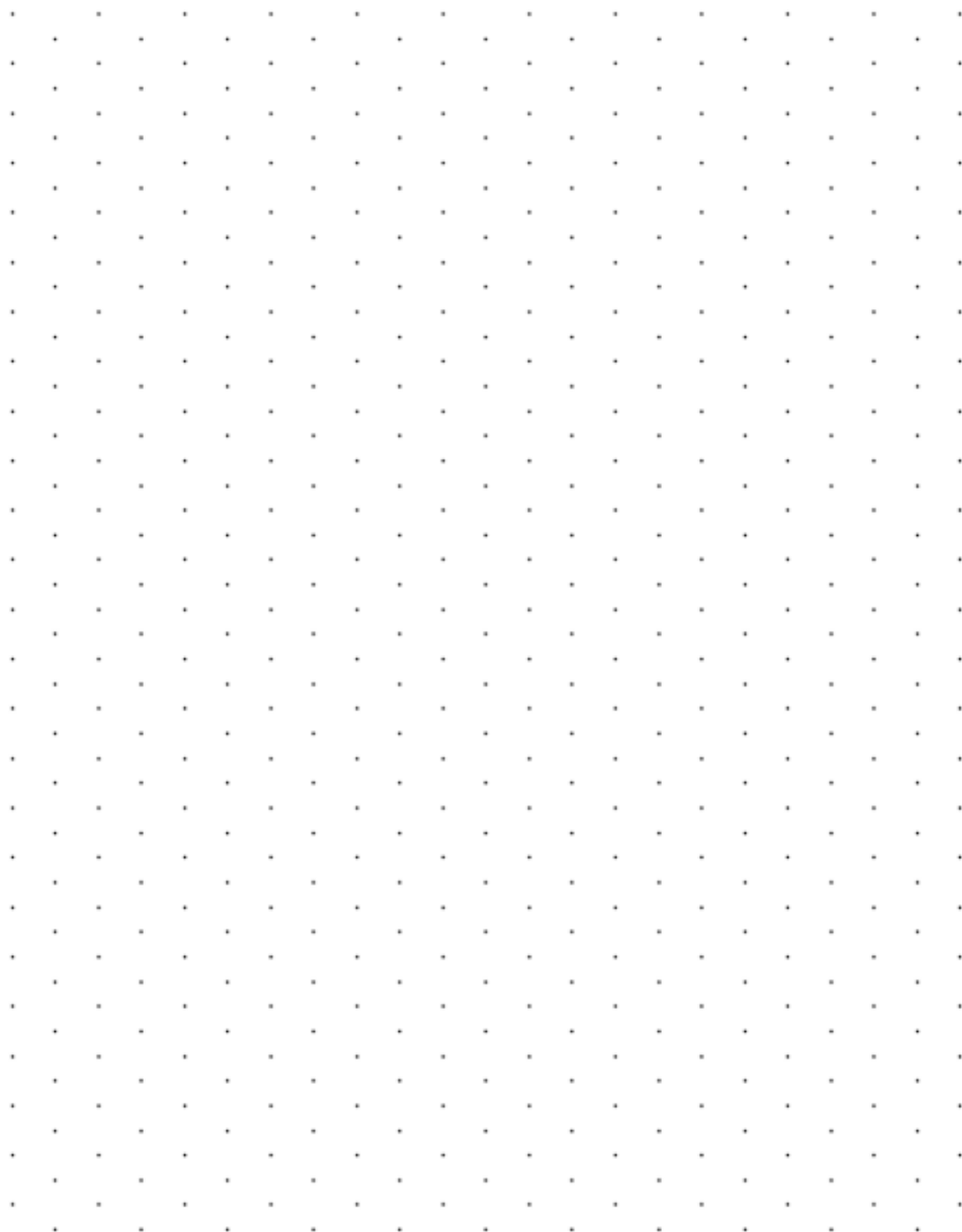
You are an explorer. You can choose your own setting but you need to use a numbered grid, decide on a scale and have a legend.

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.

Dotty Paper

Isometric Dotty Paper

Squared Paper