

Unit 5a
Shape and Space

Year 5
Spring term

This Unit Plan is designed to guide your teaching. You will need to adapt it to meet the needs of your class.

Unit Objectives
Year 5

- Visualise 3-D shapes from 2-D drawings.
- Recognise positions and directions: read and plot co-ordinates in the first quadrant; **recognise perpendicular and parallel lines.**
- Recognise reflective symmetry in regular polygons.
- Complete symmetrical patterns with two lines of symmetry at right angles.
- Make and investigate a general statement about familiar shapes by finding examples that satisfy it.

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Resources needed to teach this unit:

- Activity sheet 5a.1
- Activity sheet 5a.2
- Activity sheet 5a.3
- Activity sheet 5a.4
- OHT 5a.1
- OHT 5a.2
- OHT 5a.3
- OHT 5a.4
- OHT 5a.5
- OHT 5a.6
- OHT 5a.7
- Large sheet of paper
- OHP calculator
- Set of regular polygons
- Set of irregular polygons
- Square sheet of paper
- A4 or large rectangular sheets of paper
- Scissors
- Number fans
- Interlocking cubes
- Squared paper
- Rulers
- Irregular heptagon made from sheet of paper

Link Objectives

Year 4

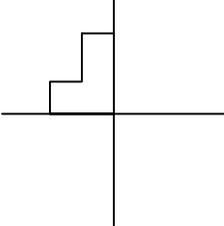
Year 6

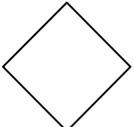
- Describe and visualise 3-D and 2-D shapes, including the tetrahedron and heptagon.
- Make shapes: for example, construct polygons by paper folding or using pin board, and discuss properties such as lines of symmetry.
- Visualise 3-D shapes from 2-D drawings and identify simple nets of solid shapes.
- Sketch the reflection of a simple shape in a mirror line parallel to one side (all sides parallel or perpendicular to the mirror line).
- Recognise simple examples of horizontal and vertical lines.
- Make and investigate a general statement about familiar shapes by finding examples that satisfy it.

- Describe and visualise properties of solid shapes such as parallel or perpendicular faces or edges.
- Visualise 3-D shapes from 2-D drawings and identify different nets for a closed cube.
- Recognise where a shape will be after reflection: in a mirror line touching the shape at a point (sides of shape not necessarily parallel or perpendicular to the mirror line); in two mirror lines at right angles (sides of shape all parallel or perpendicular to the mirror line).
- Make and investigate a general statement about familiar shapes by finding examples that satisfy it.

(Key objectives in bold)

Planning sheet		Day One		Unit 5a <i>Shape and space</i>		Term: <i>Spring</i>		Year Group: 5	
Oral and Mental			Main Teaching			Plenary			
Objectives and Vocabulary		Teaching Activities		Objectives and Vocabulary		Teaching Activities		Teaching Activities/Focus Questions	
<p>To count on or back in equal steps, including beyond zero.</p>		<ul style="list-style-type: none"> Use the OHP calculator in constant mode. Set the calculator to add 25s. Children have to say the next number before the equals key is pressed. 		<p>Recognise reflective symmetry in regular polygons.</p> <p>Make and investigate a general statement about familiar shapes by finding examples that satisfy it.</p>		<ul style="list-style-type: none"> Hold up a large square of paper. Fold the square along a line of symmetry. 		<p>Q Are the number of lines of symmetry on a regular polygon always the same as the number of sides or edges?</p>	
<p>Q Will the calculator show 450 if we go up in 25s? Explain how you know?</p>		<p>Q What is going to happen when we get to zero?</p>		<p>Establish that this is called 'a line of symmetry'.</p>		<p>Q What do we call the line created by this fold?</p>		<ul style="list-style-type: none"> Discuss children's responses and share examples. 	
<p>Enter 1000 and set the calculator to subtract 25s. Children have to say next number before the equals key is pressed.</p>		<p>Remind children of the negative numbers and continue the count past zero.</p>		<p>Invite children to make another fold and together identify the four lines of symmetry. Draw these into the square.</p>		<p>Q Are there any other lines of symmetry in the square?</p>		<p>Q Was there a shape which didn't fit this rule?</p>	
<p>Q What is going to happen when we get to zero?</p>		<p>Repeat this with steps of 0.5 and 0.1.</p>		<p>Ask children to identify the reflective symmetry of the other polygons on the sheet. Collect answers and discuss the symmetry of regular polygons with an even and an odd number of edges.</p>		<p>Collect suggestions.</p>		<p>Confirm that the regular polygons fitted this rule but that the irregular polygons did not have the same number of lines of symmetry as edges.</p>	
<p>Repeat the count.</p>		<p>Repeat this with steps of 0.5 and 0.1.</p>		<p>Give out mirrors and Activity sheet 5a.1. Demonstrate the use of a mirror to find the lines of symmetry of the square on the sheet. Remind children that a line of symmetry is sometimes called a mirror line or reflective symmetry.</p>		<p>Ask:</p>		<p>On the board draw:</p>	
<p>Q If we move back, forward 4 steps, what is the number?</p>		<p>Repeat with other combined steps.</p>		<p>Refer children back to Activity sheet 5a.1.</p>		<p>Q What other way can we find a line of symmetry?</p>			
<p>VOCABULARY negative</p>		<p>VOCABULARY line of symmetry reflective symmetry regular polygon irregular polygon edges</p>		<p>After a while ask the children to investigate the statement: 'Irregular polygons have no lines of symmetry.'</p>		<p>Give out mirrors and Activity sheet 5a.1. Demonstrate the use of a mirror to find the lines of symmetry of the square on the sheet. Remind children that a line of symmetry is sometimes called a mirror line or reflective symmetry.</p>		<p>Say the vertical line is a line of symmetry.</p>	
<p>RESOURCES OHP calculator</p>		<p>RESOURCES Activity sheet 5a.1 Set of regular polygons Set of irregular polygons Large sheet of paper</p>		<p>Discuss the children's answers. Confirm that the first statement is true but the second statement is false as there are irregular polygons that have lines of symmetry. Demonstrate that a rectangle has two lines of symmetry and an isosceles triangle has one line of symmetry, yet neither is regular.</p>		<p>Q How many edges will the completed shape have?</p>		<p>Establish it will have six edges and invite children to complete the shape.</p>	
				<p>Q Are the two statements true or false? How do you know?</p>		<p>Agree it is irregular and it has one line of symmetry.</p>		<p>Q Is it a regular hexagon? Why?</p>	
						<p>Refer children back to Activity sheet 5a.1.</p>		<p>Agree they do not by drawing a hexagon with no lines of symmetry. Refer back to the statements the children have investigated.</p>	
						<p>Record these on a large sheet of paper for display.</p>		<p>Q Will all irregular hexagons have one line of symmetry?</p>	
						<p>By the end of the lesson the children should be able to:</p>		<p>Establish they do not by drawing a hexagon with no lines of symmetry. Refer back to the statements the children have investigated.</p>	
						<p>Agree:</p>		<p>Q Can we write down two statements that we think are true?</p>	
						<p>1. Regular polygons have the same numbers of lines of symmetry as they have sides or edges.</p>		<p>By the end of the lesson the children should be able to:</p>	
						<p>2. Irregular polygons can have lines of symmetry.</p>		<p>• Recognise that the number of axes of reflective symmetry in regular polygons is equal to the number of sides;</p>	
						<p>Record these on a large sheet of paper for display.</p>		<p>• Find examples that match a general statement, for example, a regular hexagon has 6 sides and 6 lines of symmetry.</p>	
						<p>By the end of the lesson the children should be able to:</p>		<p>(Refer to supplement of examples, section 6, pages 81, 107).</p>	

Planning sheet	Day Two	Unit 5a <i>Shape and space</i>	Term: <i>Spring</i>	Year Group: 5
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
<p>Visualise 2-D shapes. Recognise lines of symmetry.</p> <p>VOCABULARY regular irregular right-angled triangle isosceles pentagon hexagon symmetry</p> <p>RESOURCES Square sheet of paper Scissors</p>	<ul style="list-style-type: none"> Ask the children to close their eyes and visualise a square. Say that you want them to imagine a line joining the mid-point of two sides that are next to one another, and a cut being made along this line to form two new shapes. <p>Q What are these two new shapes?</p> <p>Discuss children's suggestions. Establish that one is an isosceles right-angled triangle; the other an irregular pentagon.</p> <ul style="list-style-type: none"> Ask: <p>Q Do the two shapes have any lines of symmetry?</p> <p>Discuss children's suggestions. Establish that they each have one line of symmetry.</p> <ul style="list-style-type: none"> Take a square sheet of paper and demonstrate the cut and the symmetry of the two shapes. Hide the paper and ask children to close their eyes again and imagine that the mid-points of the other two sides of the original square were also joined and the cut made to get three shapes. <p>Q What are the three shapes? Do they have lines of symmetry?</p> <p>Discuss and confirm answers before demonstrating using the square sheet of paper.</p> <p>Confirm that the hexagon has two lines of symmetry.</p>	<p>Complete symmetrical patterns with two lines of symmetry at right angles.</p> <p>VOCABULARY line of symmetry reflection vertical horizontal</p> <p>RESOURCES Activity sheet 5a.2 OHT 5a.1 OHT 5a.2 Rulers Activity sheet 5a.3</p>	<ul style="list-style-type: none"> Show the class the grid on OHT 5a.1 and use the L shape from OHT 5a.2 as shown below.  <p>Explain that the two lines are lines of symmetry and you have only provided part of the shape. You want the children to complete the shape.</p> <p>Q What will it look like?</p> <p>Ask a child to come out and show what happens. Identify the final shape confirming the reflection in both lines of symmetry.</p> <ul style="list-style-type: none"> Ask the children how many lines of symmetry the new shape has got and to explain the relationship between the two lines. Establish the two lines are at right angles. Discuss how to make patterns with two lines of symmetry at right angles. Repeat using one or more of the shapes on OHT 5a.2. Each time discuss the methods the children use. <p>Q Does it matter if we use the horizontal or the vertical line of symmetry first?</p> <p>Establish it makes no difference.</p> <ul style="list-style-type: none"> Give out Activity sheet 5a.2. Ask children to complete the shapes, using pencils and rulers. Collect answers and discuss the symmetry of the final shapes. <p>Q How many sides has each of the shapes?</p> <p>Collect children's answers. Point out they are all even numbers. Emphasise that they are all polygons because they have straight sides and they are all irregular. Remind children that these are other examples of irregular polygons with lines of symmetry.</p> <p>Q Why do the shapes all have an even number of sides?</p> <p>Discuss the effects of 'copying' a shape on a mirror line and relate this to doubling.</p>	<ul style="list-style-type: none"> Give out Activity sheet 5a.3. Refer to the first grid. Say that children are to find the area of the shape that is drawn, then complete the shape using the line of symmetry. Ask children to find the area of the drawn shape. Agree the area of the drawn shape, ask: <p>Q What will the area of the completed shape be?</p> <p>Collect children's predictions. Ask them to write on the top of the Activity sheet the rule they used to get their prediction. Tell them they are to test their rules and predictions.</p> <ul style="list-style-type: none"> Say that the area is measured using the squares on the grid, and they are to write the answers below the grids. Three of the grids have a starting shape for them. On the other grid they can draw their own shape. <p>HOMEWORK – The children are to find the area of the original shape, complete the shape using the lines of symmetry, find the area of the new shape and test their rule and predictions. After completing the 4 shapes, they are to say whether their rules and predictions were correct or not.</p> <p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Complete symmetrical patterns on squared paper with two lines of symmetry at right angles. <p>(Refer to supplement of examples, section 6, page 107).</p>

Planning sheet		Day Three (page 1 of 2)		Unit 5a <i>Shape and space</i>		Term: <i>Spring</i>		Year Group: 5			
Oral and Mental			Main Teaching			Plenary					
Objectives and Vocabulary		Teaching Activities		Objectives and Vocabulary		Teaching Activities		Teaching Activities/Focus Questions			
Visualise 2-D shapes. Recognise lines of symmetry.		<ul style="list-style-type: none"> Say that you want the children to visualise a shape as on Day two. This time they are to close their eyes and visualise a rectangle. You want them to join the mid-point of a longer side to the mid-point of a shorter side and using this line, imagine the rectangle being cut into two shapes. <p>Q What are these two new shapes?</p> <p>Discuss children's suggestions. Establish that one is a scalene right-angled triangle; the other an irregular pentagon.</p> <ul style="list-style-type: none"> Ask: <p>Q Do the two shapes have any lines of symmetry?</p> <p>Discuss children's suggestions. Establish neither shape has a line of symmetry.</p> <ul style="list-style-type: none"> Using an A4 sheet of paper demonstrate the cut, the two shapes and their lack of symmetry. Hide the paper and ask the children to close their eyes and imagine a rectangle as before. They imagine a line from the mid-point of a longer side to the mid-point of a shorter side and a line from this mid-point to the mid-point of the other long side. Cuts are made along these two lines. 		Recognise perpendicular and parallel lines.		<ul style="list-style-type: none"> Collect and discuss the homework. Confirm the areas of the given shapes and that the completed shapes are four times bigger. Draw a pair of parallel lines on the board. Explain that these two lines are the same distance apart wherever you measure. Demonstrate this, showing children that the distance you measure is the perpendicular distance between the lines. Say that they are a pair of parallel lines. <p>Q Can you see any pairs of parallel lines in the classroom?</p> <p>Collect examples and where appropriate have children take some measurements as a check.</p> <ul style="list-style-type: none"> Show the first shape on OHT 5a.3. <p>Q Are there any pairs of parallel lines on this shape?</p> <p>Collect answers. Agree that for the regular hexagon the three pairs of opposite sides are parallel. Introduce the arrow notation to identify parallel lines. On the two lines on the board record:</p> <p style="text-align: center;">  </p> <p>Explain the arrows mean the lines are parallel. Put arrows on the pairs of parallel lines on the regular hexagon.</p> <ul style="list-style-type: none"> Repeat with the other shapes on the OHT. Confirm that the kite, regular pentagon and heptagon have no pairs of parallel sides. Ensure that the children can use the vocabulary and the names of the shapes. Rotate the OHT to emphasise that no matter which way the shape is, the property still holds. Return to the rectangle on the OHT. <p>Q What can you tell me about the sides and angles of this rectangle?</p> <p>Collect responses and ensure the fact that the angles are all right angles is included.</p> <p>Q What symbol do we use to show an angle is a right angle?</p> <p>Draw the symbol for a right angle on the four angles.</p> <p>Q Do you know another way of describing two lines at right angles?</p>		<ul style="list-style-type: none"> On the board draw a square as shown below. <p style="text-align: center;">  </p> <p>Q Can you see any parallel and perpendicular lines?</p> <p>Collect responses. Agree that there are two pairs of parallel lines and four pairs of perpendicular lines. Add the symbols for parallel and perpendicular lines on the shape.</p> <p>Q What is the name of the shape?</p> <p>Confirm it is a square.</p> <p>Q What other shape have we seen that had two pairs of parallel lines and four pairs of perpendicular lines?</p> <p>Collect answers and agree it was the rectangle.</p> <p>Q Can you draw a shape with one pair of parallel lines and two pairs of perpendicular lines?</p> <p>Ask children to work in pairs to find shapes with these properties.</p> <ul style="list-style-type: none"> Collect children's suggestions and discuss the properties of the shapes the children have produced. 			
VOCABULARY right-angled triangle pentagon scalene irregular symmetry		VOCABULARY parallel perpendicular edges		VOCABULARY parallel perpendicular edges							
RESOURCES A4 sheet of paper Scissors				RESOURCES OHT 5a.3							

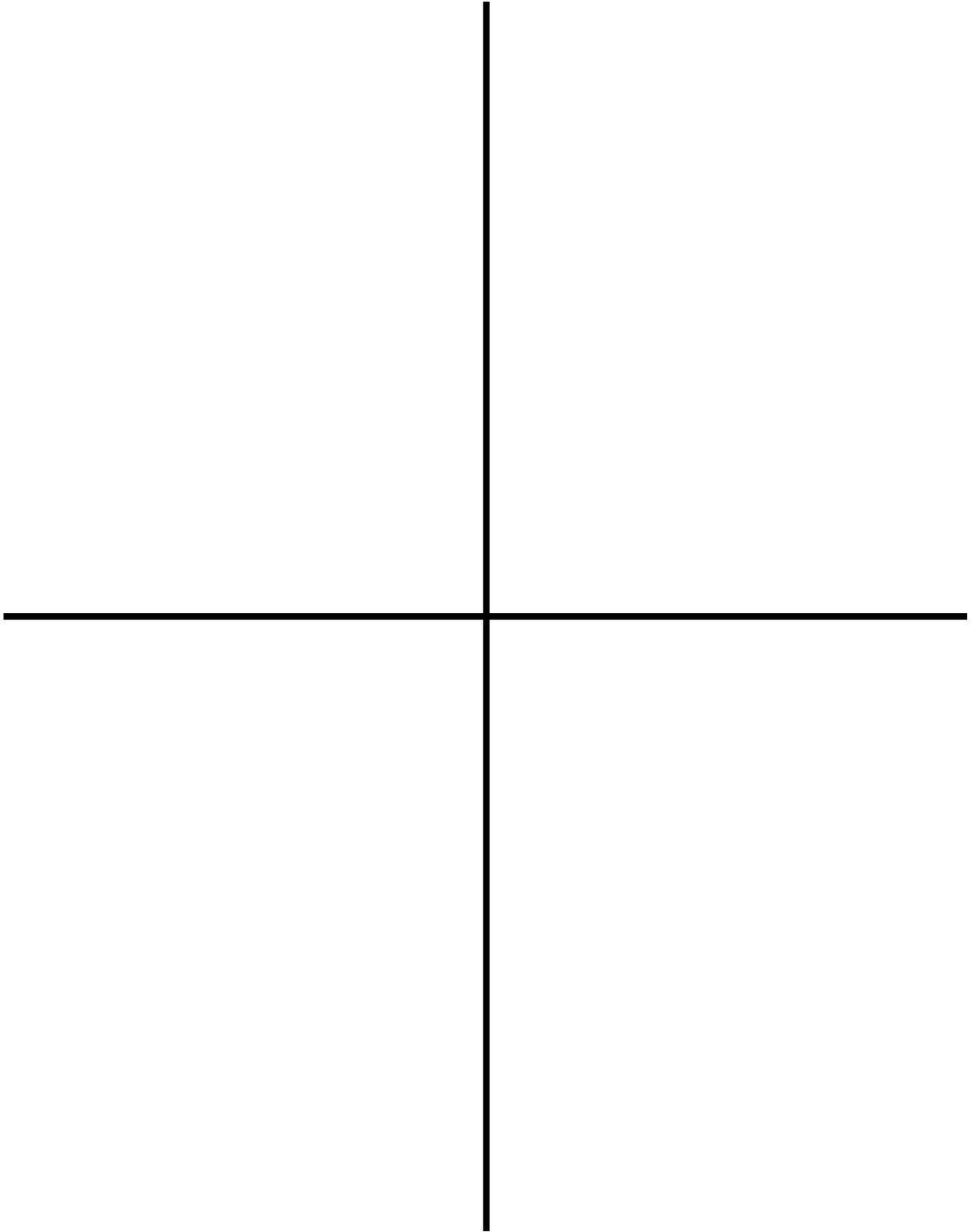
Planning sheet		Day Three (page 2 of 2)		Unit 5a <i>Shape and space</i>		Term: <i>Spring</i>		Year Group: 5		
Oral and Mental			Main Teaching				Plenary			
Objectives and Vocabulary		Teaching Activities		Objectives and Vocabulary		Teaching Activities			Teaching Activities/Focus Questions	
		<p>Q How many new shapes are made? What are their names?</p> <p>Collect children's suggestions.</p> <p>Establish that there are three shapes, two scalene right-angled triangles and a pentagon. Only the pentagon has one line of symmetry.</p>				<p>Introduce the word perpendicular and ask pairs of children to identify lines and edges of shapes in the classroom that are parallel or perpendicular. Collect suggestions and correct any misunderstandings.</p> <ul style="list-style-type: none"> Return to the OHT. <p>Q Are there any perpendicular edges on any of the other shapes?</p> <p>Agree that the trapezium and kite have pairs of perpendicular edges and draw in the symbol.</p>			<p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Know that perpendicular lines are at right angles to each other and parallel lines are the same distance apart; Recognise and identify parallel and perpendicular lines in the environment and in regular polygons such as the square, hexagon and octagon. <p>(Refer to supplement of examples, section 6, page 109.)</p>	

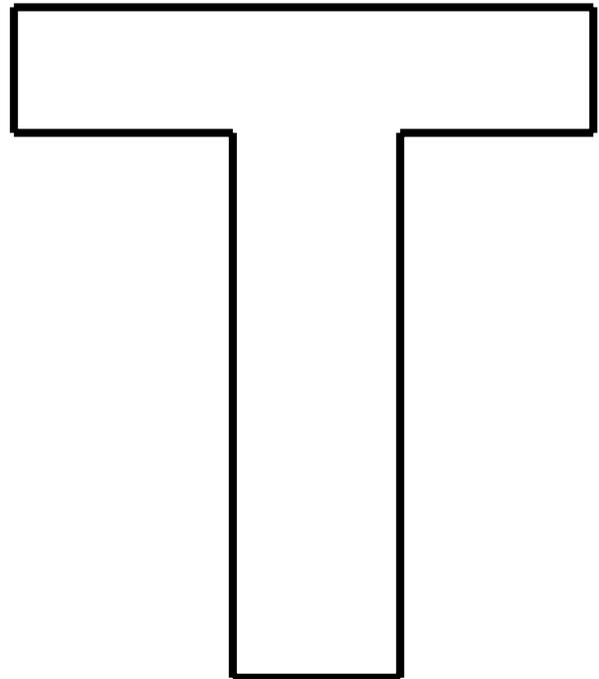
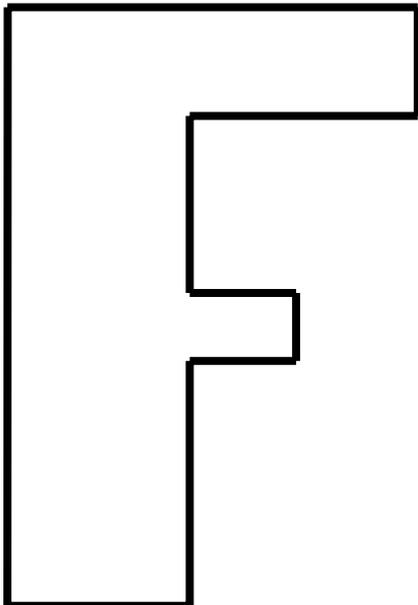
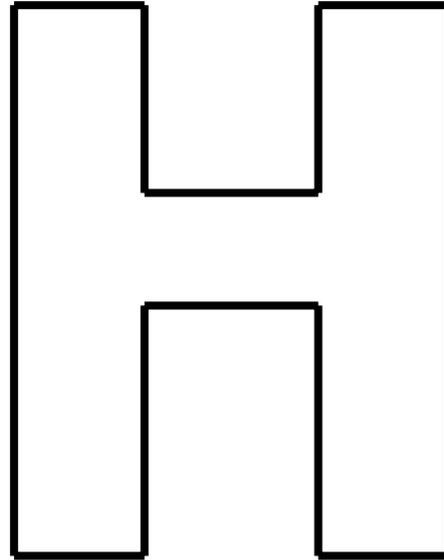
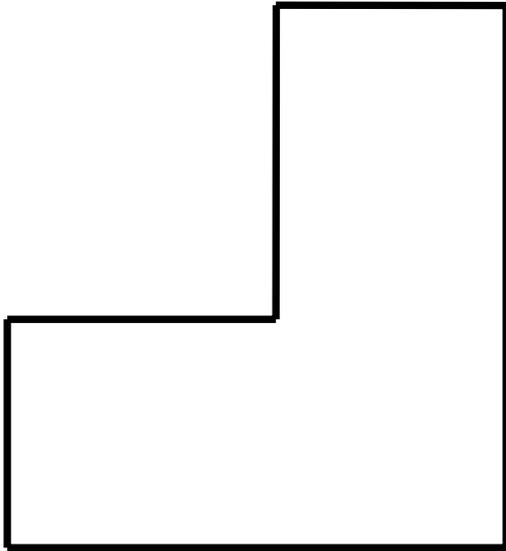
Planning sheet		Day Four (page 1 of 2)		Unit 5a <i>Shape and space</i>		Term: <i>Spring</i>		Year Group: 5			
Oral and Mental			Main Teaching			Plenary					
Objectives and Vocabulary		Teaching Activities		Objectives and Vocabulary		Teaching Activities		Teaching Activities/Focus Questions			
<p>Recall facts in 5 and 6 times tables and begin to derive division facts.</p>		<ul style="list-style-type: none"> Show the children the irregular pentagon made during day three's lesson. Confirm children can name the shape correctly. Ask children problems related to the 5 times table. Ask questions such as: <div style="border: 1px solid black; padding: 2px; margin: 5px 0;">Q If I have six irregular pentagons, how many sides can I see altogether?</div> <div style="border: 1px solid black; padding: 2px; margin: 5px 0;">Q If I can see 30 sides, how many irregular pentagons do I have?</div> <p>Children respond with number fans. In pairs, ask children to explain their methods to one another and then to the whole class.</p> <ul style="list-style-type: none"> With a pair of scissors remove a vertex from the irregular pentagon by making a straight cut. <div style="border: 1px solid black; padding: 2px; margin: 5px 0;">Q What is the name of this shape?</div> <p>Collect answers and confirm it is an irregular hexagon. Ask a series of questions relating to the 6 times table as before.</p>		<p>Recognise positions and use co-ordinates.</p> <p>Recognise perpendicular and parallel lines.</p>		<p>Recognise positions and use co-ordinates.</p> <p>Recognise perpendicular and parallel lines.</p>		<ul style="list-style-type: none"> Show OHT 5a.4. Remind children about the use of co-ordinates to describe the position of a point on the grid. Write (7, 2) on the board. <div style="border: 1px solid black; padding: 2px; margin: 5px 0;">Q Where is this point on the grid?</div> <p>Invite children to identify the point on the grid with a small cross. Emphasise that the first number identifies the horizontal distance or the distance along the axis and the second number the vertical distance or the distance up the axis.</p> Repeat with the points (5, 4), (3, 6) and (1, 8). <div style="border: 1px solid black; padding: 2px; margin: 5px 0;">Q What can you say about these points?</div> <p>Collect answers and agree that they are on a line. Join up the points (7, 2) to (1, 8) with a straight line. Ask: <div style="border: 1px solid black; padding: 2px; margin: 5px 0;">Q Are the points (2, 7), (4, 5), (6, 3) on this line?</div> <p>Identify the points and agree they are on the line. <div style="border: 1px solid black; padding: 2px; margin: 5px 0;">Q Can you give me any other points that would fit on this line if we extended it?</div> <p>Extend the line to confirm that (0, 9) and (8, 1) are on the line, and agree that (9, 0) would also be on the line.</p> </p></p> Write the co-ordinates (3, 4) on the board. Invite children to locate the point. Say you want a new line through (3, 4) that is parallel to the first line. <div style="border: 1px solid black; padding: 2px; margin: 5px 0;">Q What points would be on this new line?</div> <p>Collect answers and confirm points by drawing the line.</p> Repeat with parallel lines through (1, 2) and through (6, 6). Write (7, 9) on the board. With the children, locate the point on the grid. Say that you want to draw a line perpendicular to the other lines that passes through (7, 9). <div style="border: 1px solid black; padding: 2px; margin: 5px 0;">Q What points will be on this line?</div> <p>Collect answers and confirm points by drawing the line.</p> Repeat drawing perpendicular lines through (5, 10) and (0, 1). Give children Activity sheet 5a.4. 		<ul style="list-style-type: none"> Show a clean copy of OHT 5a.4. On the board write (0, 4) and (8, 0). <p>Invite children to identify these points with small crosses on the OHT. Tell them to draw these on their activity sheets.</p> <div style="border: 1px solid black; padding: 2px; margin: 5px 0;">Q If we join up these points with a straight line, what points will this line pass through?</div> <p>Collect answers and join up the points to confirm the points are (2, 3), (4, 2) and (6, 1).</p> Identify the point (0, 2). <div style="border: 1px solid black; padding: 2px; margin: 5px 0;">Q If we draw a line through this point parallel to the other line, what points will this line pass through?</div> <p>Collect answers and draw the line to confirm the points are (2, 1) and (4, 0).</p> Say that you now want to draw a line perpendicular to this new line from the point (4, 0). Invite children to identify points on this line. Remind them that the two lines at (4, 0) will look like the corner of a square. Collect and discuss answers. <div style="border: 1px solid black; padding: 2px; margin: 5px 0;">Q If our two lines are two sides of a square, can you tell me some points on the other two sides?</div> <p>Collect answers and invite children to draw in the lines to complete the square and check the points are on the two lines.</p> 	
<p>VOCABULARY irregular pentagon hexagon</p>		<p>VOCABULARY perpendicular parallel symmetry co-ordinates plot axis vertical horizontal vertex vertices</p>		<p>VOCABULARY perpendicular parallel symmetry co-ordinates plot axis vertical horizontal vertex vertices</p>		<p>VOCABULARY perpendicular parallel symmetry co-ordinates plot axis vertical horizontal vertex vertices</p>		<p>VOCABULARY perpendicular parallel symmetry co-ordinates plot axis vertical horizontal vertex vertices</p>			
<p>RESOURCES Sheet of A4 paper Scissors Number fans</p>		<p>RESOURCES OHT 5a.4 Activity sheet 5a.4 Rulers</p>		<p>RESOURCES OHT 5a.4 Activity sheet 5a.4 Rulers</p>		<p>RESOURCES OHT 5a.4 Activity sheet 5a.4 Rulers</p>		<p>RESOURCES OHT 5a.4 Activity sheet 5a.4 Rulers</p>			

Planning sheet		Day Four (page 2 of 2)		Unit 5a <i>Shape and space</i>		Term: <i>Spring</i>		Year Group: 5	
Oral and Mental			Main Teaching				Plenary		
Objectives and Vocabulary		Teaching Activities		Objectives and Vocabulary		Teaching Activities		Teaching Activities/Focus Questions	
						<p>Ask children to plot the points (0, 8) and (2, 8) and join them up with a pencil and ruler.</p> <p>Q How long is this line?</p> <p>Agree it is 2 squares long. Say it is one side of a square.</p> <p>Q Can you draw in the complete square?</p> <p>Collect the co-ordinates of the other vertices of the square. Establish there are two possible squares.</p> <ul style="list-style-type: none"> Ask children to plot the points (4, 8) and (6, 6). Say that these points are vertices of a square. <p>Q How many squares can you draw with these two points as vertices?</p> <p>Collect answers and establish there are three possible squares. Discuss the squares the children have drawn using the vocabulary parallel and perpendicular.</p>		<p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Read and plot points using co-ordinates in first quadrant. Know that perpendicular lines are at right angles to each other; Know that parallel lines are the same distance apart. <p>(Refer to supplement of examples, section 6, page 109.)</p>	

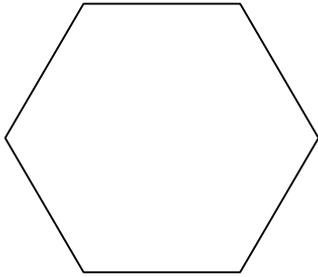
Planning sheet	Day Five (page 1 of 2)	Unit 5a <i>Shape and space</i>		Term: <i>Spring</i>	Year Group: 5
Oral and Mental		Main Teaching			Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions	
<p>Recall facts in 7, 8 and 9 tables and begin to derive division facts.</p> <p>VOCABULARY heptagon octagon nonagon</p> <p>RESOURCES Irregular heptagon made from sheet of paper Scissors</p>	<ul style="list-style-type: none"> Ask children: <ul style="list-style-type: none"> Q What is a seven-sided shape called? <p>Collect answers and show children an irregular heptagon. Ask children questions relating to the 7 times tables.</p> Q If I have four heptagons, how many sides is that? Q I can see 70 sides. How many heptagons do I have? <p>Children to discuss answers in pairs and respond with number fans. Ask the children how they worked it out and encourage the children to use the relevant multiplication table.</p> <ul style="list-style-type: none"> Remove a vertex from the heptagon to form an irregular octagon. Ensure children can name the shape. Ask questions like: <ul style="list-style-type: none"> Q I have a set of octagons and the total number of sides is 48. How many octagons are in my set? <p>Children discuss answers in pairs and respond with number fans.</p> <ul style="list-style-type: none"> Q How did you work it out? <p>Encourage the children to use the relevant division facts.</p> <ul style="list-style-type: none"> Repeat by making an irregular nonagon and asking questions involving the 9 times tables. 	<p>Visualise 3-D shapes from 2-D drawings.</p> <p>VOCABULARY net open cube closed cube</p> <p>RESOURCES Interlocking cubes OHT 5a.5 OHT 5a.6 OHT 5a.7 Squared paper</p>	<ul style="list-style-type: none"> Show the first shape on OHT 5a.5. Explain that the 3-D shape or solid is made of interlocking cubes. <ul style="list-style-type: none"> Q How many cubes do you think make up this solid shape? <p>Get children to work in pairs and work out the number of cubes. Collect answers and record suggestions on the board.</p> Q How can we check? <p>Agree that making the 3-D shape is a good check.</p> Give pairs of children the number of cubes they think they need, and ask them to build the shape. Get pairs of children to swap their shapes and decide whether the shapes are the same as that shown on the OHT. With the class agree which shapes are the same and the number of cubes needed. Establish that you can see five cubes on the OHT but there are some that are hidden. Agree that you can make the shape using 7 cubes even though you can only see six cubes. Show the second shape on OHT 5a.5. <ul style="list-style-type: none"> Q How many more cubes do you need to make this 3-D shape? <p>Give out cubes as before and get pairs of children to make the shape. Discuss the shape and the number of cubes needed to make the shape. Agree that it could be made with 9 cubes even though you can only see six cubes.</p> Say that now you want the children to work out how many more cubes they would need to make the shape into a cube. <ul style="list-style-type: none"> Q What size would the cube be? <p>Discuss suggestions and agree it would be a 3 by 3 by 3 cube.</p> Q How many cubes would you need altogether to make a 3 by 3 by 3 cube? <p>Establish it would be 27 cubes.</p> Q How many more cubes do we need? <p>Collect answers.</p>	<ul style="list-style-type: none"> Show OHT 5a.6. Discuss the three diagrams. Explain that these are three views of a shape made from seven interlocking cubes. Ask children to work in pairs and to make the shape. Collect answers. Project the three views of children's shapes using the OHP. Ask children to talk about how they used the information on the OHT to make the shape. Show OHT 5a.7. <ul style="list-style-type: none"> Q Is this shape the same shape as the one you were asked to make? <p>Discuss what you would see if you drew the top, front and side view of this shape.</p> Q Which of the 3-D representations make it easier for you to visualise the 3-D shape? <p>Discuss children's answers and reasons.</p> <p>By the end of the lesson, the children should be able to:</p> <ul style="list-style-type: none"> Visualise 3-D shapes from 2-D drawings. <p>(Refer to supplement of examples, section 6, page 105.)</p> 	

Planning sheet	Day Five (page 2 of 2)	Unit 5a <i>Shape and space</i>		Term: <i>Spring</i>	Year Group: 5
Oral and Mental		Main Teaching			Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions	
			<ul style="list-style-type: none"> Give out the squared paper. Refer to the two 3-D shapes on the board. Say that you want the children to draw on the squared paper what they would see if they looked down on to the 3-D shape. <p style="border: 1px solid black; padding: 2px;">Q How many squares would you see?</p> <p>Agree it is five squares and with the children draw the shape. Identify other views of the 3-D shape you want the children to draw. Discuss the different views and these 2-D representations of the solid.</p> <ul style="list-style-type: none"> Repeat using the second 3-D shape on the OHT. 		

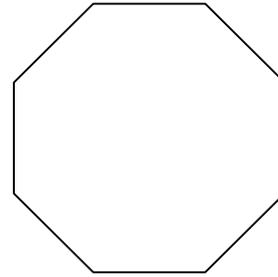




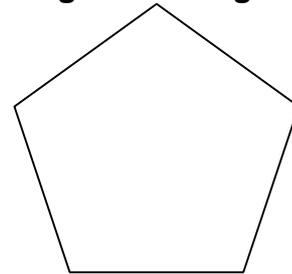
Regular Hexagon



Regular Octagon



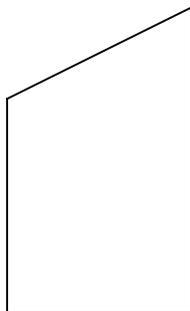
Regular Pentagon



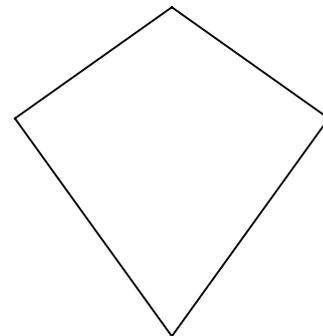
Rectangle



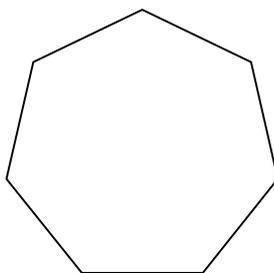
Trapezium



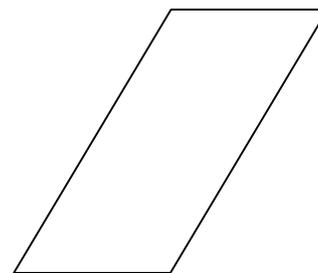
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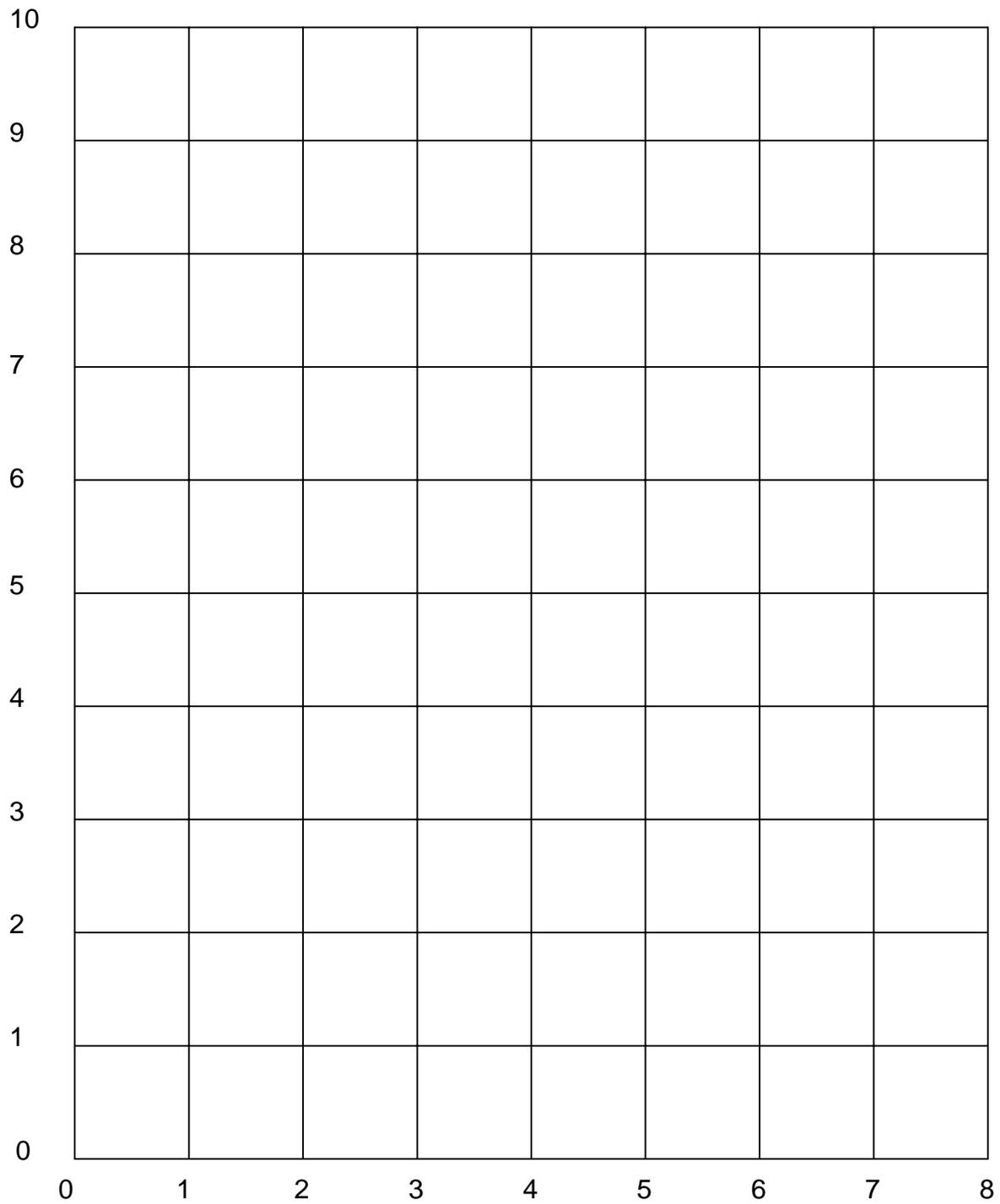


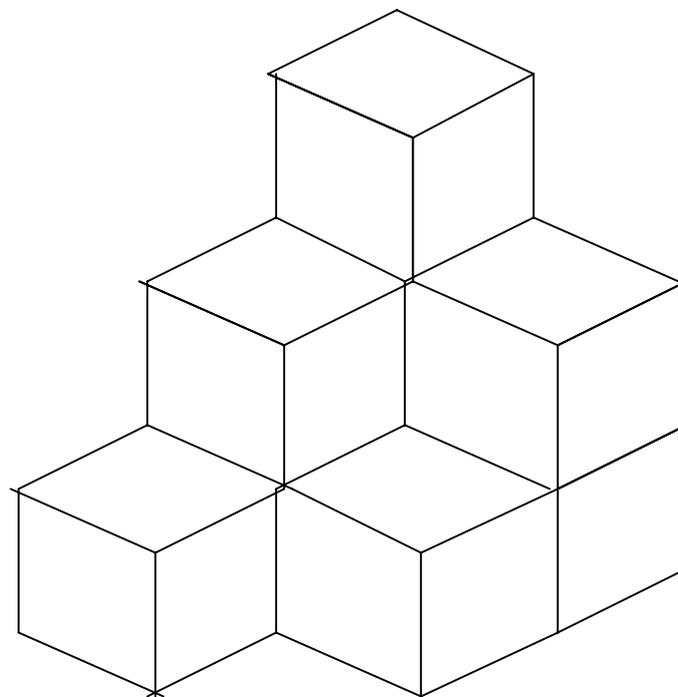
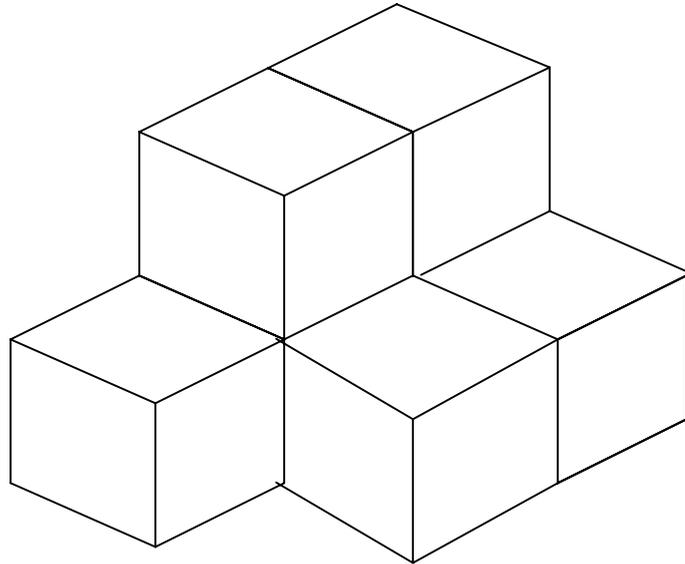
Regular Heptagon



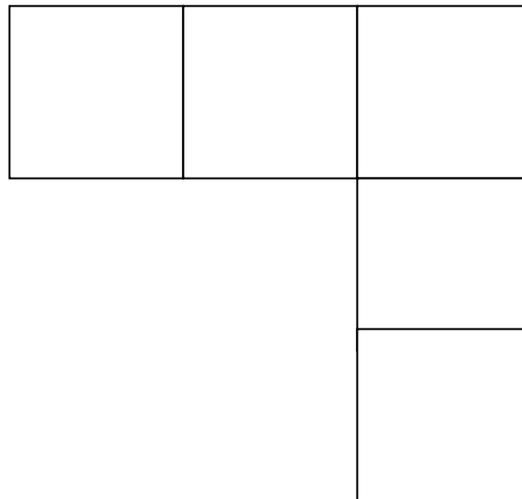
Parallelogram



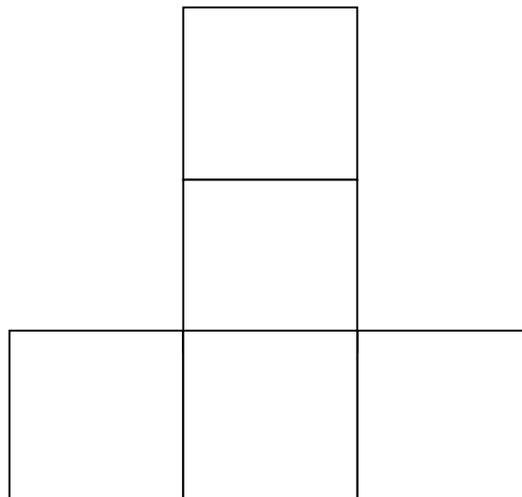




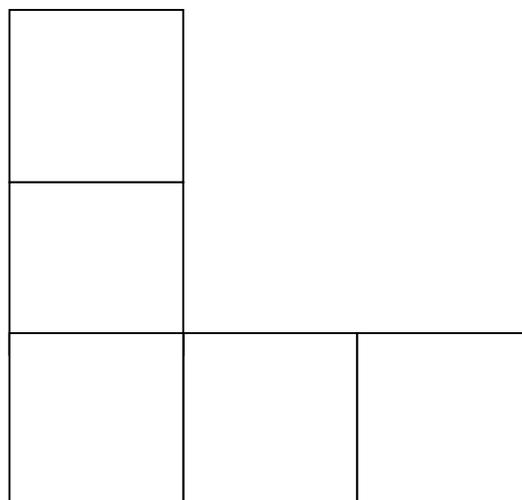
Top View

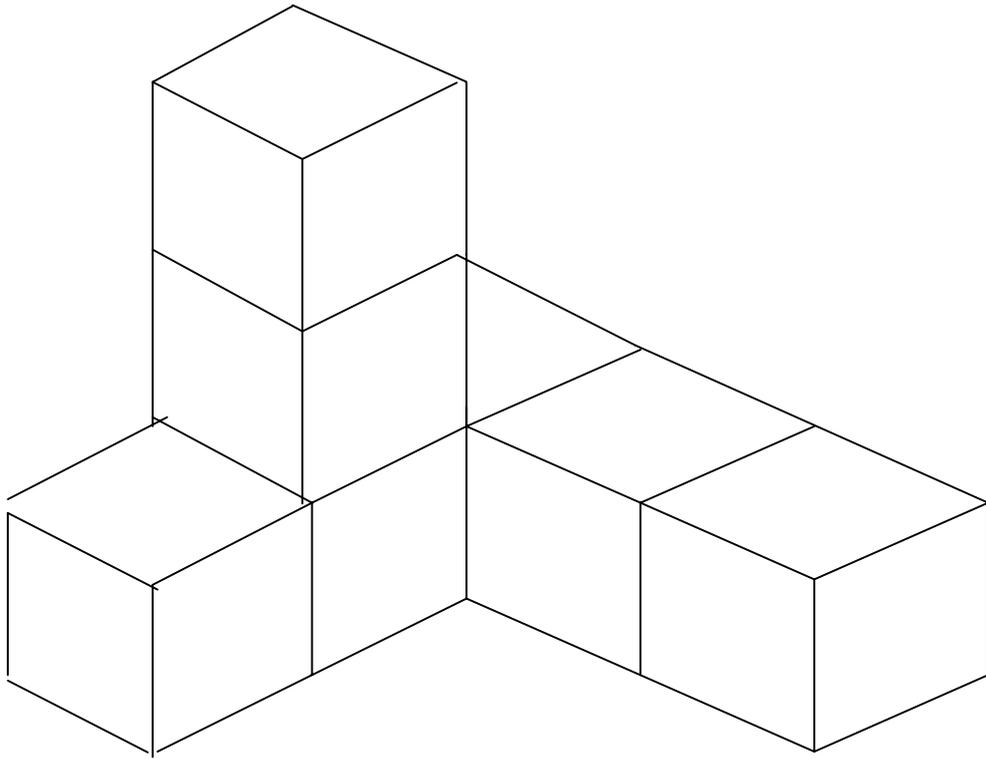


Front View

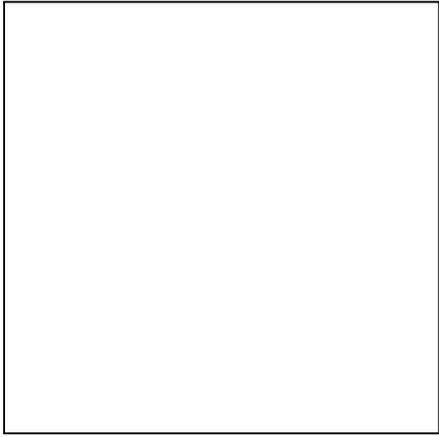


Side View



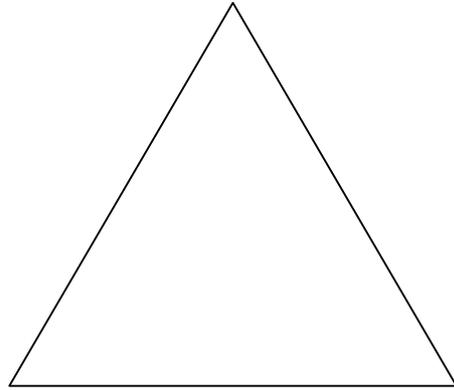


Square



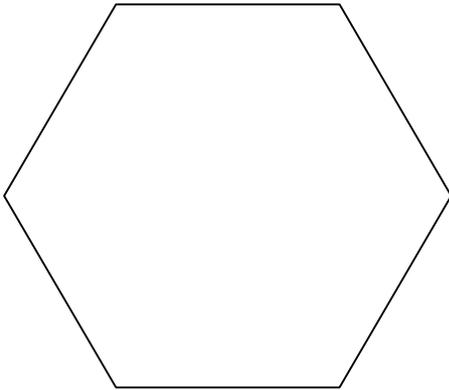
Lines of symmetry

Equilateral Triangle



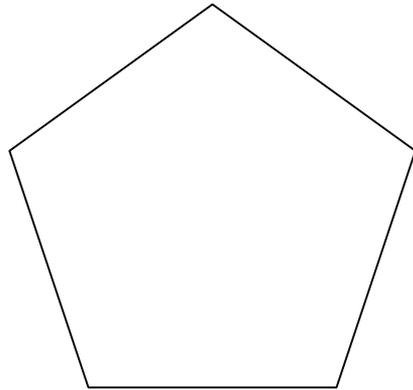
Lines of symmetry

Regular Hexagon



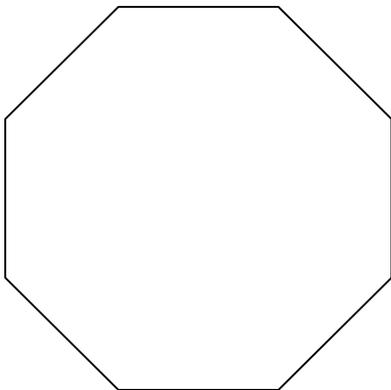
Lines of symmetry

Regular Pentagon



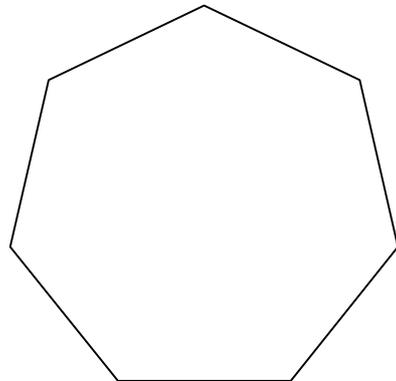
Lines of symmetry

Regular Octagon

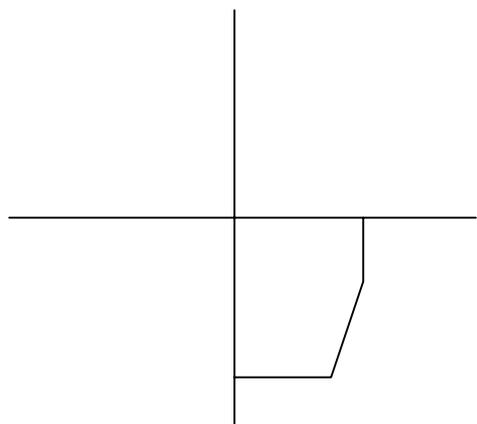
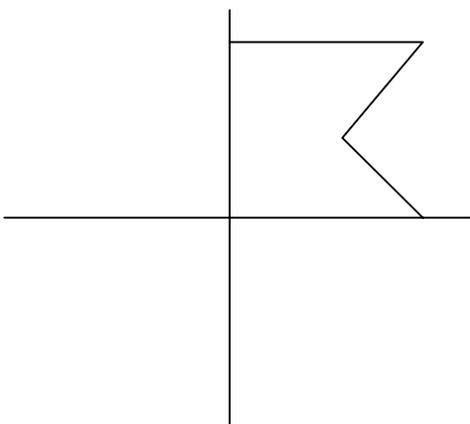
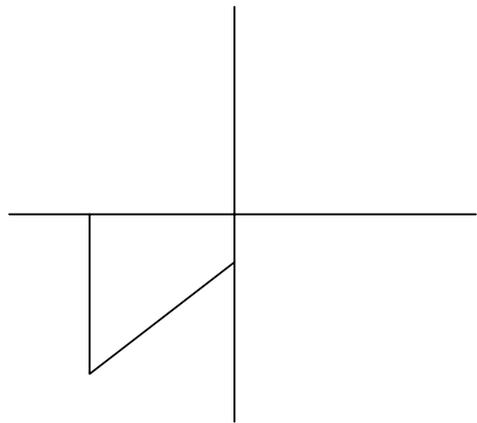
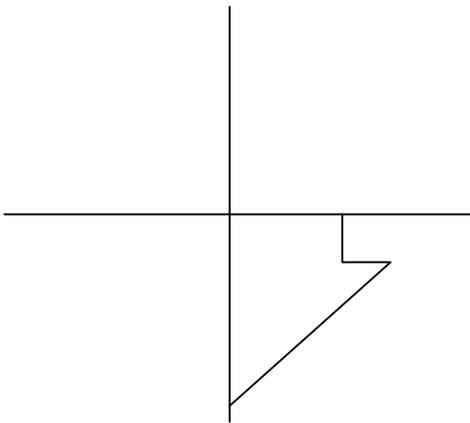
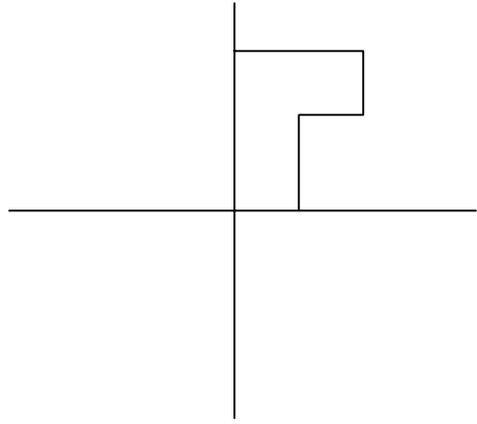
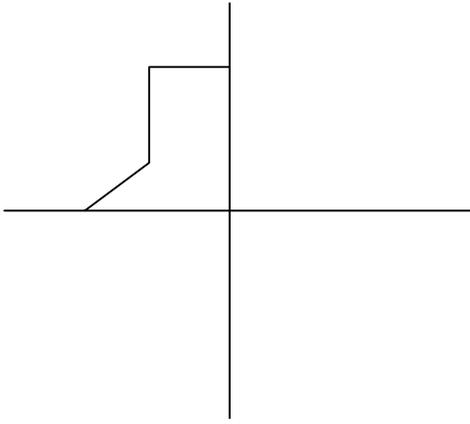


Lines of symmetry

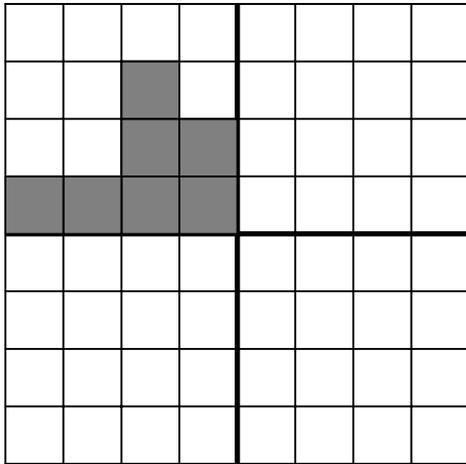
Regular Heptagon



Lines of symmetry

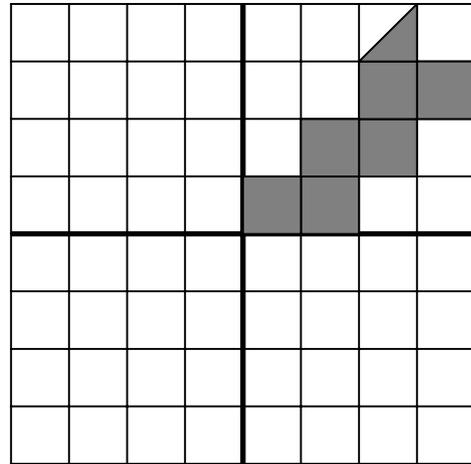


The rule for my predictions is: _____



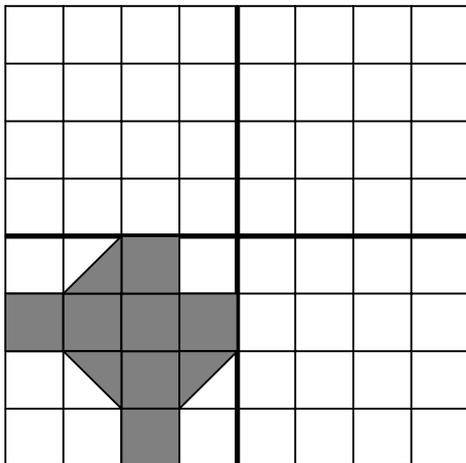
Area _____

Area _____



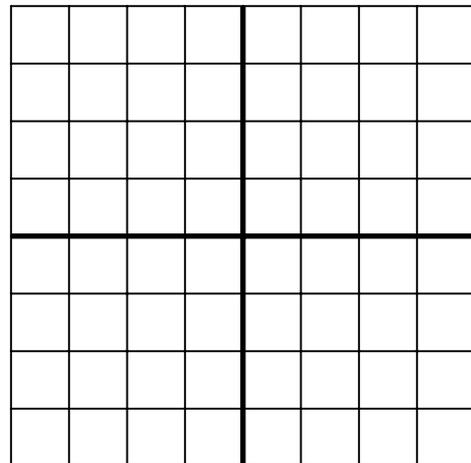
Area _____

Area _____



Area _____

Area _____



Area _____

Area _____

I think my rule works because: _____
