

Unit 7

Perimeter, area, calculation and problem solving

Five daily lessons

*National
Numeracy Strategy*

Year 6

Summer term

Unit Objectives

Year 6

- Carry out column addition and subtraction of numbers involving decimals.
- Calculate the perimeter and area of simple compound shapes that can be split into rectangles.
- Identify and use the appropriate operations (including combinations of operations) to solve word problems involving numbers and quantities and explain methods and reasoning.

Pages 49, 51

Page 97

Pages 82–89

This Unit Plan is designed to guide your teaching.

You will need to adapt it to meet the needs of your class.

Resources needed to teach this unit:

- OHT 7.1
- OHT 7.2
- OHT 7.3
- OHT 7.4
- OHT 7.5
- Self-assessment sheet 7.1
- Self-assessment sheet 7.2
- Whiteboards
- Centimetre squared paper
- Scissors
- Rulers
- Multilink cubes
- Rectangular sheets of stiff paper of different sizes
- Sticky tape
- Materials for filling cylinders

Year 5

Link Objectives

Year 7

- **Extend written methods to column addition/subtraction of two integers less than 10 000;** addition or subtraction of a pair of decimal fractions both with one or with two decimal places.
- **Understand area measured in square centimetres (cm²).**
- **Understand and use the formula in words, 'length × breadth' for the area of a rectangle.**
- Understand, measure and calculate perimeters of rectangles and regular polygons.
- Choose and use appropriate number operations to solve problems.

- Use standard column procedures to add and subtract whole numbers and decimals.
- Know and use the information for the area of a rectangle; calculate the perimeter and area of shapes made from rectangles.
- Calculate the surface area of cubes and cuboids.
- **Solve word problems and investigate in a range of contexts.**

(Key objectives in bold)

department for
education and skills

Planning sheet	Day One	Unit 7 <i>Perimeter, area, calculation and problem solving</i>	Term: Summer	Year Group: 6																								
Oral and Mental		Main Teaching		Plenary																								
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions																								
Add and subtract numbers with one decimal place. Explain methods and reasoning. RESOURCES Whiteboards VOCABULARY increase decrease	<ul style="list-style-type: none">Write on the board:<table><tr><td>a</td><td>b</td><td>2.6</td></tr><tr><td>c</td><td>1.3</td><td>d</td></tr></table><p>3.8 2.1</p><p>Explain that there are four missing numbers: a, b, c and d. The sum of the numbers in the first column is 3.8, the second column 2.1 and the first row 2.6.</p><div>Q Can you find a, b, c and d?</div><p>The children work out their answers on whiteboards. Collect the answers and discuss strategies.</p><div>Q Is there only one answer?</div><p>Discuss the children's responses and their reasoning. Repeat, replacing 1.3 by 0.9, then 0.5 and 0.1.</p><div>Q What happens to a, b, c and d as we change the bottom right-hand number in the grid?</div><p>Establish as this number decreases, b increases, a decreases and c increases while d does not change.</p><div>Q Why does d stay the same?</div><p>Discuss the explanations children offer.</p>Write on the board:<table><tr><td>a</td><td>b</td><td>7.4</td></tr><tr><td>c</td><td>1.3</td><td>d</td></tr></table><p>3.8 2.1</p><p>Explain that this time 7.4 and d are still the sums of the numbers in the rows but the numbers in the columns are subtracted so 3.8 is a – c and 2.1 is b – 1.3.</p><div>Q Can you find a, b, c and d?</div><p>Collect the children's answers and strategies</p><div>Q Is there only one answer?</div><p>Discuss the children's responses and reasoning. Repeat, replacing 1.3 by 0.9, then 0.5 and 0.1.</p><div>Q What happens to a, b, c and d as we change the bottom right-hand number in the grid?</div><p>Collect responses.</p><div>Q Why does d stay the same?</div><p>Discuss the children's explanations.</p>	a	b	2.6	c	1.3	d	a	b	7.4	c	1.3	d	<ul style="list-style-type: none">Carry out column addition and subtraction of numbers involving decimals. RESOURCES Self-assessment sheet 7.1 OHT 7.1 VOCABULARY sum difference inverse operations	<ul style="list-style-type: none">Write on the board: 7.459 and 7.001. Ask the children to read these numbers:<div>Q Which number is larger? How much larger?</div><p>Ensure the children understand the values of the digits and can calculate the difference mentally.</p><div>Q What is the sum of these two numbers?</div><p>Ensure the children can represent the answer correctly as 14.46.</p>Write on the board: 26.3 and 1.847<div>Q What is the sum and difference of the two numbers?</div><p>Discuss the children's answers and methods. Set the calculations out in column form:</p><table><tr><td>26.300</td><td>26.300</td></tr><tr><td>+ 1.847</td><td>– 1.847</td></tr><tr><td>_____</td><td>_____</td></tr></table>Emphasise the importance of lining up the decimal point when adding and subtracting decimals.<p>Explain that putting in the two zeros after the 3 makes no difference to the number but can help to keep track of the calculation. Ask the children to undertake the calculations. Collect their answers.</p><div>Q How can we check our answers?</div><p>Emphasise the use of the inverse operations and write:</p><table><tr><td>28.147</td><td>24.453</td></tr><tr><td>– 1.847</td><td>+ 1.847</td></tr><tr><td>_____</td><td>_____</td></tr></table><p>Ask the children to undertake these calculations to confirm their answers were correct.</p>Display OHT 7.1. Explain that numbers from two of the lists can be added or subtracted to get a number in the other list. Not every pair of numbers will work. Say you want the children to find as many cases as they can by carrying out the addition or subtraction. They should use the inverse operation to check their answers. Remind them to estimate the answer first to decide which calculation they should work out.	26.300	26.300	+ 1.847	– 1.847	_____	_____	28.147	24.453	– 1.847	+ 1.847	_____	_____	<ul style="list-style-type: none">Write on the board:<p>6.54 + 54.063, 645 – 45.06</p><div>Q How do you work these out?</div><div>Q How could you check the calculations?</div><p>Draw out the importance of deciding if you can do the calculations mentally and use estimation and the inverse operations to check answers.</p><p>ASSESSMENT –</p><ul style="list-style-type: none">Give out Self-assessment sheet 7.1. Remind the children that the sheet is to help them to identify what mathematics they are able to do during the week. There will be some time each lesson for them to complete the sheet.Ask the children to work out the first two cloud questions on the sheet. Say that you want them to write their answers in the loop. When they have done this, they should show their work to a friend. Some of the children may need help.Tell the children that they should tick the box to say if they required any help.Give the children a few minutes to complete this task and ask them to put this sheet away ready for their next mathematics lesson.
	a	b	2.6																									
c	1.3	d																										
a	b	7.4																										
c	1.3	d																										
26.300	26.300																											
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Planning sheet	Day Two (page 1 of 2)	Unit 7 <i>Perimeter, area, calculation and problem solving</i>	Term: Summer	Year Group: 6				
Oral and Mental		Main Teaching		Plenary				
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/ Focus Questions				
<p>Sum two-digit and three-digit numbers. Explain methods and reasoning.</p> <p>RESOURCES Whiteboards</p> <p>VOCABULARY vertically total</p>	<ul style="list-style-type: none">Write on the board:<div><table><tr><td>4</td><td>3</td></tr><tr><td>5</td><td>9</td></tr></table><div><div><div>43</div><div>+ 59</div><div>102</div></div><div>and</div><div><div>39</div><div>+ 45</div><div>84</div></div></div><p>Explain that you are going to sum the pairs of two-digit numbers vertically and from the left. With the children work through:</p><div><div><div>43</div><div>+ 59</div><div>102</div></div><div>and</div><div><div>39</div><div>+ 45</div><div>84</div></div></div><p>The answers to these two additions are then summed to give:</p><div><div><div>102</div><div>+ 84</div><div>186</div></div></div><p>Say 186 is called the ‘vertileft total’ of 4, 3, 9, 5. Emphasise that the order of the four numbers is important as this determines how they are placed on the grid.</p><div><div>Q</div><div>What is the vertileft total of 5, 4, 9, 3?</div></div><p>Collect the children’s answers on their whiteboards. Ensure the children arrange the four numbers on the grid in the right way and get the total 195.</p><div><div>Q</div><div>Is this the largest vertileft total we can make using these four numbers?</div></div><p>Discuss the children’s responses and confirm there is a larger total.</p><div><div>Q</div><div>What is the largest vertileft total using these four numbers?</div></div><p>Collect answers and discuss where the children placed the numbers on the grid and why:</p><ul style="list-style-type: none">Repeat using four other numbers. Collect answers and discuss strategies.Say that so far the children have been finding vertileft totals for given numbers. Now you will give them the vertileft total and they must find the four numbers.</div>	4	3	5	9	<ul style="list-style-type: none">Calculate the perimeter of compound shapes.Solve problems involving quantities and explain methods and reasoning. <p>RESOURCES OHT 7.2 OHT 7.3 OHT 7.4 Self-assessment sheet 7.1 Centimetre squared paper Rulers</p> <p>VOCABULARY perimeter reflective symmetry rotational symmetry polygon</p>	<ul style="list-style-type: none">Display OHT 7.2.<div><div>Q</div><div>How could you describe this shape to someone?</div></div><p>Encourage the children to refer to a polygon with 12 sides/edges, 12 vertices, etc. Agree the shape has rotational symmetry but not reflective symmetry. Explain that the shape is made up of squares.</p><div><div>Q</div><div>How many squares make up this shape?</div></div><p>Establish it is one large square with four smaller squares attached. Say that the sides of the small squares are half those of the large square.</p><div><div>Q</div><div>How many small squares make up the shape?</div></div><p>Agree there are eight small squares and draw these on the diagram on OHT 7.2.</p><ul style="list-style-type: none">Say the diagram represents a flowerbed with the side of each small square 60 cm. A gardener wants to place a border of bricks around the outside of the flowerbed. Remind the children this length is called perimeter.<div><div>Q</div><div>What is the perimeter of the flowerbed?</div></div><p>Annotate the diagram on OHT 7.2 to identify the lengths of the different sides. Emphasise the repeating patterns and establish the perimeter is 960 cm.</p><ul style="list-style-type: none">The border bricks are 10 cm wide and 22 cm long. Show OHT 7.3. Say that this shows where the bricks are to be placed. The gardener will cement the bricks in place so there must be some space left between the bricks. He wants to work out the number of bricks he should buy.<div><div>Q</div><div>What size gap is usually left between bricks?</div></div><p>Ensure children recognise it is usually just over 1 cm, for pathways and borders it could be wider, up to 3 cm.</p><div><div>Q</div><div>What space should the gardener leave between the bricks so he does not have to cut up any bricks?</div></div><ul style="list-style-type: none">Discuss the children’s answers.<p>A brick plus gap could be up to 25 cm long. Encourage the children to use these dimensions and help them to recognise how they can use the rotational symmetry of the shape to solve this problem. Say each brick costs 85p.</p>	<ul style="list-style-type: none">Show the first shape on OHT 7.4.<div><div>Q</div><div>How could we find the perimeter of this shape?</div></div><p>Collect answers.</p><div><div>Q</div><div>Did you need to work out missing lengths? Did you use all the information?</div></div><p>Discuss what was essential and confirm the perimeter would be the same for the 12 cm by 20 cm rectangle (64 cm).</p><ul style="list-style-type: none">Work through the other shapes and compare the answers to the perimeter of the rectangle.<div><div>Q</div><div>When is the perimeter the same as the rectangle? When is it different?</div></div><p>Establish the reasons for the similarities and differences.</p><p>ASSESSMENT –</p><ul style="list-style-type: none">Ask the children to complete the third cloud question on Self-assessment sheet 7.1. Discuss it with a friend as before and tick the appropriate box. Help those children who need it.Give the children a few minutes to complete the task and put the sheet away carefully for the next lesson.
4	3							
5	9							

Planning sheet	Day Two (page 2 of 2)	Unit 7 <i>Perimeter, area, calculation and problem solving</i>	Term: Summer	Year Group: 6	
Oral and Mental		Main Teaching			Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/ Focus Questions	
	<div>Q Can you find sets of four numbers with vertileft totals of 50, 100, 120 and 160?</div> <p>Discuss the children's strategies.</p>		<div>Q How much will the bricks cost the gardener?</div> <p>Give out centimetre squared paper. Encourage the children to represent the flowerbed and the border.</p> <ul style="list-style-type: none"> Discuss the children's approaches and strategies. <div>Q Are there different ways to arrange the bricks?</div> <p>Discuss how they coped with the corners and whether they used the same formation on each corner.</p>	<p>HOMEWORK – Ask the children to find sets of four numbers for the vertileft totals 50, 100, 120 and 160, and bring their answers to the lesson on day four.</p>	

Planning sheet	Day Three	Unit 7 <i>Perimeter, area, calculation and problem solving</i>	Term: <i>Summer</i>	Year Group: 6																																				
Oral and Mental		Main Teaching		Plenary																																				
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/ Focus Questions																																				
Subtract two-digit numbers. Explain methods and reasoning.	<ul style="list-style-type: none">Tell the children that today they are to find ‘vertileft differences’. Write on the board:<table><tr><td>4</td><td>7</td></tr><tr><td>2</td><td>9</td></tr></table> Work through:<table><tr><td>47</td><td></td><td>79</td></tr><tr><td>– 29</td><td>and</td><td>– 42</td></tr><tr><td>18</td><td></td><td>37</td></tr></table> Explain that we then find the difference to get:<table><tr><td>37</td></tr><tr><td>– 18</td></tr><tr><td>19</td></tr></table> Say 19 is the vertileft difference of 4, 7, 9, 2. <div>Q What is the vertileft difference of 7, 9, 4, 2?</div> <p>Collect the children’s answers on their whiteboards, and confirm the vertileft difference is 33.</p> <ul style="list-style-type: none">Ask the children to find the vertileft difference of 4, 8, 3, 1. Collect answers; confirm that the answer is 7. <div>Q What other sets of four numbers can you find which have a single-digit vertileft difference?</div> <p>Collect responses and discuss the children’s strategies.</p> <ul style="list-style-type: none">With the children discuss the effects of changing 4, 8, 3, 1 to 4, 8, 2, 1 and 4, 8, 4, 1. <div>Q How can this help us find other sets of numbers with single-digit vertileft differences?</div> <p>Encourage the children to identify the value of the digit that has been changed when they undertake their subtractions.</p> <div>Q What set of four numbers will give a vertileft difference of zero?</div> <p>Agree that any set of four identical numbers will do. Write on the board:</p> <table><tr><td>5</td><td>5</td></tr><tr><td>5</td><td>5</td></tr></table> <div>Q Can we change just one of the 5s?</div> <p>Discuss possibilities.</p>	4	7	2	9	47		79	– 29	and	– 42	18		37	37	– 18	19	5	5	5	5	<ul style="list-style-type: none">Calculate the area of compound shapes.Solve problems involving quantities and explain methods and reasoning. <p>RESOURCES Multilink cubes Centimetre squared paper Rulers Scissors OHT 7.2 OHT 7.4</p> <p>VOCABULARY cube cuboid faces net area (cm²)</p>	<ul style="list-style-type: none">A new sweet called ‘Chewacube’ is in the shape of a cube with sides of 2 cm. Eight Chewacubes are to be packaged and sold. The company cannot decide how best to do this. Give out multilink cubes, and ask the children to work in pairs. <div>Q How could the eight Chewacubes be put together?</div> <p>Discuss the children’s suggestions.</p> <ul style="list-style-type: none">Agree there are three main possibilities which form cuboids and a cube. <div>Q What are the lengths of the edges of these shapes?</div> <p>Collect answers and record on the board:</p> <table><tr><th>Shape</th><th colspan="3">Edges</th></tr><tr><td>Cuboid1</td><td>2 cm</td><td>2 cm</td><td>16 cm</td></tr><tr><td>Cuboid 2</td><td>4 cm</td><td>2 cm</td><td>8 cm</td></tr><tr><td>Cube</td><td>4 cm</td><td>4 cm</td><td>4 cm</td></tr></table> <ul style="list-style-type: none">Tell the children that they are going to design cardboard containers for each of these shapes. <div>Q How many faces are there in each shape?</div> <p>Establish there are six faces. Say that you want the children to make the nets for each container with overlapping faces for gluing the container together.</p> <div>Q What shape is each of the six faces?</div> <p>Establish they are rectangle or squares. Say that the overlaps must be the same size as the faces that are rectangles or squares.</p> <p>Tell the children they are to find the area of card they will need to make each container, this must include the overlaps.</p> <div>Q How do you find the area of a rectangle?</div> <p>Ensure the children understand that the area of a rectangle is length times breadth and is measured in cm²</p> <ul style="list-style-type: none">Give out centimetre squared paper. Tell the children they are to work in pairs and make their nets using the paper. Remind them to calculate and record the area of paper used to make the net. They can test their nets by wrapping the multilink cubes in their paper containers.	Shape	Edges			Cuboid1	2 cm	2 cm	16 cm	Cuboid 2	4 cm	2 cm	8 cm	Cube	4 cm	4 cm	4 cm	<ul style="list-style-type: none">Compare the nets of the containers the children have made for each of the three packages. <div>Q Which of the three packages will require the least cardboard? Which will require the most cardboard?</div> <p>Compare the areas of the nets of the containers to find the least and most. Remind the children of the need to include the areas of the overlaps in their calculations.</p> <ul style="list-style-type: none">Display the first shape on OHT 7.4. <div>Q How can we find the area of this shape?</div> <p>Collect answers and ensure that children use the two methods: – cut into rectangles/squares and add; – surround by a large rectangle and subtract. Repeat with each of the other shapes.</p> <div>Q Will each shape fit into a 12 cm by 20 cm rectangle?</div> <p>Establish that each shape does.</p> <ul style="list-style-type: none">Display OHT 7.2. Remind the children that this is the flowerbed from the previous lesson and the length of the side of the smaller square is 60 cm. <div>Q What is the area of the flowerbed?</div> <p>Collect answers and discuss the children’s strategies.</p> <p>HOMEWORK – Ask the children to build on the set of four 5s to try to find a set of four numbers with vertileft differences of 1 to 9. Tell the children to bring their answers to the next lesson.</p>
4	7																																							
2	9																																							
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Shape	Edges																																							
Cuboid1	2 cm	2 cm	16 cm																																					
Cuboid 2	4 cm	2 cm	8 cm																																					
Cube	4 cm	4 cm	4 cm																																					

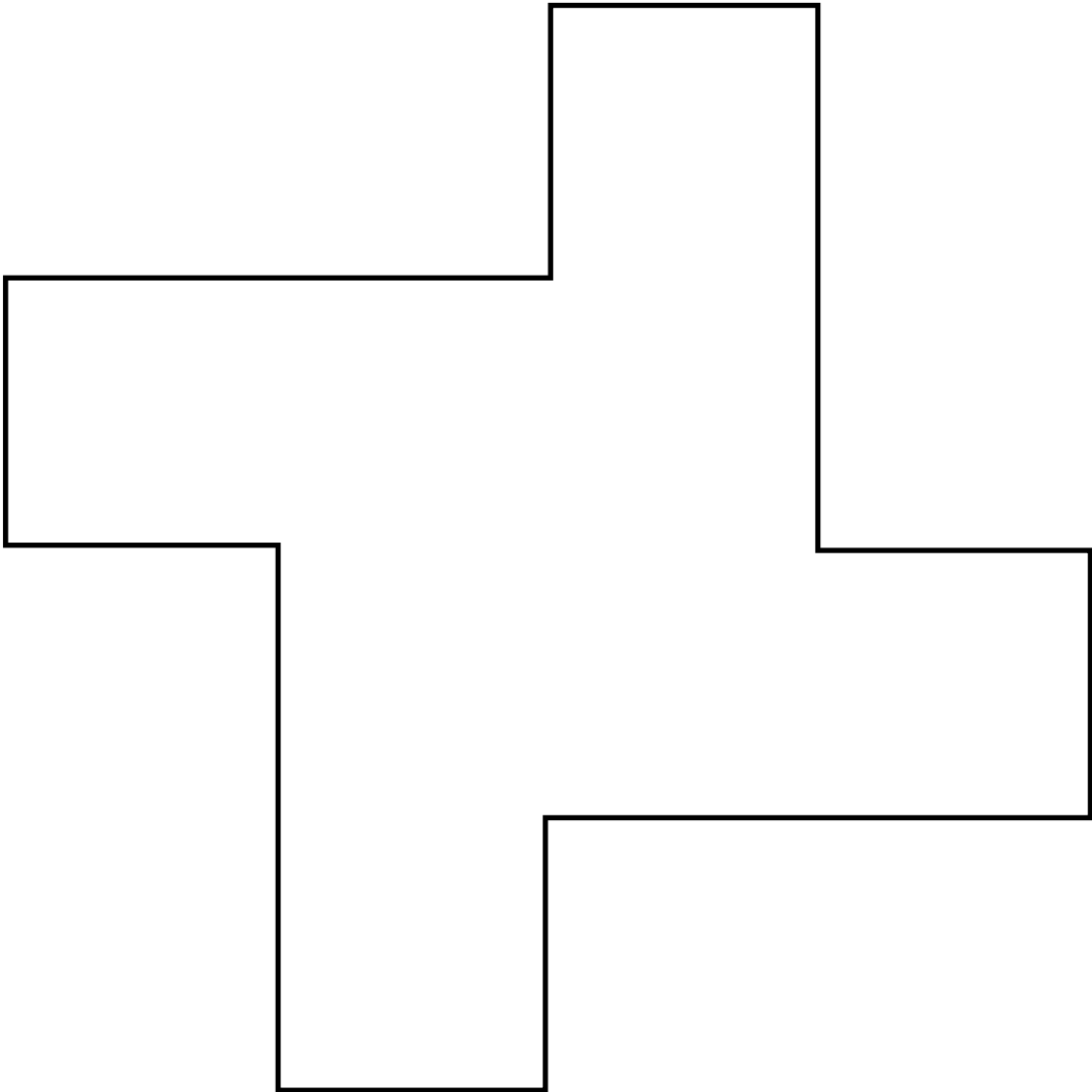
RESOURCES
Whiteboards

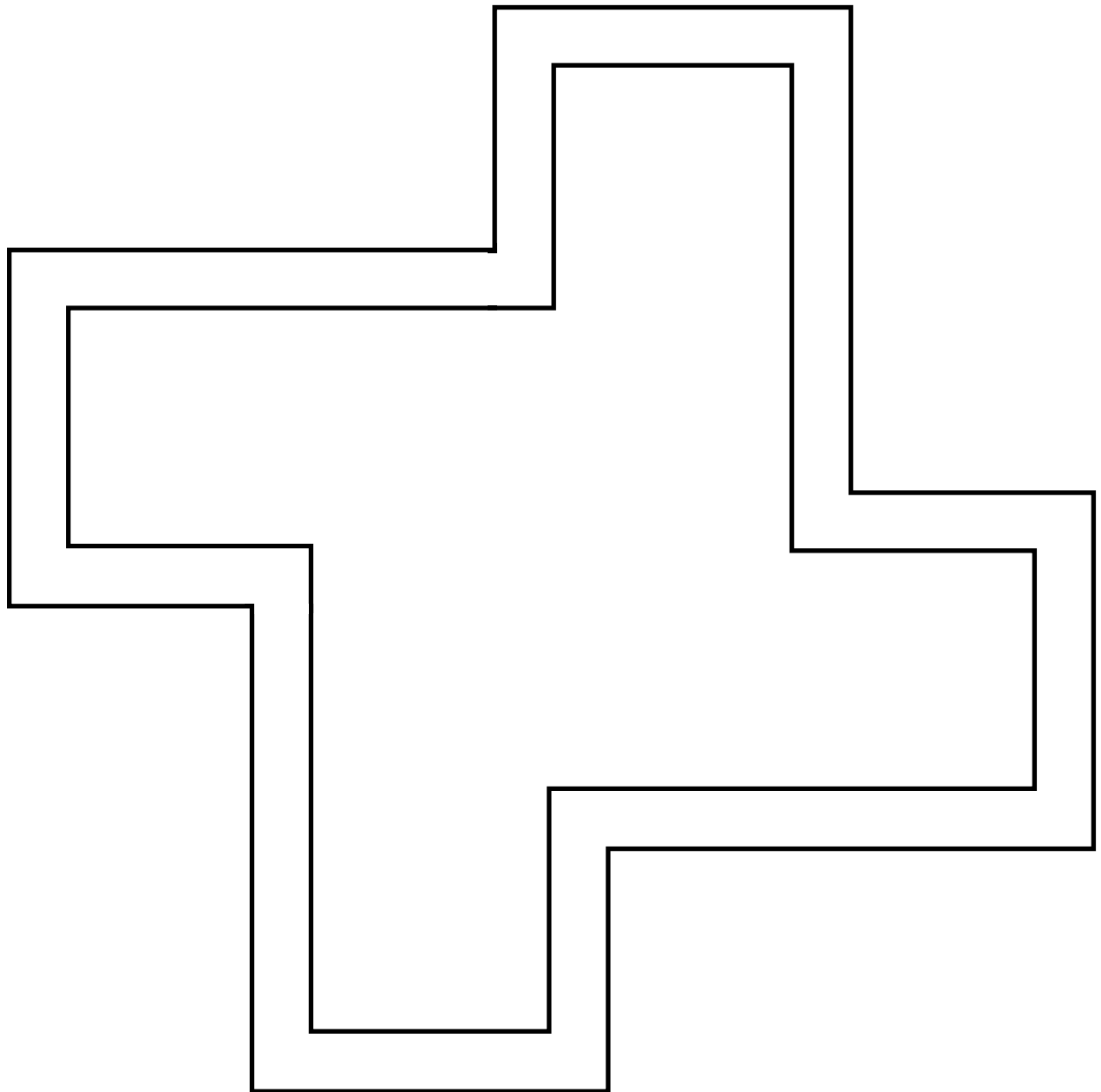
VOCABULARY
difference

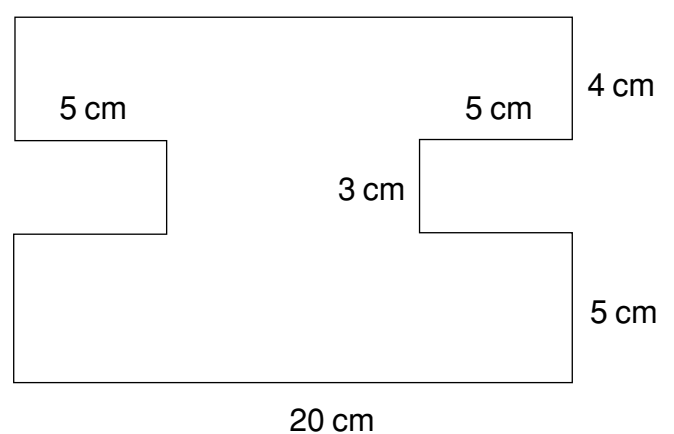
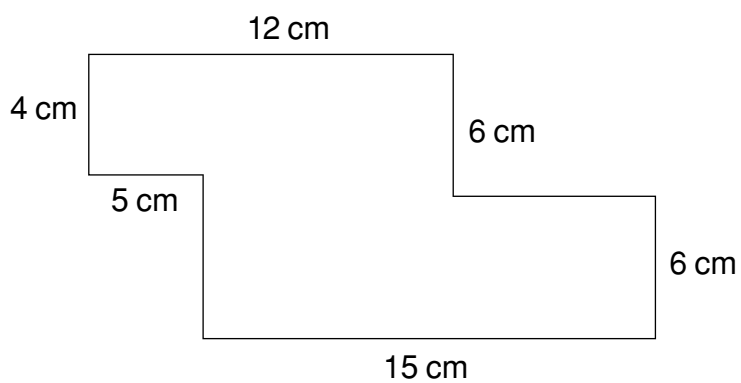
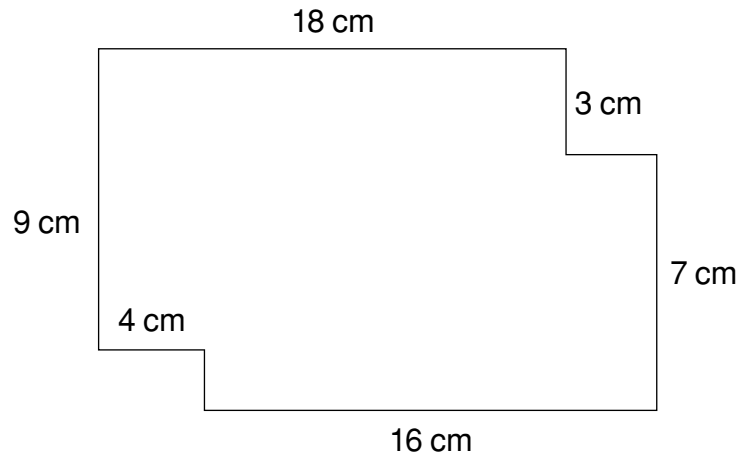
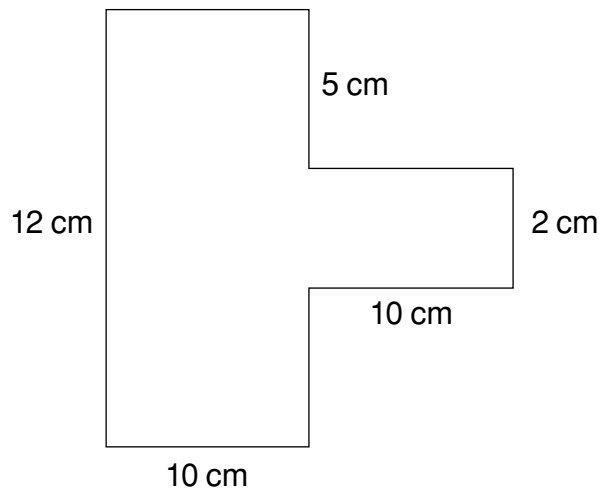
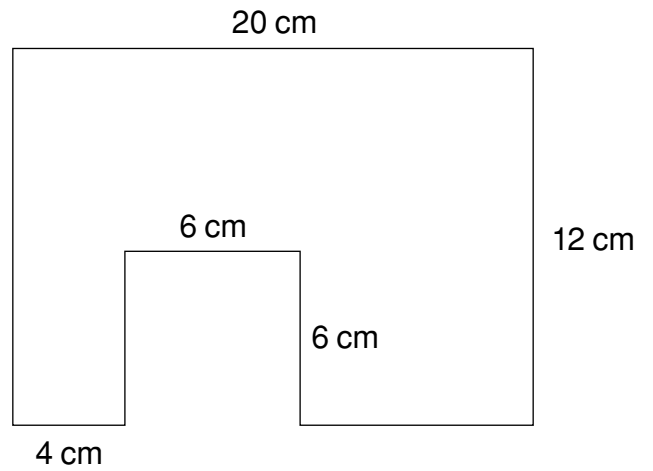
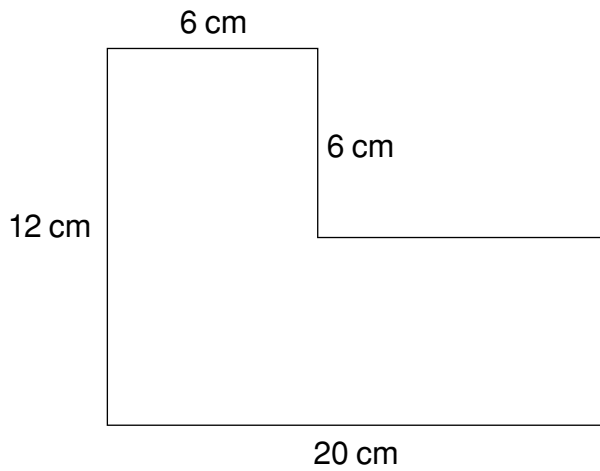
Planning sheet	Day Four	Unit 7 <i>Perimeter, area, calculation and problem solving</i>	Term: <i>Summer</i>	Year Group: 6
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
<p>Recall multiplication facts for 10 x 10.</p> <p>Give pairs of factors for whole numbers to 100.</p> <p>RESOURCES Whiteboards</p> <p>VOCABULARY dimensions area perimeters</p>	<ul style="list-style-type: none"> Sketch a rectangle on the board and write 24 cm² in the centre. <div>Q If one side is 6 cm, what length is the other side?</div> <p>Collect the children's answers on their whiteboards and establish it is 4 cm.</p> <div>Q Could the rectangle have other dimensions?</div> <p>Collect and record other cases and ask the children to work out the perimeter in their heads.</p> <ul style="list-style-type: none"> Repeat using 64 cm² for the area. Collect answers and confirm that the square has the smallest perimeter. Set the area of the rectangle to be 32 cm². <div>Q If this time one side is twice the length of the other, what are the dimensions?</div> <p>Collect answers via whiteboards and discuss strategies. Sketch the rectangle to show how it is made up of two squares each 16 cm² so the sides are 4 cm and 8 cm.</p> <div>Q Suppose the area is 75 cm² and one side is three times the other, what are the dimensions?</div> <p>Collect answers and confirm that this time the rectangle is made of three squares of 25 cm² so the sides are 5 cm and 15 cm.</p> <ul style="list-style-type: none"> Repeat with other areas and ratios. 	<ul style="list-style-type: none"> Calculate the perimeter and area of simple compound shapes that can be split into rectangles. <p>RESOURCES OHT 7.5 Self-assessment sheet 7.1</p>	<ul style="list-style-type: none"> Show the first diagram on OHT 7.5. <p>Explain that the large square has been split into four rectangles. The areas of two of the rectangles are shown. All the lengths are whole numbers.</p> <div>Q What is the area of the large square?</div> <p>Give the children time to become familiar with the problem and ask them to share their thoughts and ideas with a partner. Collect ideas and possible strategies for solving the problem. Prompt these by asking:</p> <div>Q How can you use the information you have been given?</div> <p>Ensure the children recognise that as they know the areas of the two rectangles, they can find lengths of the sides of these rectangles.</p> <p>Let the children continue to work on the problem. Emphasise that they are to provide an explanation for their solutions and record their reasoning.</p> <p>Collect responses and discuss the methods and reasoning the children used. Compare children's organisation of their data and highlight how their approach helped them to identify the dimensions of the square.</p> <div>Q What properties of the square were you trying to meet?</div> <p>Establish that the sides of the square must be equal and that each side is the sum of the two different sides of the rectangles.</p> <div>Q Can you find more than one square that works?</div> <p>Encourage the children to make a conjecture and give them time to test it and present an argument to support it.</p> <ul style="list-style-type: none"> Show the second diagram on OHT 7.5. Explain that for this large rectangle the length is twice the breadth. <div>Q What is the area of the large rectangle?</div> <p>Set the children to solve the problem working in pairs. Remind them of the strategies they used in the first problem.</p> <ul style="list-style-type: none"> Collect answers and discuss the strategies the children used. 	<ul style="list-style-type: none"> Review the children's answers to the vertileft totals and differences from days 2 and 3. Encourage the children to describe how they found the four numbers in order to make the totals and differences. Get the children to swap their numbers and check one another's answers. <p>ASSESSMENT –</p> <ul style="list-style-type: none"> Ask the children to complete the final cloud question involving area on Self-assessment sheet 7.1. Tell them to discuss it with a friend and tick the appropriate box. Help the children who need it. Remind the children to put the sheet away ready for use in the next lesson.

Planning sheet	Day Five	Unit 7 <i>Perimeter, area, calculation and problem solving</i>	Term: <i>Summer</i>	Year Group: 6
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
<p>Calculate the perimeter and area of simple compound shapes that can be split into rectangles.</p> <p>RESOURCES Whiteboards</p>	<ul style="list-style-type: none"> Sketch a rectangle on the board and below it write 'perimeter is 24 cm'. <div>Q If one side is 8 cm, what length is the other side?</div> <p>Collect the children's answers on their whiteboards and establish that the other side is 4 cm.</p> <div>Q What is the area of this rectangle?</div> <p>Collect answers and discuss strategies.</p> <div>Q Could a rectangle with this perimeter have other dimensions?</div> <p>Collect and record other cases and ask the children to work out the areas in their heads.</p> <ul style="list-style-type: none"> Repeat using 32 cm for the perimeter. Collect answers and confirm that the square has the largest area. Set the perimeter of the rectangle at 30 cm. <div>Q If one side of this rectangle is twice the length of the other, what are the dimensions?</div> <p>Collect the children's answers on their whiteboards and discuss their strategies.</p> <div>Q Suppose the perimeter is 56 cm and one side is three times the other, what are the dimensions?</div> <p>Collect answers. Sketch the rectangle to show that dividing half the perimeter by 4 will give the shortest side.</p> <ul style="list-style-type: none"> Repeat with other perimeters and ratios. 	<ul style="list-style-type: none"> Solve problems involving numbers and quantities and explain methods and reasoning. <p>RESOURCES Rectangular sheets of stiff paper of different sizes Sticky tape Materials to fill cylinders Self-assessment sheet 7.2</p> <p>VOCABULARY cylinder volume capacity curved surface prism conjecture</p>	<ul style="list-style-type: none"> Using two identical rectangular sheets of stiff paper, show the class how to make two open cylinders. Fold one sheet by joining the two long sides, fold the other sheet by joining the two short sides. Emphasise that edges should just meet and are to be joined using sticky tape. Display the two cylinders, upright next to one another. <p>Give pairs of children two identical rectangular sheets to make two cylinders, vary the rectangles given to different pairs of children.</p> <div>Q Will your two cylinders hold the same quantities?</div> <p>Collect responses and ask children to record their conjectures. See if there is a consensus view.</p> <div>Q How can we test our conjectures?</div> <p>Collect ideas and decide what is practical, e.g. fill the two cylinders with sand, beans or marbles. Agree possibilities and get the children to record how they will conduct their tests.</p> <ul style="list-style-type: none"> Get the children to conduct their tests and see if their conjectures were true or not. Ask them to record their results and decisions. Collect the children's responses to their tests. <div>Q Did you confirm your conjectures?</div> <p>Encourage the children to explain their views about the tests and the conclusions they drew. Remind them they started with two identical rectangles.</p> <div>Q How did this influence your initial judgements?</div> <p>Establish that the two rectangles fixed the area of the curved surface not the volume.</p> <div>Q Could we start with two identical rectangles and fold them into two cylinders that hold the same amount?</div> <p>Agree that if the sheets were square this would work. Remind the children that a cylinder is a special prism as it has the same shape, a circle, extended throughout its length. Hold up one of the cylinders.</p> <div>Q If we wanted this cylinder to hold the same amount but be taller what would we have to do?</div> <p>Encourage the children to offer their ideas on how the base circle might change. Explain that the quantity the cylinder holds is volume or capacity. Tell the children that the volume of the cylinder is the area of the circle multiplied by the height, something they will use later.</p>	<p>ASSESSMENT –</p> <ul style="list-style-type: none"> Give out Self-assessment sheet 7.2. Allow time for the children to read and complete the question on the sheet and describe their methods and reasoning. Discuss the solution to the problems with the class. Explain that the table on the bottom half of the sheet is for the children to summarise how well they have been able to answer each question. <p>Ask the children to look at the statements in the left-hand column. The questions alongside each statement are intended to remind the children what each statement means.</p> <p>Ask the children to look back on their work to help them fill in the table.</p> <p>Encourage the children to complete each statement by putting a tick in one box.</p> <ul style="list-style-type: none"> Ask the children to complete the target statement by choosing one of the three areas of mathematics where they think they need to improve. For those children who were able to answer all the questions without help, discuss the learning objectives for Year 7 shown on the front page of the unit. Get the children to stick Self-assessment sheets 7.1 and 7.2 in their books.

A**B****C****14.31****3.776****3.262****1.097****15.88****16.394****12.618****9.77****14.048****4.109****11.048****10.867****0.514****0.847****0.333****4.278****1.43****1.57**







24 cm ²	
	36 cm ²

30 cm ²	
	126 cm ²

My Mathematics by

Add 13.675 to:
5.3, 0.52, 7.29,
2.086 or 8.346

My calculation

Show or discuss with
a friend

I did this addition:

on my own

with some help

From 13.675 subtract:
1.4, 2.77, 3.28,
4.486, or 4.479

My calculation

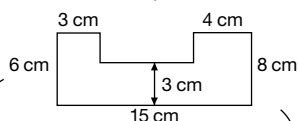
Show or discuss with
a friend

I did this subtraction:

on my own

with some help

Find the perimeter:



My calculation

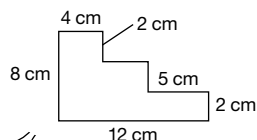
Show or discuss with
a friend

I found this perimeter:

on my own

with some help

Find the area:



My calculation

Show or discuss with
a friend

I found this area:

on my own

with some help

My Mathematics by

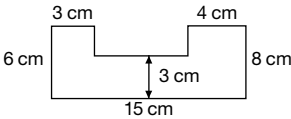
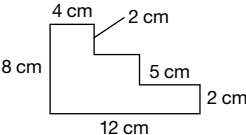
Biggest and smallest perimeters

	24 cm ²
24 cm ²	

This large square has been split into four rectangles. The areas of two of the rectangles are shown. All the lengths are whole numbers. What is the length of the side of the large square? What different lengths can you find? What are the perimeters of your biggest square and your smallest square?

My strategy for solving this problem is:

	I explained my strategy: on my own <input type="checkbox"/> with some help <input type="checkbox"/>

Name:	School:
What I can do	
I can carry out column addition and subtraction of numbers involving decimals: on my own <input type="checkbox"/> with some help <input type="checkbox"/>	Add 13.675 to: 5.3, 0.52, 7.29, 2.086 or 8.346
	From 13.675 subtract: 1.4, 2.77, 3.28, 4.486 or 4.479
I can calculate the perimeter and area of simple compound shapes: on my own <input type="checkbox"/> with some help <input type="checkbox"/>	
	
I can solve problems involving numbers and quantities and explain my methods and reasoning: on my own <input type="checkbox"/> with some help <input type="checkbox"/>	Biggest and smallest perimeters.

My next target:

I want to get better at _____