

Unit 1
Place value

Three daily lessons

**National
Numeracy Strategy**

Year 6
Autumn term

Unit Objectives

Year 6

- **Multiply and divide decimals by 10 or 100 and integers by 1000, explain the effect.**
- Identify and use appropriate operations (including combinations of operations) to solve problems involving numbers and quantities based on 'real life' or money, using one or more steps.

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Link Objectives

Year 5

Year 7

- **Multiply and divide any positive integer up to 10 000 by 10 or 100 and understand the effect.**
- Read and write whole numbers in figures and words and know what each digit represents.
- Use the vocabulary of comparing and ordering numbers, including symbols such as $<$, $>$, \leq , \geq , $=$.
- Give one or more numbers lying between two given numbers.
- Order a set of integers less than 1 million.

- Understand and use decimal notation and place value; multiply and divide integers and decimals by 10, 100, 1000 and explain the effect.
- Compare and order decimals in different contexts

(Key objectives in bold)

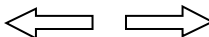
This Unit Plan is designed to guide your teaching.

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

Resources needed to teach this unit:

- Resource sheet 1.1
- Resource sheet 1.2
- Resource sheet 1.3
- Resource sheet 1.4
- Resource sheet 1.5
- Resource sheet 1.6
- Resource sheet 1.7
- Resource sheet 1.8
- Metre stick
- OHP calculator (optional)
- Whiteboards
- Related Key Stage 2 national test questions

Planning sheet	Day One	Unit 1 <i>Place value</i>	Term: <i>Autumn</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>Read whole numbers and decimals.</p> <p>Use decimal notation for tenths, hundredths and thousandths.</p> <p>Multiply or divide decimals by 10.</p> <p>RESOURCES Resource sheet 1.1 Whiteboards</p>	<ul style="list-style-type: none">Use Resource sheet 1.1 on OHP or large display version. Cover 0.3, 0.05 and 0.007. <div><p>Q What is covered up?</p></div> <p>e.g. 3 tenths, 5 hundredths, 7 thousandths.</p> <p>Repeat with 7 and 0.003, 40, 2 and 0.2, 0.01</p> <ul style="list-style-type: none">Ask children to use whiteboards to show decimal fraction equivalents of: 2 tenths and 5 hundredths 13, 3 hundredths and 1 thousandth.	<p>Multiply and divide decimals by 10 or 100 and integers by 1000 and explain the effect.</p> <p>VOCABULARY digits multiply divide place value</p> <p>RESOURCES Resource sheet 1.1, 1.2, 1.3</p>	<ul style="list-style-type: none">Using Resource sheet 1.1 on OHP or board. Cover 30 and 2 (32). <div><p>Q What is $10 \times$ bigger than 32?</p></div> <p>Model moving counters to 300 and 20.</p> <div><p>Q How do we make it $100 \times$ bigger?</p></div> <p>Draw out from children’s responses that $\times 100$ is the same as $\times 10 \times 10$.</p> <p>Repeat with 5.6 to consolidate idea.</p> <ul style="list-style-type: none">Write a number in the middle of the board and begin to explore different ways of reaching the target number using a ‘spider’ diagram (shown below). <p>Suggest that children begin with one step. Refer to place value chart to support explanation.</p> <div><div><div>5.4 × 1000</div><div>54 × 100</div><div>540 × 10</div><div>5400</div><div>54 × 10 × 10</div><div>5.4 × 10 × 10 × 10</div><div>0.54 × 100 × 100</div></div></div> <p>Ask children to work in groups to develop their own spider diagram for other numbers showing equivalent calculations.</p> <ul style="list-style-type: none">Using Resource sheet 1.1, repeat as above using $\div 10$ and $\div 1000$. Choose 4200 and 42 and ask children what to divide 4200 by to get 42. Show the one-step and two-step methods. $4200 \div 100 = 42$ $4200 \div 10 \div 10 = 42$Set pupils the task of adding 6 more legs to their spider diagram using division operations.	<ul style="list-style-type: none">Show class Resource sheet 1.2 and work through it with pupils explaining what goes in empty boxes. <div><p>Q Why does $4.6 \times 10 \times 10$ give me the same answer as 4.6×100?</p></div> <div><p>Q Can you give me a single step operation that will be the same as $\div 10 \div 10$?</p></div> <ul style="list-style-type: none">Show children the Resource sheet 1.3 to support discussion and to extend examples. <table><tr><td>0.4</td><td>17.6</td><td>3</td></tr><tr><td>0.33</td><td>30</td><td>156</td></tr><tr><td>40</td><td>1.56</td><td>1.76</td></tr></table> <p>HOMEWORK – Give the children four numbers from the Resource sheet 1.3. Ask them to write 1, 2 and 3 step equivalent calculations for each number using \times and \div.</p> <p>e.g. 4×10, $4000 \div 10 \div 10$ $0.4 \times 10 \times 10$</p> <div><p>By the end of the lesson the children should know that:</p><ul style="list-style-type: none">Multiplying by 1000 is equivalent to multiplying by 10, then by 10, then by 10 or is equivalent to multiplying by 10 and then 100 and similar equivalents for dividing by 1000.<p>(Refer to supplement of examples, section 6, page 7.)</p></div>	0.4	17.6	3	0.33	30	156	40	1.56	1.76
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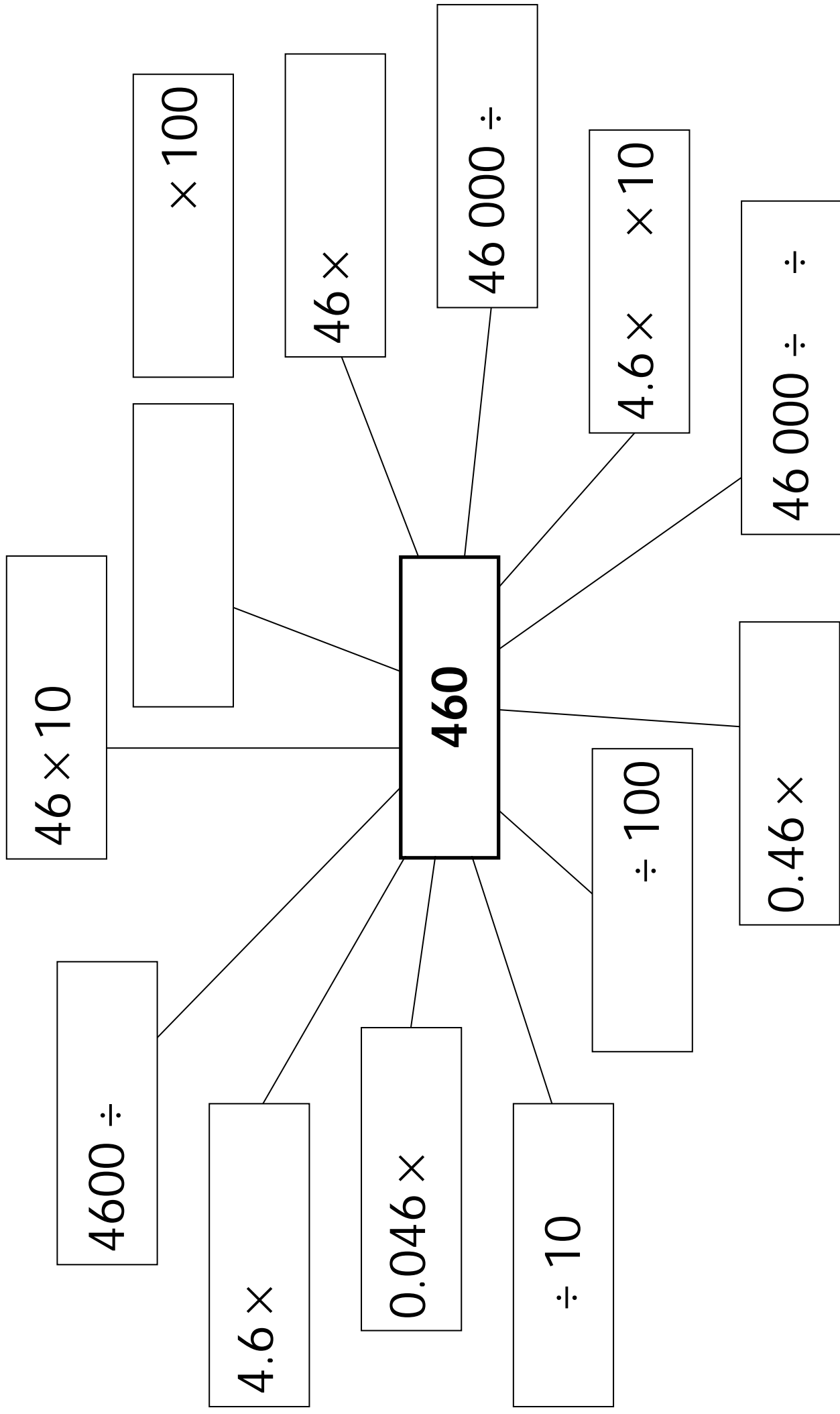
Planning sheet	Day Two	Unit 1 <i>Place value</i>	Term: <i>Autumn</i>	Year Group: 6																
Oral and Mental		Main Teaching		Plenary																
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions																
<p>Read whole numbers and decimals.</p> <p>Multiply and divide numbers by 10, 100 and 1000 mentally</p> <p>VOCABULARY tens hundreds thousands</p> <p>RESOURCES Resource sheets 1.4, 1.5, 1.6, 1.7</p>	<ul style="list-style-type: none">Write a two-digit number on board, get children to count in 10s/100s/1000s backwards and forwards to respond to direction cards. Use the arrow cards on Resource sheet 1.4. <div></div> <p>Use other starting numbers (Resource sheet 1.3 – homework) hold up a card from Resource sheets 1.5, 1.6, 1.7 ($\times 10$, $\times 100$, $\times 1000$) and ask children to give and explain their answer.</p> <ul style="list-style-type: none">Repeat holding up card from $\div 10$, $\div 100$, $\div 1000$ and ask children to give and explain their answers.	<p>Multiply and divide decimals by 10 or 100 and integers by 1000 and explain the effect.</p> <p>VOCABULARY decimal point tens hundreds thousands tenths hundredths thousandths</p> <p>RESOURCES Metre stick Calculators</p>	<ul style="list-style-type: none">Show children a metre stick and ask them to quickly identify something in the room that is 1m in length. <p>Ask children to think of examples of objects or distances that are 10 \times, 100 \times, 1000 \times, 10 000 \times longer.</p> <p>Take feedback and show children a clear method of how to record their own examples in their books recording on board.</p> <table><tr><td>10 000m</td><td>Road to next town</td></tr><tr><td>1000m</td><td>Four times round school</td></tr><tr><td>100m</td><td>Fence roundschool playground</td></tr><tr><td>10m</td><td>Classroom</td></tr><tr><td>1m</td><td>Door width</td></tr></table> <ul style="list-style-type: none">Later get children to continue the pattern to record the length of items that are 10 \times, 100 \times, 1000 \times smaller than 1m. <table><tr><td>10cm = 0.1m</td><td>1cm = 0.01m</td><td>1mm = 0.001m</td></tr><tr><td>Length of pencil</td><td>Width of thumb nail</td><td>Thickness of 5p coin</td></tr></table> <p>Extend the activity to ask questions like:</p> <div><p>Q What is one hundredth of a pencil length?</p></div> <div><p>Q What is about 100 times the width of a thumbnail?</p></div> <div><p>Q How many times will a pencil go round the school fence?</p></div> <ul style="list-style-type: none">Write on the board: 1.37 24.5 702 <p>Give out calculators. Tell the children they are going to use these numbers to make a target number. They can multiply each of these three numbers by 10 or 100 or divide each of these three numbers by 10 or 100, then add these numbers.</p> <div><p>Q How close to 100 can you get?</p></div> <p>Collect answers and discuss strategies. Repeat giving other sets of numbers as targets.</p>	10 000m	Road to next town	1000m	Four times round school	100m	Fence roundschool playground	10m	Classroom	1m	Door width	10cm = 0.1m	1cm = 0.01m	1mm = 0.001m	Length of pencil	Width of thumb nail	Thickness of 5p coin	<ul style="list-style-type: none">Key a four-digit number into an OHP calculator. <div><p>Q What will happen to this number when I multiply by 100? What will the display show?</p></div> <p>Repeat with other examples and use $\times 10$, $\times 1000$, $\div 10$, $\div 100$, $\div 1000$</p> <p>Take feedback on each and use OHP calculator to check.</p> <div><p>By the end of the lesson children should know that:</p><ul style="list-style-type: none">When you multiply a number by 10, 100, 1000 the digits move 1, 2, 3 places to the left.When you divide a number by 10, 100, 1000 the digits move 1, 2, 3 places to the right.<p>(Refer to supplement of examples section 6, page 7.)</p></div> <p>RESOURCES OHP calculator</p>
10 000m	Road to next town																			
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Planning sheet	Day Three	Unit 1 <i>Place value</i>	Term: <i>Autumn</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>Read whole numbers and decimals.</p> <p>Use decimal notation for tenths, hundredths and thousandths.</p> <p>Develop calculator skills and use a calculator effectively.</p>	<ul style="list-style-type: none"> Ask children to enter any six-digit number (with one decimal place) in their calculators and secretly enter one yourself. Ask them to change their number to match your number, altering one digit at a time by adding or subtracting according to criteria such as: <ul style="list-style-type: none"> I have six tenths My number contains eight hundreds It is greater than two hundred thousand but less than three hundred thousand. <p>When sufficient clues have been given ask children to reveal their numbers. Reveal yours for children to check.</p>	<p>Multiply and divide decimals by 10 or 100 and integers by 1000 and explain the effect.</p> <p>Solve word problems, involving numbers and quantities, based on 'real life', money, using one or more steps.</p> <p>VOCABULARY tenths hundredths thousandths</p> <p>RESOURCES Resource sheet 1.1 Resource sheet 1.8 Related KS2 national test questions</p>	<ul style="list-style-type: none"> Explain to children that they can use the place value chart (Resource sheet 1.1) to support multiplication and division problems using money. <p>Write on the board, How many £10 notes are in £130?</p> <p>Present the calculation as $£130 \div £10$ (emphasising that the units are the same but the answer is the number of £10 notes).</p> <p>Illustrate the calculation using the place value chart and extend to how many £100 in £1300, 10p coins in £120?</p> <p>Show that we can also work out how many £50 notes are in £700.</p> <div> <p>Q If there are seven £100 notes in £700, how many £50 notes are there in £700? Do you need to multiply or divide?</p> </div> <p>Model on the board</p> $\begin{array}{rcl} 2 \times £50 & = & £100 \\ 7 \times £100 & = & £700 \\ 14 \times £50 & = & £700 \end{array}$ <p>Use Resource sheet 1.8 to aid understanding.</p> <ul style="list-style-type: none"> Extend to 50p coins, ask how many 50p coins in £45, and to £20 notes and 20p coins. <div> <p>Q What strategies did you use?</p> </div> <ul style="list-style-type: none"> Write a word problem on the board. Canned drinks cost 48p and come in packs of 10. There are 10 packs in each box. Ten boxes are placed in a crate. How much do 1, 10, 100 crates cost? <p>Set similar problems for children to work through, model structure for recording in books.</p>	<p>Write this question on the board:</p> <p>Canned drinks come in packs of 10. There are 10 packs in each box. 10 boxes are placed in a crate. If 10 crates cost £2700 and the shopkeeper sells the drinks for 55p how much profit does he make?</p> <p>Work through the problem with the children.</p> <div> <p>Q What happens to digits when you multiply or divide by 10?</p> </div> <div> <p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Multiply and divide decimals by 10 or 100 and integers by 1000 and explain the effect. <p>(Refer to supplement of examples, section 6, page 7.)</p> </div>

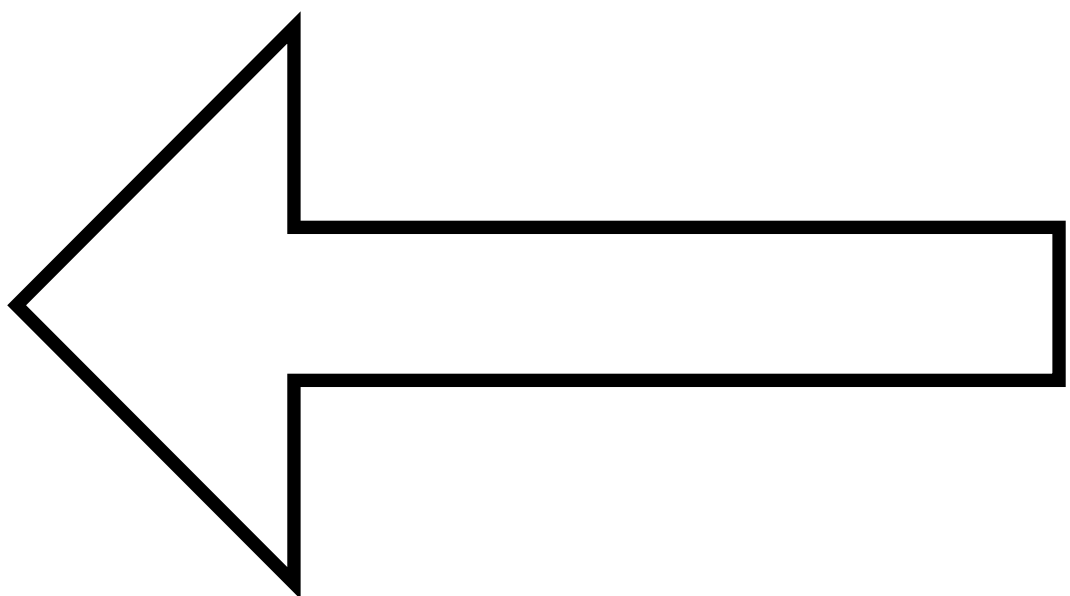
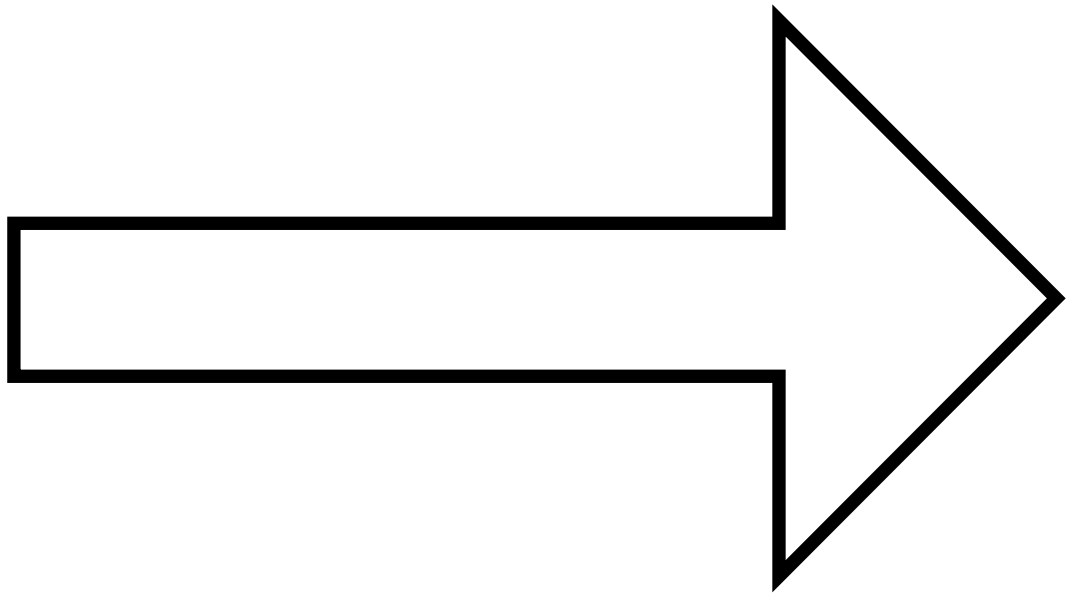
Unit 1 Year 6 (Autumn Term)

Resource sheet 1.1

0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
1	2	3	4	5	6	7	8	9
10	20	30	40	50	60	70	80	90
100	200	300	400	500	600	700	800	900
1000	2000	3000	4000	5000	6000	7000	8000	9000
10 000	20 000	30 000	40 000	50 000	60 000	70 000	80 000	90 000



0.4	17.6	3
0.33	30	156
40	1.56	1.76



÷ 10

× 10

÷ 100

× 100

÷ 1000

× 1000



Related Key Stage 2 national test questions:

2000 Test A

18

Circle two different numbers which **multiply** together to make **1 million**.



10

100

1000

10 000

100 000



18

1 mark

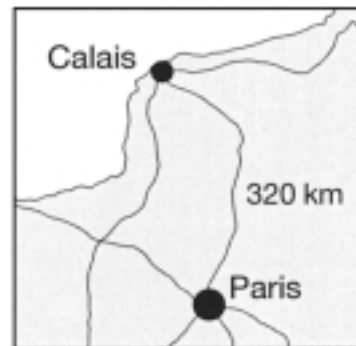
2000 Test B

21

Here is a map of part of France.

The map shows that the distance from Calais to Paris is **320 kilometres**.

5 miles is approximately **8 kilometres**.



Use these facts to calculate the approximate distance in **miles** from Calais to Paris.



Show your **method**.
You may get a mark.



miles



21a

2 marks

2000 Test B

9



Chris saves **50p** coins.

He has saved **45** of them.

How much money has Chris saved?



5

1 mark

2001 Test B

2

Write in the **missing** number.



8

×

=

400

2

1 mark

2001 Test B

7

Write in what the **missing** numbers could be.



(÷

÷

)

+

90

=

100

2

1 mark