Bk3	R: Addition and subtraction (mental and written work) **C: Revision: numbers to 100** E: *Roman numerals. Puzzles*	*Lesson Plan* *1*

| **Activity**		**Notes**
1	**Mental counting** Listen carefully, do the calculations in your head and show me the final answer with number cards when I say. Nod your heads when you have done each step. a) T: '3 + 6' . . . ' – 2' . . . '+ 3' . . . '– 5' Show me the answer with number cards . . . now! (5) Similarly for: b) 50 – 10 + 30 – 50 + 70 Show me . . . now! (90) c) 25 – 4 + 9 + 8 – 18 Show me . . . now! (20) d) 6 + 7 + 7 – 4 – 9 Show me . . . now! (7) e) 28 + 8 – 12 + 19 Show me . . . now! (43) [N.B. Parts a) to c): without crossing tens; parts d) and e): crossing tens] ——————————————— *5 min* ———	Whole class activiry T waits until most of class nod their heads before moving on Cards shown in unison Ps who answered correctly explain to those who did not. T asks what kind of mistakes were made. If problems, write details on BB Praising, encouragement only
2	**Secret numbers** I am thinking of a number. You must ask me questions to find out what it is. I can answer only 'Yes' or 'No'. (e.g. <u>67</u>: 'Does it have 2 digits?' (Y) 'Is it more than 50? (Y); 'Is it even?' (N) 'Is it less than 75?' (Y), etc.) Ps may use their number lines to help them if necessary. Ps can think of a number and answer questions about it too! ——————————————— *10 min* ———	Whole class activity Involve several Ps Encourage Ps to ask logical questions, keeping in mind the clues already given. Praise clever questions Class applauds correct answer

3
 	
Extension
	Book 3, page 1
	Q.1 a) Read: *Complete the table*.
	        Review with whole class. Let's read out the 3rd row (6th column, etc.) Mistakes corrected.
	
	    b) Read: *Colour red the 2-digit numbers in the 2nd row*.
	        A, come and point to the 2nd row and tell us the numbers you coloured red. (All of them) Who agrees/disagrees?
	
	    c) Read: *Colour blue the 2-digit even numbers in the 5th column from the left*.
	        B, come and point to the column and tell us the numbers you coloured blue. (14, 24, 34) Who agrees/disagrees?
	
	    d) Read: *Colour yellow the 1-digit odd numbers in the 4th column from the right*.
	        C, come and point to the column and tell us the numbers you coloured yellow. (None) Why? (6 is the only 1-digit number but it is even.)
	
	    e) Read: *Colour green the numbers not less than 36*.
	        D, tell us the numbers you coloured green. (36, 37, 38, 39) Who agrees? Who thinks something else?
	
	Who can tell us something else about the numbers in the table? e.g.
	• Only the number 14 is coloured red <u>and</u> blue (i.e. violet).
	• The numbers in each column have the same units digit and are increasing by 10.
	• The numbers in the 4th row are 20 more than in the 2nd row.
	
	——————————————— *18 min* ———
		Individual work, monitored
		
		Deal with one part at a time.
		
		Table drawn on BB or use enlarged copy master or OHP
		
		Discussion, agreement, checking, self-correcting
		
		T deals with all mistakes
		
		Praising
		
		Give Ps time to think.
		
		T gives hints if Ps cannot think of anything
		
		Discussion, agreement, praising

Bk3		*Lesson Plan 1*

Activity		*Notes*
4	**Writing numbers**	Whole class activity

Writing numbers

Look at these pictures. What numbers are they showing?

BB:

a) (36)

b) (43)   c) (70)
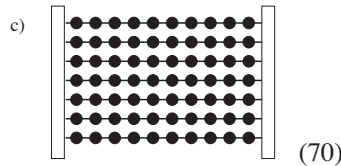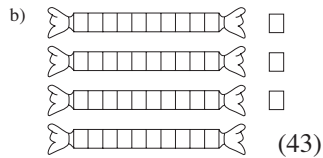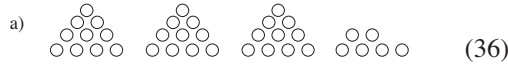
Ps come out to write the numbers on the BB, explaining their reasoning. Who agrees? Who thinks something else? Why?

Discuss how many tens and units are in each number. This can be shown in a place-value table. T explains what each column stands for.

BB:

	Hundreds	Tens	Units	
a)		3	6	$36 = 3 \times 10 + 6$
b)		4	3	$43 = 4 \times 10 + 3$
c)		7	0	$70 = 7 \times 10$
Total	1	4	9	

What is the total of these 3 numbers? (149) Let's check.

Who can come and write the total in the table? Who agrees/disagrees?

Notes:

Whole class activity

Already prepared on small board or use enlarged copy master or OHP

(Or Ps can show with number cards on command.)

Ps come to BB to count the elements as a check.

Drawn on BB or use enlarged copy master or OHP

Ps come out to write the numbers in the table and point to them on the class number line.

Discussion, reasoning, agreement, checking, praising

By counting the elements, or BB: $36 + 43 = 79$,
$70 + 79 = 70 + 30 + 40 + 9$
     $= \underline{149}$

— 22 min —

5

Book 3, page 1

Q.2   Read: *Write the number of circles in the place-value table*.

(All Ps should be asked to fill in the numbers but only the more able Ps need to write the total.)

Review at BB with whole class. Ps come out to write in the numbers, explaining reasoning.

Who made a mistake? What kind of mistake? Deal with all cases. Ps show position of numbers on class number line too.

Who can write in the total of the 3 numbers? Who agrees? Who thinks something else? Let's check.

(Accept 8 tens and 17 units but T (or P) then explains that there is enough for another whole ten, i.e. 9 tens and 7 units)

Notes:

Individual work, monitored, (helped)

Discussion, reasoning, agreement, checking, praising

BB:

	H	T	U
a)		3	3
b)		1	6
c)		4	8
Total		9	7

[Preparation for vertical addition]

— 27 min —

6

Roman numerals

How did the ancient Romans write numbers? Elicit that:

BB: $I = 1$, $V = 5$, $X = 10$, $L = 50$, $C = 100$

Let's fill in the numbers missing from this table.

BB:

Roman		II		IV		VI	VII		IX	X		XIV		XIX		LV	
Arabic	1		3		5			8			11		18		26		73

Ps come out one at a time to fill in a number and explain reasoning (with T's help if necessary). Who agrees? Who thinks something else?
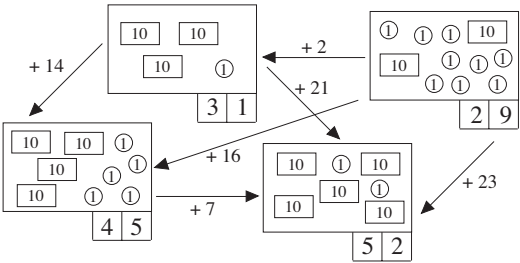
Notes:

Whole class activity

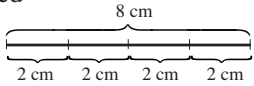Drawn on BB or use enlarged copy master or OHP
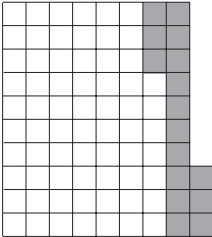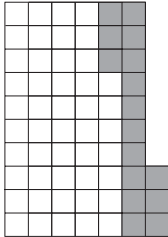
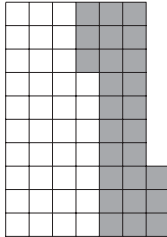Discussion, reasoning, agreement, checking, praising

BB: e.g. $VI = V + I = 6$
$IV = V - I = 4$
$XIV = X + (V - I) = 14$
$LV = L + V = 55$, etc.

— 32 min —

Bk3		*Lesson Plan 1*

Activity		Notes
7	***Book 3, page 1*** Q.3 Read: *The same shape means the same number.* *Fill in the missing whole tens.* How could we solve it? Ps suggest methods of solution. (trial and error, or comparison of rows: e.g. in the 1st equation, we add a triangle and in the 2nd we subtract a triangle. Therefore $100 - 60 = 40$, which equals 2 triangles, so 1 triangle = 20, etc.) *Logical solution (*by getting rid of two of the unknowns): e.g. 1. Add rows 1 and 4 together: 2 rectangles $= 100$, so 1 rectangle = <u>50</u> 2. Subtract row 2 from row 1: 2 triangles $= 40$, so 1 triangle = <u>20</u> 3. Then in row 1: 50 + semicircle + 20 $= 100$, so semicircle = <u>30</u> Whatever method is used, check that the solution is true in <u>all</u> equations. (Or as individual work if Ps wish, followed by whole class discussion.) ———— *36 min* ————		Whole class activity Use enlarged copy master/OHP Give Ps time to think and to suggest methods of solution If Ps reach correct solution by trial and error, praise them but also demonstrate logical solution Discussion, reasoning, agreement, praising BB: $50 + 30 + 20 = 100$ $50 + 30 - 20 = 60$ $50 - 30 + 20 = 40$ $50 - 30 - 20 = 0$
8	***Book 3, page 1*** Q.4 Read: *The sum of any two adjacent numbers is the number* *directly above them. Fill in the missing numbers.* Revise meaning of adjacent. Review at BB with whole class. Ps come out to fill in each pair of numbers, explaining reasoning. Class agrees/disagrees. *Solution:* a) b) (diagram: a) 100 / 40 60 / 20 20 40 / 10 10 10 30; b) 100 / 30 70 / 10 20 50 / 0 10 10 40) ———— *41 min* ————		Individual work, monitored, helped Drawn on BB or use enlarged copy master or OHP Discussion, agreement, checking, self-correction Write additions on BB if there are problems. Praising, encouragement only
9	**Sequences** T says first few terms in a squence and Ps continue it . T asks for the rule in each case. a) 0, 20, 40, . . . (+ 20) b) 0, 5, 10, 15, . . . (+ 5) c) 100, 90, 80, . . . (– 10) d) 1, 11, 21, . . . (+ 10) e) 99, 89, 79, . . . (– 10) f) 4, 9, 14, 19, . . . (+ 5), etc. ———— *45 min* ————		Whole class activity T chooses Ps at random Done at speed Class points out errors Ps can make up own sequences too for class to continue. Praising only

Bk3	R: Mental calculation. Revision and extension of numbers and number system **C: Addition and subtraction. Money.** E: *Puzzles*	*Lesson Plan* *2*

Activity		Notes
1	**Oral work** Let's see how many different ways we can think of to describe the number 10. (e.g. $1 + 9$, $12 - 2$, $5 + 2 + 3$, the next whole number greater than 9, half of 20, 1 tenth of 100, etc.) Repeat with 20, 30, 50, 100. ———— *5 min* ————	Whole class activity T chooses Ps at random At speed Class agrees/disagrees with each description If problems, write on BB

2
 	
Extensions
	Book 3, page 2
	
	Q.1 Read: *Fill in the amounts and mark the numbers on the number line*.
	
	T explains task and elicits that there are 10 coins in each pile, 10 sweets in each packet and 10 marbles in each pyramid.
	
	Review at BB with whole class. Ps come out to write in a number, explaining reasoning. Class agrees/disagrees.
	Then they mark their number on the number line and label it.
	
	Who had them all correct? Who made a mistake?
	What kind of mistake? Who did the same? etc.
	
	• Add up the numbers in: BB
	  a) and b) $74 + 29 = 74 + 20 + 6 + 3 = \underline{103}$ (or $73 + 30$)
	  a) and c) $74 + 32 = 74 + 30 + 2 = \underline{106}$ (or $76 + 30$)
	  b) and c) $29 + 32 = 29 + 30 + 1 + 1 = \underline{61}$ (or $30 + 31$)
	
	• What is the total of all three numbers? e.g.
	
	• Ps come out to point to a number on the number line and choose another P to read it out.
	
	———— *10 min* ————
		Individual work, monitored
		
		Use enlarged copy master or OHP
		
		Discussion, reasoning, agreement, self-correcting, praising
		
		BB: a) 74 coins
		        b) 29 sweets
		        c) 32 marbles
		
		Whole class activity
		
		Ps come out to write additions on the BB
		
		Class agrees/disagrees
		
		BB: $(74 + 29) + 32 =$
		        $103 + 32 = \underline{135}$
		
		At speed. Praising

3	**Number puzzle**
	
	Let's find the whole tens value of each shape, if the same shape stands for the same number. Ps suggest methods of solution.
	
	Solution: e.g.
	
	◯ $= \underline{50}$, as $100 - \underline{50} = \underline{50}$.
	
	So,
	
	▭ $= \underline{40}$, as $10 + \underline{40} = 50$,
	
	△ $= \underline{30}$, as $40 - 10 = \underline{30}$,
	
	◠ $= \underline{60}$, as $40 + \underline{60} = 100$, and ⬡ $= 60 - 40 = \underline{20}$
	
	BB: ▭ $+$ ◠ $= 100$
	      $-$ $-$ $-$
	      $10 +$ ▭ $=$ ◯
	      $=$ $=$ $=$
	      △ $+$ ⬡ $=$ ◯
	
	———— *14 min* ————
		Whole class activity
		
		Drawn on BB or use enlarged copy master/OHP
		
		Reasoning, agreement
		
		Check solution is true for all equations.
		
		Praising
		
		(Or done as individual work if Ps wish, reviewed at BB with whole class)

4	**Mental addition** Class all stand. Ps sit down when they have answered correctly. T says a number. P completes it to make 100 (50, 99). e.g. T says '23', P_1 says '77'; T says '45', P_2 says '55'; etc. Class points out errors. Ps left standing are given another chance to answer correctly. If problems, refer to class number line. ———— *17 min* ————	Whole class activity At speed round class Involve all Ps T differentiates questions according to ability Praising, encouragement only

Bk3		*Lesson Plan 2*
Activity		*Notes*
5	**Money investigation** Ps work in pairs. **A** has to pay £67 to **B**. Then **B** pays £67 to **A** in a different way. Change may be given if needed. Both Ps write the different ways as additions or subtractions in their *Ex. Bks*. (*Heading:* Lesson number and date) Review at BB with the whole class. **A**, show us one way to pay £67. Who did the same as **A**? Who did it a different way? Deal with as many cases as possible in the time. e.g.　**A** gives **B**　£10 + £10 + £10 + £10 + £10 + £10 + £5 + £1 + £1 　　　**B** gives **A**　£20 + £20 + £20 + £2 + £2 + £2 + £1 　　　**C** gives **D**　£50 + £50;　**D** gives **C** back　£20 + £10 + £2 + £1 (Or done as whole class activity with pairs of Ps at front of class choosing from model coins and notes on T's desk and sticking to BB so that whole class can see. Class agrees/disagrees. T (or P) writes additions or subtractions on BB if needed. ——— *22 min* ———	Paired work, monitored, helped Ps have model money on desks: £1 and £2 coins, £5, £10, £20 and £50 notes Reasoning, agreement, checking, praising Extra praise for creativity! [Practice in addition and subtraction and familiarisation with money]
6	***Book 3, page 2*** Q.2　Read: *Draw and write down how you could pay £76 from these notes and coins: £50, £20, £10, £5, £2, £1* 　　　*a) with the exact amount*　　　*b) with change needed*. Review at BB with whole class. **A**, what did you write? Who did the same as **A**? Who did it a different way? etc. e.g. BB:　a)　£50　£20　£5　(£1)　　50 + 20 + 5 + 1 = 76 　　　b)　£50　£20　£10　and change of　(£2) (£1) (£1) 　　　(50 + 20 + 10)　– (2 + 1 + 1) = 80 – 4 = 76 Who made a mistake? What kind of mistake? ——— *27 min* ———	Individual work, monitored, helped Ps may use model money Discussion with whole class T uses large model money stuck to BB (Possible answers could be prepared beforehand on small board (SB) or OHP) Reasoning, agreement, self-correction, praising
7	***Book 3, page 2*** Q.3　Read: *Fill in the amounts. Compare them by drawing arrows towards the amount which is more*. Review at BB with whole class. Mistakes corrected. How much more is one than the other? Ps come out to write the differences on the arrows. Let's check by writing equations. BB: e.g　29 + <u>16</u> = 45　or　45 – 29 = 45 – 20 – 5 – 4 = <u>16</u> *Solution:* What do you notice about the arrows? (6 arrows in all; '52' has only incoming arrows, because it is the biggest; '29' has only outgoing arrows, because it is the smallest) ——— *32 min* ———	Invidual work, monitored Drawn on BB or use enlarged copy master or OHP Discussion, agreement, self-correction, praising. Show the 2 kinds of equation (completion and subtraction) Elicit or point out that: 31 + 14 + 7 = 31 + 21 = 52 29 + 2 + 14 = 29 + 16 = 45 29 + 16 + 7 = 29 + 23 = 52 If nobody notices anything, T gives hints. Praising

Bk3		*Lesson Plan 2*

Activity		*Notes*
8	**Sequences** Let's continue the sequences. T has SB or OHP already prepared. Ps come out to write next 5 terms and give the rule. (Or T writes what Ps dictate.) a) 99, 94, 89, . . . [84, 79, 64, 59, 64, . . .] (− 5) b) 24, 19, 14, . . . [9, 4, − 1, − 6, − 11, . . .] (− 5) c) I, VI, XI, XVI, . . . [XXI, XXVI, XXXI, XXXVI, XLI, . . .] (+ 5) d) C, XC, LXXX, . . . [LXX, LX, L, XL, XXX, . . .] (− 10) e) II, 4, VI, 8, X, 12, . . . [XIV, 16, XVIII, 20, XXII, . . .] (+ 2) ———— *39 min* ————	Whole class activity Involve several Ps Done at a good pace Reasoning, agreement With T's help if necessary for negative and Roman numbers Praising, encouragement only Extra praise for Ps who can continue the sequences further

9	***Book 3, page 2***
	
	Q.4 Read: *Draw a line 8 cm long. Divide it up into quarters.*
	
	    T revises how to draw a certain length of line accurately.
	    Ps draw 8 cm line first. Discuss how to divide it into quarters.
	    (4 equal parts, each part is 1 quarter)
	
	    BB: 4 quarters (1 whole): 8 cm, 1 quarter: 8 cm ÷ 4 = <u>2 cm</u>
	
	    Ps mark with short, vertical lines every 2 cm starting from LHS.
	
	———— *45 min* ————
		Ps have rulers on desks
		Individual work, monitored, helped
		
		          8 cm
		BB: ├──┼──┼──┼──┤
		    2 cm 2 cm 2 cm 2 cm
		
		Discussion, agreement, checking, praising accuracy
		Check: 4 × 2 cm = 8 cm

Bk3	R: Mental calculation **C: Addition and subtraction** E: *Problems in context*	*Lesson Plan* *3*

Activity		**Notes**

1	**Different ways to add and subtract**
	
	Let's add or subtract these numbers in different ways. T writes addition on BB. **A**, come and show us how you would do it. Is **A** correct? Who can think of doing it another way? etc.
	
	a) $47 + 8$ $= 45 + 2 + 5 + 3 = 50 + 5 = 55$
	                $= 47 + 3 + 5 = 50 + 5 = 55$
	                $= (47 + 3) + (8 - 3) = 50 + 5 = 55$
	
	b) $92 - 19$ $= 92 - 20 + 1 = 72 + 1 = 73$
	                $= 80 + 12 - 10 - 9 = 70 + 3 = 73$
	                $= 92 - 10 - 2 - 7 = 80 - 7 = 73$
	                $= (92 + 1) - (19 + 1) = 93 - 20 = 73$
	
	c) $80 + 81$ $= 80 + 80 + 1 = 160 + 1 = 161$
	                $= 80 + 20 + 61 = 100 + 61 = 161$
	                $= 2 \times 80 + 1 = 160 + 1 = 161$
	
	4 min
		Whole class activity
		
		Deal with one part at a time.
		
		Done at a good pace
		
		Reasoning, agreement, praising
		
		T gives hints if necessary or demonstrates those not given by Ps
		
		Discussion about which method Ps think is easiest for them and why.

2	**Addition and subtraction**
	
	Study these diagrams carefully. What do you notice about them? (columns of 10 squares, some shaded. Each diagram has column of only 3 squares at the RHS)
	
	Let's write an addition and subtraction about each diagram.
	
	BB:
	
	a) $67 + 16 = 83$ b) $47 + 16 = 63$ c) $37 + 26 = 63$
	    $67 + 3 + 13 = 83$ $47 + 3 + 13 = 63$ $37 + 3 + 23 = 63$
	
	    $83 - 16 = 67$ $63 - 16 = 47$ $63 - 26 = 37$
	    $83 - 3 - 13 = 67$ $63 - 3 - 13 = 47$ $63 - 3 - 23 = 37$
	
	8 min
		Whole class activity
		
		Drawn on small board or use enlarged copy master or OHP
		
		Ps dictate what T should write for part a) and then Ps come to BB to write operations for parts b) and c)
		
		Relate additions/subtractions to pictures
		
		Reasoning, agreement, checking, praising

3	***Book 3, page 3***
	
	Q.1 Read: *Practise addition*.
	
	       How many additions are there? ($3 \times 6 = 18$)
	
	       Let's see how many you can do in 4 minutes. You can use your number lines if you need to. Sit up with your arms folded when you have finished. Start . . . now! . . . . . Stop!
	
	       Review orally round class. If problems write details on BB.
	
	       e.g. $17 + 5 = 17 + 3 + 2 = 22$, $8 + 24 = 24 + 6 + 2 = 32$
	
	       Ps mark own (or neighbour's) work and count how many correct out of 18. Who had 18 correct? Who had 1 (2, 3, 4) mistakes? What were your mistakes? Who did the same? etc.
	
	14 min
		Individual work, monitored
		
		T notes Ps who need to refer to their number lines
		
		Keep to the time limit
		
		Agreement, checking, self-correcting, evaluation
		
		Praising, encouragement only
		
		T awards good work (e.g. stars, stickers, badges)

Bk3		*Lesson Plan 3*

Activity		*Notes*
4	*Book 3, page 3* Q.2 Read: *Practise subtraction*. How many subtractions are there? $(3 \times 6 = 18)$ Let's see if you can increase your score this time! Do as many as you can in 4 minutes. Use your number lines if you need to. Sit up with your arms folded when you have finished. Start . . . now! . . . . . Stop! Review orally round class. If problems write details on BB. e.g. $26 - 9 = 26 - 6 - 3 = 17$, $25 - 17 = 25 - 10 - 5 - 2 = 8$ Ps mark own (or neighbour's) work and count how many correct out of 18. Who had 18 correct? Who had 1 (2, 3, 4) mistakes? What were your mistakes? Who did the same? etc. Who scored more than before? How many more? ———— *20 min* ————	Individual work, monitored T notes Ps who need to refer to their number lines Keep to the time limit Agreement, checking, self-correcting, evaluation Praising, encouragement only T awards most improved work (e.g. stars, stickers, badges)
5	**Number puzzle** T has BB (or SB or OHP) already prepared: BB: a) $13 + 12 + 12 = \boxed{37}$ $+ \quad + \quad +\quad +$ $20 + 15 - 13 = \boxed{22}$ $+ \quad - \quad - \quad -$ $11 + 3 + 11 = \boxed{25}$ $= \quad = \quad = \quad =$ $\boxed{44} - \boxed{24} + \boxed{14} = \boxed{34}$ b) $26 - 12 + 5 = \boxed{19}$ $- \quad + \quad + \quad -$ $11 + 15 - 10 = \boxed{16}$ $+ \quad - \quad - \quad +$ $3 + 23 - 4 = \boxed{22}$ $= \quad = \quad = \quad =$ $\boxed{18} - \boxed{4} + \boxed{11} = \boxed{25}$ Ps come out one at a time to fill in the missing numbers, saying how they did the calculation. Class checks that they are correct. ———— *25 min* ————	Whole class activity Written on BB or use enlarged copy master or OHP Involve several Ps At a good pace Reasoning, agreement, checking, praising
6	**Inequalitites** Let's fill in the missing numbers so that the inequalities are correct. BB: a) $27 - \overset{10}{19} + 2 < _2\ 7 + \overset{12}{8} - \boxed{3}$ b) $28 - \overset{22}{9} + 3\ < _1\ 19 + \overset{23}{6} - \boxed{2}$ c) $24 - \overset{10}{15} + \boxed{1}\ \ _3 > 6 + \overset{7}{5} - 4$ d) $37 - \overset{13}{28} + \boxed{4}\ \ _4 > 7 + \overset{9}{6} - 4$ Ps come out to BB to write value above completed side, then to write value above incomplete side, then to fill in the missing number. Class checks that the inequality is correct. If problems, write calculations out in full on BB. ———— *30 min* ————	Whole class activity Written on BB or use enlarged copy master or OHP At a good pace Ps say how they do each calculation, (e.g. $27 - 9 = 28 - 10$, or $27 - 9 = 27 - 7 - 2$) Reasoning, agreement, checking, praising Refer to class number line if necessary.

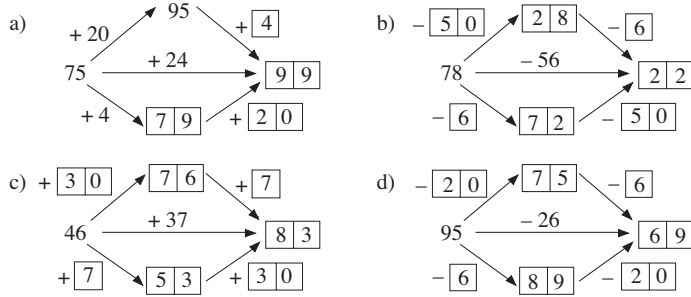| **Bk3**		*Lesson Plan 3*

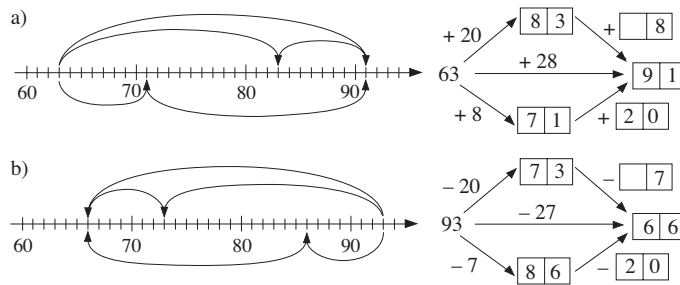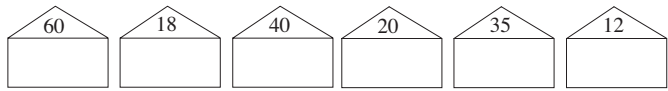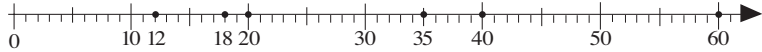| *Activity*		*Notes*
7	**Addition and subtraction** Look carefully at these diagrams. What do they show? (Additions or subtractions done in one or two steps). Follow the arrows and fill in the missing numbers. BB: a) $75 \xrightarrow{+20} 95 \xrightarrow{+\boxed{4}} \boxed{9}\boxed{9}$, $75 \xrightarrow{+24} \boxed{9}\boxed{9}$, $75 \xrightarrow{+4} \boxed{7}\boxed{9} \xrightarrow{+\boxed{2}\boxed{0}} $ b) $78 \xrightarrow{-\boxed{5}\boxed{0}} \boxed{2}\boxed{8} \xrightarrow{-\boxed{6}}$, $78 \xrightarrow{-56} \boxed{2}\boxed{2}$, $78 \xrightarrow{-\boxed{6}} \boxed{7}\boxed{2} \xrightarrow{-\boxed{5}\boxed{0}}$ c) $46 \xrightarrow{+\boxed{3}\boxed{0}} \boxed{7}\boxed{6} \xrightarrow{+\boxed{7}}$, $46 \xrightarrow{+37} \boxed{8}\boxed{3}$, $46 \xrightarrow{+\boxed{7}} \boxed{5}\boxed{3} \xrightarrow{+\boxed{3}\boxed{0}}$ d) $95 \xrightarrow{-\boxed{2}\boxed{0}} \boxed{7}\boxed{5} \xrightarrow{-\boxed{6}}$, $95 \xrightarrow{-26} \boxed{6}\boxed{9}$, $95 \xrightarrow{-\boxed{6}} \boxed{8}\boxed{9} \xrightarrow{-\boxed{2}\boxed{0}}$ Ps come out to BB to fill in the missing numbers, explaining reasoning. Class points out errors. — *35 min* —		Whole class activity Drawn on BB or SB or use enlarged copy master or OHP Deal with one part at a time At a good pace Reasoning, agreement, checking, praising Show the calculations as jumps along the class number line
8	***Book 3, page 3*** Q.3 Read: *Do the additions in different ways.* *Fill in the missing numbers. Complete the diagrams.* Elicit that this is similar to previous exercise. Make sure that your numbers match the jumps shown along the number line. Think about which jumps are missing from the diagrams. Ps do one part at a time. Review at BB with whole class. Ps come out to fill in their numbers, explaining reasoning and to draw the missing jumps. Class agrees/disagrees. BB: a) number line 60–90; $63 \xrightarrow{+20} \boxed{8}\boxed{3} \xrightarrow{+\boxed{~}\boxed{8}}$, $63 \xrightarrow{+28} \boxed{9}\boxed{1}$, $63 \xrightarrow{+8} \boxed{7}\boxed{1} \xrightarrow{+\boxed{2}\boxed{0}}$ b) number line 60–90; $93 \xrightarrow{-20} \boxed{7}\boxed{3} \xrightarrow{-\boxed{~}\boxed{7}}$, $93 \xrightarrow{-27} \boxed{6}\boxed{6}$, $93 \xrightarrow{-7} \boxed{8}\boxed{6} \xrightarrow{-\boxed{2}\boxed{0}}$ — *40 min* —		Individual work, monitored, (helped) Drawn on BB or use enlarged copy master or OHP Reasoning, agreement, self-correction, praising Involve several Ps Discuss which method Ps think is easier. Elicit that it does not matter whether units or tens are added or subtracted first – personal preference.
9	***Book 3, page 3*** Q.4 Read: *Ann has 35 picture cards, 18 more than Lisa. How many picture cards do the two girls have altogether?* Write a plan and do the calculation in your *Pbs*. Show me the answer with number cards when I say Show me . . . . . now! (52) **X**, come and explain to us how you worked out the solution. Who agrees with **X**? Who did it a different way? BB: Ann: 35 Lisa: $35 - 18 = 17$ Ann + Lisa: $35 + 17 = 35 + 10 + 5 + 2 = \underline{52}$ *Answer:* They have 52 cards altogether. — *45 min* —		Individual work, monitored, (helped) (Or written on scrap paper) In unison Reasoning, agreement, checking, correcting, praising Demonstrate with 2 Ps at front of class and real cards if there is a problem

Bk3	R: Addition, subtraction **C: Equations. Inequalities** E: *Problems in context*	*Lesson Plan* *4*

Activity		**Notes**
1	**Oral work** Let's see how many different ways we can think of to describe the number 40. (e.g. $30 + 10$, $100 - 60$, $25 + 12 + 3$, the next whole number greater than 39, 4×10, half of 80, etc.) Repeat with 70, 55. *———— 4 min ————*	Whole class activity T chooses Ps at random At speed. Praise creativity. Class agrees/disagrees with each description If problems, write out on BB

2	**Number patterns**
	
	 a) T says $'21 - 7 ='$, P_1 says '14'; T says $'31 - 17 ='$, P_2 says '14';
	     T says $'41 - 27 ='$, P_3 says '14'; Ps continue the pattern themselves.
	     P_4 says $'51 - 37 ='$, P_5 says '14', P_6 says $'61 - 47 ='$, P_7 says '14', etc.
	
	     What is the rule? (Number subtracted from, and number being subtracted, are both increasing by 10.) What happens to the result? (It does not change.) Consolidate with another example.
	
	 b) T says $'63 + 16 ='$, P_1 says '79'; T says $'63 + 17 ='$, P_2 says '80';
	     T says $'63 + 18 ='$, P_3 says '81'; Ps continue the pattern themselves.
	     P_4 says $'63 + 19 ='$, P_5 says '82', P_6 says $'63 + 20 ='$, P_7 says '83', etc.
	
	     What is the rule? (Number added to stays the same and number being added is increasing by 1.) What happens to the result? (It increases by 1.) Consolidate with another example.
	
	 ———— 8 min ————
		Whole class activity
		
		 T chooses Ps at random
		
		 Involve at least half of the class. At speed
		
		 Discussion, agreement, praising. Write sequence on BB if necessary.
		
		 T chooses Ps at random
		
		 Involve the other half of the class. At speed
		
		 Discussion, agreement, praising. Write sequence on BB if necessary.
		
		 Refer to number line if needed.

3 **Extension**	**Problem** Listen carefully and try to picture the story in your head. *In a park, 24 children were playing rounders, 43 were playing football and the rest played on the swings.* *How many children were playing on the swings if the total number of children in the park was less than 75?* T asks several Ps what they think. Let's do it logically and show all the possibilities in a table. What is the least number of children who could be playing on the swings? (1) Let's start with 1. Ps come out one at a time to fill in the bottom 2 rows (1 column per P). Class checks their totals. BB: 	Rounders	24	24	24	24	24	24	24	24	24	24	 |---|---|---|---|---|---|---|---|---|---|---| 	Football	43	43	43	43	43	43	43	43	43	43	 	Swings	1	2	3	4	5	6	7	8̶	9̶	1̶0̶	 	Total	68	69	70	71	72	73	74	7̶5̶	7̶6̶	7̶7̶	 Discuss: 8 children and above is not possible as total would <u>not</u> be less than 75; zero children is possible mathematically but not in reality, or the swings would not have been mentioned. How could we write it in a mathematical way? **B**, come and try. Who agrees? Who can write it another way? BB: $24 + 43 + \square < 75 \;\rightarrow\; 67 + \square < 75$ or $1 \leq \square < 8$ *———— 12 min ————*	Whole class activity T repeats slowly and Ps repeat in own words Drawn on BB or use enlarged copy master or OHP. At a good pace Discussion, reasoning, agreement, checking, praising Extra praise if Ps notice this themselves Reasoning, agreement, checking, praising

Bk3		*Lesson Plan 4*
Activity		***Notes***

4	**Book 3, page 4**	Individual work, monitored
	Q.1 Read: *Jane has £64. How many pounds could she spend and how many pounds would she have left?*	Table drawn on BB or use enlarged copy master or OHP
	Complete the table.	Discussion, agreement, checking, self-correction
	Ps complete the table first. Review at BB with whole class.	Class agrees/disagrees.
	Ask Ps for other cases not shown on the table. (e.g. 4 + 60)	*Rule*: $64 = S + H$
	How could we write the general rule? **C**, come and try. Who agrees? Who can write it a different way? etc.	$S = 64 - H$ $H = 64 - S$
	[N.B. Time limit differentiation – only the fastest Ps should be expected to complete the whole table; the rule can still be seen with only some of the table completed.]	Praising, encouragement only
	⎯ *17 min* ⎯	

5	**2-digit numbers**	Whole class activity
	a) Let's list all the 2-digit numbers which are greater than 7 and smaller than 16.	Involve several Ps
	T writes on BB as dictated by Ps. BB: 10, 11, 12, 13, 14, 15	Class agrees/disagrees
	Write inequalities about it in your *Ex. Bks*. (*Heading*: Lesson number and date) Review at BB with whole class.	Reasoning, agreement, checking, praising
	BB: $7 <$ ☐ and ☐ < 16 and ☐ is 2-digit;	Discuss the possibilities and show on class number line.
	or $7 <$ ☐ < 16 and ☐ is 2-digit;	
	or $9 <$ ☐ < 16; or $10 \leq$ ☐ ≤ 15	
	b) Let's list all the 2-digit numbers which are odd, not more than 65 and more than 51.	Involve several Ps
	T writes on BB as dictated by Ps. BB: 53, 55, 57, 59, 61, 63, 65	Class agrees/disagrees
	Write inequalities about it in your *Ex. Bks*. Review at BB with whole class.	Reasoning, agreement, checking, praising
	BB: $65 \geq$ ☐ and ☐ > 51 and ☐ is odd;	Discuss the possibilities and show on class number line.
	or $51 <$ ☐ ≤ 65 and ☐ is odd;	
	c) Let's list all the 2-digit numbers which have the tens digit not less than 7 and the units digit less than 3.	Involve several Ps.
	T writes on BB as dictated by Ps. BB: 70, 71, 72, 80, 81, 82, 90, 91, 92	Class agrees/disagrees. Praising.
	⎯ *22 min* ⎯	

6	**Book 3, page 4**	Individual work, monitored
	Q.2 Read: *Andrew has £46 more than Brian has. How much money could they each have? Complete the table.*	Table drawn on BB or use enlarged copy master or OHP
	Ps complete the table first. Review at BB with whole class.	Discussion, agreement, checking, self-correction
	Let's compare some of the columns. e.g. 80 + 34 and 81 + 35; 73 + 27 and 83 + 37, etc.	Encourage Ps to find other such columns.
	(Elicit that if number in top row increases by a certain number, number in bottom row increases by the same amount.)	*Rule*: $A = B + 46$
	How could we write the general rule? **D**, come and try. Who agrees? Who can write it a different way? etc.	$B = A - 46$ $46 = A - B$
	[N.B. Time limit differentiation as in Activity 4]	Praising
	⎯ *28 min* ⎯	

Bk3		*Lesson Plan 4*

Activity		*Notes*
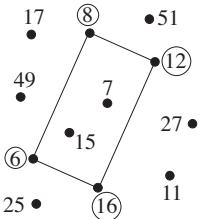
7	**Book 3, page 4**
	
	Q.3 Read: *A book case has 3 shelves. On the middle shelf there are 32 books, 9 less than there are on the top shelf and 9 more than there are on the bottom shelf.*
	
	  a) *How many books are on the top shelf?*
	  b) *How many books are on the bottom shelf?*
	  c) *How many books are in the book case?*
	
	Try to picture it in your head. You can draw a diagram to help you. Think about one shelf at a time. Write each answer as an addition or subtraction in your *Pbs*.
	
	Review at BB with whole class. Ps explain solution to class. Who did the same? Who did it a different way? etc.
	
	If no P has already done so, T shows a 'great idea' for part c)!
	
	BB: $32 \times 3 = 96$ Why have I written this?
	
	$(32 + 9) + 32 + (32 - 9) = 32 + 32 + 32 = 32 \times 3$)
	
	———— *33 min* ————
		Individual work, monitored, helped
		
		T might need to relate to a real book case in the classroom
		
		Discussion, reasoning, agreement, checking, self-correcting, praising
		
		BB: a) $32 + 9 = \underline{41}$
		  b) $32 - 9 = \underline{23}$
		  c) $41 + 32 + 23 = \underline{96}$
		
		![diagram: bars labelled 41, 32 with 9, 23 with 9]

8	**Book 3, page 4**
	
	Q.4 Read: *Fill in the missing numbers*.
	
	How many additions/subtractions are there? .$(4 \times 6 = 24)$
	
	Let's see how many you can do in 4 minutes! Use your number lines if you need to. Sit up with your arms folded when you have finished. Start . . . now! . . . . . Stop!
	
	Review orally round class. If problems write details on BB.
	
	Ps mark own (or neighbour's) work and count how many correct out of 24. Who had all correct? Who had 1 (2, 3, 4) mistakes? What were your mistakes? Who did the same? etc.
	
	• How do we get the unknown number in an addition if we know the other number and the sum? (Subtract the known number from the sum) T (or P) gives examples.
	
	• How do we get the unknown number in a subtraction if we know the number being subtracted from and the difference? (Subtract the difference from the known number.) T (or P) gives examples.
	
	• How do we get the unknown number in a subtraction if we know the number being subtracted and the difference? (Add the known number and the difference.) T (or P) gives examples.
	
	———— *40 min* ————
		Individual work, monitored
		
		Keep to time limit
		
		Agreement, self-correction.
		
		If problems, write details on BB. Praising. Awards given for perfect work. (Stars, etc.)
		
		BB: e.g. $40 + ? = 60$
		    $60 - 40 = \underline{20}$
		
		  e.g. $60 - ? = 20$
		    $60 - 20 = \underline{40}$
		
		  e.g. $? - 40 = 20$
		    $40 + 20 = \underline{60}$

9	**Calculation practice** Let's find the easiest way to do these calculations. What do you notice? (Can use answer in part i) to deduce the others.) Ps dictate the answers, T writes them in. (Or T has answers already written but covered up. T uncovers one answer at a time and Ps agree/disagree, giving reasoning.) *Answers:* a) i) 83, ii) 88 (83 + 5), iii) 88, iv) 93 (83 + 10), (v) 78 (83 – 5), vi) 78, vii) 73 (83 – 10), viii) 83, ix) 83 b) i) 41, ii) 46 (41 + 5), iii) 36 (41 – 5), iv) 41 (v) 36 (41 – 5), vi) 46 (41 + 5), vii) 41, viii) 51 (41 + 10), ix) 31 (41 – 10) ———— *45 min* ————	Whole class activity Prepared beforehand on SB or use enlarged copy master or OHP At a good pace round class Reasoning, agreement, checking, praising (Ps could have copy of sheet on desks too.)

Bk3	R: Addition, subtraction **C: Revision of multiplication. Tables for 2, 5 and 10** E: *Extension of multiplication. Multiples.*	*Lesson Plan* *5*
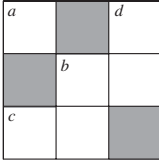
Activity		**Notes**
1	**Sequences** (verbal) a) The first term of a sequence is 20. Each following term is 5 more than the previous one. Let's continue the sequence: Ps: 20, 25, 30, 35, 40, 45, . . ., What else can you say about the numbers in this sequence? (Divisible by 5; multiples of 5) b) T: Here is another number sequence. 100, 90, 80, . . . What could the rule be? (Decreasing by 10) Let's continue the sequence: . . ., 70, 60, 50, 40, 30, 20, 10, 0, (–10, – 20, . . .) (or as far as Ps are able) What else can you say about the numbers in theis sequence? (Divisible by 10; multiples of 10) *———— 4 min ————*	Whole class activity T chooses Ps at random Class points out errors. (Develops calculation skills) Agreement, praising Ask several Ps what they think. In chorus Agreement, praising T notes Ps having difficulty
2	**Sequences** (written) Write this sequence in your *Ex. Bks.* and continue it for the next 8 terms. T: 50, 55, 53, . . ., Review with whole class. **A**, what did you write? (e.g. 58, 56, 61, 59, 64, 62, 67, 65, . . .) What rule did you use? (I added 5 then took away 2, added 5 then took away 2, and so on.) Who used the same rule? Who used a different rule? Who agrees? e.g. **B**: 50, 55, 53, 50, 55, 53, 50, 55, . . . (Repeat 1st 3 terms) **C**: 53, 55, 50, 50, 55, 53, 53, 55, . . . (inverse order, original order) *———— 8 min ————*	Individual work, monitored (*Heading*: Lesson number and date) Discussion at BB. Reasoning, agreement, praising Deal with all cases Class agrees whether each is valid
3	**Products** Let's help Mr. Mouse to match up the mouseholes to the houses. What kind of operations are in the mouseholes? (multiplications) BB: houses: 60, 18, 40, 20, 35, 12 mouseholes: 4 × 5, 6 × 10, 9 × 2, 7 × 5, 4 × 10, 6 × 2 Ps come out one after the other to choose a multiplication and stick it in the correct house, saying the complete operation. Class agrees or disagrees. What other multiplication could go in this house? Who remembers the name for the result of a multiplication? (product) Let's write these products on the number line. (Ps come out to mark numbers (with a dot or cross) and label them. BB: 0 10 12 18 20 30 35 40 50 60 Write in your *Ex. Bks.*: a) the smallest of these numbers; (12) b) the number which has only odd digits.; (35) c) the greatest of these numbers. (60) Review orally with whole class. Who had them all correct? Who made a mistake? What kind of mistake? Who does not undertand? *———— 13 min ————*	Whole class activity Use copy master, enlarged, coloured, cut out and stuck to BB as in diagram. (Or drawn on BB or OHP and Ps join up matching pairs) Agreement, praising (e.g. 20 = 2 × 10, etc.) BB: product Stick dots on class number line or use enlarged copy master or OHP Individual work Agreement, self-correction (Or whole class activity with number cards/scrap paper) (Feedback for T) Praising, encouragement only

Bk3		*Lesson Plan 5*

Activity		**Notes**
4	**Multiples of 2**	Whole class activity
	Which of these numbers are multiples of 2? Let's draw a circle around each one. Ps come out one at a time to choose, explaining reasoning (e.g.' 6 is a multiple of 2 because it is exactly divisible by 2' (because $2 \times 3 = 6$, because it is even). Revise even and odd numbers if necessary. Class points out errors. (6, 8, 12, 16)	Drawn on BB or use enlarged copy master or OHP
		Reasoning, agreement, praising
	Let's join up the multiples of 2 in increasing order.	T (or P) joins up numbers as dictated by Ps
	BB:	
	⑧ 17 •51	
	49 7 ⑫	Discussion, agreement
	• 27 •	
	•15	Write words on BB if Ps do not remember them
	⑥ 25 • ⑯ 11	Praising
	What shape have we drawn?	
	(plane shape, quadrilateral, polygon, <u>rectangle</u>)	
	T uses all these words and explains meaning if necessary.	
	———— *16 min* ————	
5	***Book 3, page 5***	Individual work, monitored, (helped)
	Q.1 Read: *Write an addition and a multiplication about each picture*.	
	Talk about each picture first. (e.g. pairs of cherries; groups of 5 lines as in a tally chart, piles or pyramids of 10 marbles, etc.)	Use enlarged copy master or OHP
	Review at BB with whole class. Mistakes corrected.	Reasoning, agreement, self-correction, praising
	BB: a) $2 + 2 + 2 + 2 + 2 + 2 + 2 = 7 \times 2 = \underline{14}$	
	b) $5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 9 \times 5 = \underline{45}$	(Feedback for T)
	c) $10 + 10 + 10 = 3 \times 10 = \underline{30}$	Encourage Ps to use them too.
	T uses the words 'product', 'factor', 'sum', 'total'.	
	———— *21 min* ————	
6	***Book 3, page 5***	
	Q.2 Read: *The animals start at 0 and make jumps of equal length along the number line. Draw their jumps and write the numbers they land on below the number line*.	Individual work, monitored, (helped)
	Talk about the animals first. (*Sparrow, Frog, Rabbit*). Review at BB with whole class. **A**, what numbers did you write for *Sparrow*? Who agrees? Who wrote something else? etc.	Use enlarged copy master or OHP or refer to class number line.
	BB: *Sparrow:* 0, 2, 4, 6, 8, 10, . . ., 48, 50	Reasoning, agreement, self-correction, praising
	Frog: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50	
	Rabbit: 0, 10, 20, 30, 40, 50	Continue each set orally to 100 in unison
	What can you say about each animal's numbers? (e.g.	Ask several Ps
	S: multiples of 2; even numbers; divisible by 2; twice 0, 1, 2, 3, . . .	With T's help if necessary
	F: multiples of 5; divisible by 5; 5 times 0, 1, 2, 3, etc.	
	R: multiples of 10; divisible by 10; whole tens; 10 times 0, 1, 2, etc.)	(Expressing common properties in different ways)
	———— *30 min* ————	
7	**Review of 2, 5, 10 times tables**	Whole class activity
	B, come and point to the multiples of 2 on this multiplication table (vertically and horizontally). Let's say the 2 times table together. (2 times 0 equals 0, 2 times 1 equals 2, 2 times 2 equals 4, . . .	Use *OHT 14* with coloured cross strips
	How else could we say it? (0 times 2 = 0, 1 times 2 = 2, . . .)	In unison, at speed
		T notes Ps having difficulty
	Repeat for the 5 (10) times tables. T points to the 2 factors when necessary.	Praising, encouragement only
	———— *32 min* ————	

Bk3		*Lesson Plan 5*
Activity		***Notes***
8	**Oral practice** T says multiplications involving 2, 5 or 10. Ps give products. (e.g. T: '3 × 5', P₁: '15'; T: '2 × 9', P₂: '18', etc.) ———— *35 min* ————	Whole class activity T chooses Ps at random. At speed. Praising only

9	***Book 3, page 5***
	
	Q.3 Read: *Fill in the rows and columns for 2, 5 and 10.*
	        Make sure you know these multiplication facts by heart.
	
	Review at BB with whole class. Ps come out to fill in a row or column. Mistakes corrected.
	
	Let's try to extend the sequences!
	
	(e.g. 11 times 2 equals 22, 12 times 2 equals 24, . . .
	
	        11 times 5 equals 55, 12 times 5 equals 60, . . .
	
	        11 times 10 equals 110, 12 times 10 equals 120, . . .
	
	———— *40 min* ————
		Individual work, monitored
		
		Use *OHT 14* or enlarged copy master or OHP
		
		Agreement, self-correcting
		
		Whole class in unison
		
		With T's help
		
		Praising

10	**Tables practice** T says a product, Ps say multiplications involving 2, 5 or 10, e.g. T: '30', P₁: '5 times 6', P₂: '10 times 3', P₃: '2 times 15' ; T: '50', P₄: '5 times 10', P₅: '10 times 5', P₆: '2 times 25', etc. Class points out errors. Ps can say the products too. (Extend to products beyond 100 if Ps are able.) ———— *45 min* ————	Whole class activity T chooses Ps at random At speed Agreement, praising Expectation only of products up to 100. Extra praise for products beyond 100.

Bk3	R: Understanding of multiplication **C: Multiplication tables for 4 and 8, and for 3, 6 and 9** *E: Multiples*	*Lesson Plan* *6*

Activity		Notes
1	**Oral work** Let's play Boom! Everyone stand up! We will start counting from 1 but instead of saying every third number you must say 'boom'. If you make a mistake you have to sit down. T: '1', P_1: '2', P_2: 'boom', P_3: '4', P_4: '5', P_6: 'boom', etc. What can you say about the 'boom' numbers? (multiples of 3, exactly divisible by 3) (Feedback for T) *——— 3 min ———*	Whole class activity T chooses Ps at random. If P makes a mistake and sits down, T points to another P to say it correctly (Develops concentration, memory and calculation skills) Praising only

2	**Secret Code**
	
	I have written some multiplications on the BB and each has a letter beside it. In your *Ex. Bks*, write only the letters and the products of the multiplications. (*Heading*: Lesson number and date)
	
	BB: 6×5 E (30) 4×4 L (16)
	     4×10 R (40) 5×3 C (15)
	     9×2 E (18) 7×4 V (28)
	
	Review with whole class. Ps change their pencils (to red) and mark their work, correcting any mistakes. Ps read answers and T writes on BB.
	Who had all 6 correct? Who had 5 (4, 3, 2, 1, 0)?
	Write the products out again in increasing order and write the letters underneath. What word have you written? Class shout, 'CLEVER'
	
	BB: 15, 16, 18, 28, 30, 40
	            C L E V E R
	
	——— 8 min ———
		Whole class activity but Ps write results individually
		
		T has BB or SB already prepared
		
		Discussion, agreement, self-correcting, praising
		(Feedback for T)
		
		In unison
		P comes to BB to show it.
		Mistakes corrected

3	**Additions and multiplications 1**
	Study the pictures and write an addition and a multiplication about each part in your *Ex. Bks*.
	
	BB: a) $4 + 4 + 4 + 4 + 4 + 4 = 24$
	                              $6 \times 4 = 24$
	
	     b)
	          $8 + 8 + 8 + 8 + 8 + 8 + 8 = 56$
	                          $7 \times 8 = 56$
	
	Review at BB with whole class. **A**, what did you write for part a)? Why? Who agrees? Who wrote something else? Similarly for b).
	
	——— 12 min ———
		Individual work, monitored
		
		Drawn on BB or use enlarged copy master or OHP
		
		Discussion, reasoning, agreement, self-correction
		Praising. (Feedback)

4	**Additions and multiplications 2**
	Talk about the pictures first.
	
	Elicit the names of the the shapes (triangle, hexagon, square).
	
	a)
	b)
	c)
	
	Write an addition and a multiplication about each part in your *Ex. Bks*.
	
	Review at BB with whole class. **B**, what did you write for a)? Why? Who agrees? Who wrote something else? Similarly for b) and c).
	
	——— 16 min ———
		Individual work, monitored
		Drawn on BB or use enlarged copy master or OHP
		BB: a) $3 + 3 + 3 + 3 + 3 + 3$
		    $= 6 \times 3 = \underline{18}$
		  b) $6 + 6 + 6 + 6 = 4 \times 6$
		    $= \underline{24}$
		  c) $9 + 9 + 9 = 3 \times 9$
		    $= \underline{27}$
		Reasoning, agreement, self-correction, praising.

Bk3

Lesson Plan 6

Activity		Notes
5	*Book 3, page 6* Q.1 Read: *Starting from 0, draw jumps of equal length along the number line.* *Write the numbers landed on below the number line.* Review at BB with whole class. **D**, what numbers did you write for part a)? Who agrees? Who wrote something else? etc. BB: a) 0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, (52, . . .) b) 0, 8, 16, 24, 32, 40, 48, (54, . . .) c) 0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, (51, . . .) d) 0, 6, 12, 18, 24, 30, 36, 42, 48, (54, . . .) e) 0, 9, 18, 27, 36, 45, (54, . . .) What can you say about the numbers? (e.g. a) multiples of 4; divisible by 4; 4 times 0, 1, 2, 3, . . . b) multiples of 8; divisible by 8; 8 times 0, 1, 2, 3, etc. ———— *25 min* ————	Individual work, monitored, (helped) Use enlarged copy master or OHP or refer to class number line. Do part a) with whole class first if Ps do not understand Reasoning, agreement, self-correction, praising Continue each set orally to 100 in unison (with T's help if needed) Ask several Ps (Expressing common properties in different ways)
6	**Review of 4 (8, 3, 6, 9) times tables** **C**, come and point to the multiples of 4 on this multiplication table. (vertically and horizontally) Let's say the 4 times table together. (4 times 0 equals 0, 4 times 1 equals 4, 4 times 2 equals 8, . . . How else could we say it? (0 times 4 = 0, 1 times 4 = 4, . . .) Repeat for the 8, 3, 6 and 9 times tables. T points to the two factors when necessary. ———— *30 min* ————	Whole class activirty Use *OHT 14* with coloured cross strips In unison, at speed T notes Ps having difficulty Praising, encouragement only
7	*Book 3, page 6* Q.2 Read: *Complete the table. Multiply the numbers in the top row by 3, 6 and 9*. T explains task. (Only the more able Ps should be expected to complete the last 5 columns.) Review at BB with whole class. Mistakes corrected. Write details on BB if necessary, e.g. $9 \times 15 = 9 \times 10 + 9 \times 5 = 90 + 45 = 90 + 10 + 35 = \underline{135}$ Compare the rows. (e.g. 3rd row is 3 times 1st row, etc.) ———— *36 min* ————	Individual work, monitored (helped) Drawn on BB or use enlarged copy master or OHP Agreement, self-correction, praising Extend by adding rows for multiplying by 2, 4 and 8

8	*Book 3, page 6*
	
	Q.3 Read: *Fill in the rows and columns for 3, 4, 6, 8 and 9.*
	   Make sure you know these multiplication facts by heart.
	
	Review at BB with whole class. Ps come out to fill in a row or column. Mistakes corrected. Let's try to extend the sequences!
	
	(e.g. 11 times 3 equals 33, 12 times 3 equals 36, . . .
	   11 times 4 equals 44, 12 times 4 equals 48, . . , etc.
	———— *42 min* ————
		Individual work, monitored
		
		Use *OHT 14* or enlarged copy master or OHP
		
		Agreement, self-correcting
		
		Whole class in unison
		
		With T's help if needed
		
		Praising, encouragement only

9	**Tables practice** T says a multiplication, Ps give answer. Class points out errors. Mistakes corrected at multiplication square. (Use all numbers, including 7 × 7, as several Ps might know it). ———— *45 min* ————	Whole class activity T chooses Ps at random. At speed. Praising only
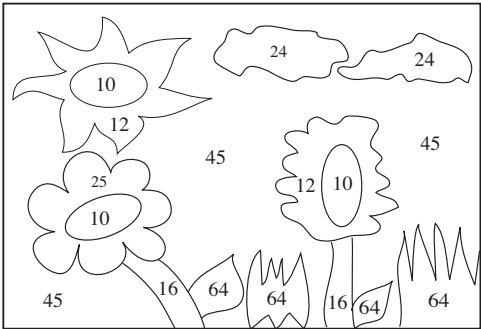
Bk3	R: Mental calculation **C: Revision of multiplication: 7, 0, 1** *E: Multiples*	*Lesson Plan* **7**

Activity		Notes
1	**Oral work** Let's play Boom! Everyone stand up! We will start counting from 1 but instead of saying every 7th number you must say 'boom'. If you make a mistake you have to sit down. T: '1', P_1: '2', P_2: '3', P_3: '4', P_4: '5', P_5: '6', P_6: 'boom', etc. What can you say about the 'boom' numbers? (multiples of 7, exactly divisible by 7) (Feedback for T) ——— *4 min* ———	Whole class activity T chooses Ps at random. If P makes a mistake and sits down, T points to another P to say it correctly (Develops concentration, memory and calculation skills) Praising only

2	**Secret Code**
	
	I have written some multiplications on the BB and each has a letter beside it. In your *Ex. Bks*, write only the letters and the products of the multiplications. (*Heading*: Lesson number and date)
	
	BB: 8×5 L (40) $4 \times 4 + 10 \div 5$ E (18)
	   $4 \times 10 - 6$ O (34) $5 \times 3 + 6 \times 4$ D (39)
	   $9 \times 2 + 3 \times 3$ N (27) $9 \times 9 - 6$ E (75)
	   $8 \times 8 - 2 \times 4$ L (56) $7 \times 4 + 52$ W (80)
	
	Review with whole class. Ps change their pencils (to red) and mark their work, correcting any mistakes. Ps read answers and T writes on BB.
	Who had all 8 correct? Who had 7 (6, 5, less than 5)?
	Write the products out again in decreasing order and write the letters underneath. What have you written? Class shouts: 'WELL DONE'
	BB: 80, 75, 56, 40, 39, 34, 27, 18
	     W E L L D O N E
	——— *9 min* ———
		Whole class activity but Ps write results individually
		
		T has BB or SB already prepared
		
		Revise order of operations if necessary
		
		Discussion, agreement, self-correcting, praising
		(Feedback for T)
		
		In unison
		P comes to BB to show it.
		Mistakes corrected

3	**Cross-number puzzle** *Robin Rabbit* has a number puzzle for us! He wonders if we can solve it! Read the clues, discuss it with your partner and fill in the missing numbers. Check that the puzzle is correct vertically and horizontally! BB: Across a) The greatest 1-digit odd number (9) b) Take away half of 20 from 6 times 10. (50) c) Two less than the smallest 3-digit number. (98) Down b) Take away 14 from 8 times 9. (58) d) Add 7 times 7 to the smallest 1-digit odd number. (50) Review at BB with whole class. Ps come out to fill in missing numbers, explaining reasoning. Class agrees/disagrees. Mistakes discussed and corrected. Write details on BB if necessary. ——— *14 min* ———	Paired work, monitored Ps have copies of puzzle on desks. Use enlarged copy master Ps discuss, solve and check in pairs. T listens and observes. Develops problem-solving ability and cooperation Feedback for T Discussion, reasoning, self-correction, praising e.g. $6 \times 10 - 20 \div 2$ $= 60 - 10 = \underline{50}$

Bk3		*Lesson Plan 7*

Activity		Notes
4	*Book 3, page 7* Q.1 Read: *Starting from 0, draw jumps of equal length along the number line. Write the numbers landed on below the number line.* Review at BB with whole class. **A**, what numbers did you write? Who agrees? Who wrote something else? etc. BB: $0, 7, 14, 21, 28, 35, 42, 49, 56, (63, 70, 77, 84, 91, 98, 105, \ldots)$ What can you say about these numbers? (e.g. multiples of 7; divisible by 7; 7 times $0, 1, 2, 3, \ldots$; $0, 1, 2, 3, \ldots$ times 7) ―――― *17 min* ――――	Individual work, monitored, (helped) Use enlarged copy master/OHP Reasoning, agreement, self-correction, praising Continue orally to (beyond) 100 in unison (with T's help) (Expressing common properties in different ways)
5	*Book 3, page 7* Q.2 Read: *Write an addition and a multiplication about the picture.* Review at BB with whole class. Mistakes corrected. BB: $7 + 7 + 7 + 7 + 7 + 7 + 7 = 7 \times 7 = \underline{49}$ T uses the words 'product', 'factor', 'sum', 'total'. Elicit that there are 7 terms in the addition, and each term is 7. ―――― *20 min* ――――	Individual work, monitored, (helped) Use enlarged copy master/ OHP Discussion, agreement, self-correction, praising Ps encouraged to use these words too. (Feedback for T)
6	**Additions and multiplications** Let's write an addition and a multiplication about each part. **B**, what should we write for part a)? Why? Who agrees? Who thinks something else? Similarly for b) and c). BB: a) ① ① b) ① ① ① ① c) ① ① ① ① ① ① ① ① What do you notice from these results? Elicit that: • 1 multiplied by any number is that number. • 1 times any number is that number. (e.g. $2 \times 1 = 1 \times 2 = 2$) T consolidates with other examples orally. What is 47×1 (1 times 29, etc.)? (47, 29, etc.) Let's find the row and column for '1' on the multiplication table. ―――― *23 min* ――――	Whole class activity Drawn or stuck on BB or use enlarged copy master or OHP Ps dictate what T should write BB: a) $1 + 1 = 2 \times 1 = \underline{2}$ b) $1 + 1 + 1 + 1$ $\quad = 4 \times 1 = \underline{4}$ c) $1 + 1 + 1 + 1 + 1 + 1 + 1 + 1$ $\quad = 8 \times 1 = \underline{8}$ Agreement, praising.
7	*Book 3, page 7* Q.3 Read: *Complete the table. Write the rule in different ways.* Review orally with whole class. **C**, which numbers did you write in the 2nd row? Why? Each snake has 1 head, so numbers are the same as in top row.) Who agrees/disagrees? **D**, which numbers did you write in the 3rd row? Why? (A snake has no legs, so however many snakes there are, there will still be no legs.) Who agrees/disagrees? Let's compare the rows in the table. Who could write the rule? Who agrees? Who could write it another way? What do you notice from the results in the table? Elicit that: • zero multiplied by any number is zero. • zero times any number is zero. T consolidates with other examples orally. (e.g. $49 \times 0, 0 \times 93$) Let's find the row and column for '0' on the multiplication table. ―――― *27 min* ――――	Individual work, monitored Drawn on BB or use enlarged copy master or OHP Agreement, checking, self-correcting, praising BB: $S = H, \; H = S$ $\quad\;\; L = 0$ Class recites in unison Ps chosen at random. At speed
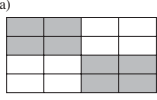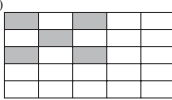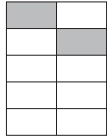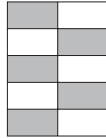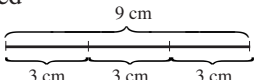
Bk3		*Lesson Plan 7*

Activity		*Notes*
8	**Tables practice** T says a multiplication, Ps give product. Class points out errors. Mistakes corrected at multiplication square. (Use all numbers.) ———— *30 min* ————	Whole class activity At speed round class Praise if × table not used
9	***Book 3, page 7*** Q.4 Read: *Practise multiplication.* How many multiplications are there? (3 × 3 = 9) Try to do them without using your multiplication table. Sit up with your arms folded when you have finished. Start . . . now! . . . . . Stop! (No more than 3 minutes!) Review orally round class. Ps change their pencil to (red), mark own work and count how many correct out of 9. Who had 9 correct? Who had 1 (2, 3, 4) mistakes? What were your mistakes? Refer to multiplication table if problems. ———— *34 min* ————	Individual work, monitored T notes Ps who need to refer to their × table Keep to the time limit Agreement, checking, self-correcting, evaluation Praising, encouragement only T awards good work (e.g. stars, stickers, badges)
10	***Book 3, page 7*** Q.5 Read: *Complete the multiplication table for 0, 1 and 7.* *Make sure you know all the multiplication facts by heart.* Review at BB with whole class. Ps come out to fill in a row or column. Mistakes corrected. Let's try to extend the sequence for 7. (e.g. 11 times 7 equals 77, 12 times 7 equals 84, . . ., ———— *39 min* ————	Individual work, monitored Use OHP or enlarged copy master. Agreement, self-correcting Whole class in unison, with T's help if needed Praising, encouragement only
11	**Money** T has 6 purses already prepared with real or model coins. 6 Ps are each given a purse and come to BB to write a multiplication about its contents. Class has to say what coins are in the purse. *Purse A*: four 5 p coins BB: 4 × 5 = <u>20</u> *Purse B*: four 50 p coins BB: 4 × 50 = <u>200</u> *Purse C*: three 10 p coins BB: 3 × 10 = <u>30</u> *Purse D*: three £1 coins BB: 3 × 100 = <u>300</u> *Purse E*: six 2 p coins BB: 6 × 2 = <u>12</u> *Purse F*: six 20 p coins BB: 6 × 20 = <u>120</u> T (or P) points out the similarity between the amounts in each pair. ———— *45 min* ————	Whole class activity Agreement, checking, praising At a good pace Consolidate with other examples orally.

Bk3	R: Mental calculation: addition, subtraction, multiplication **C: Review of multiplication tables. Practice** *E: Contextual problems. Equations.*	*Lesson Plan* *7*

Activity		**Notes**
1	**Odd one out** **A**, which card do you think is the odd one out? Why? Who thinks the same as **A**? Who thinks another one? Why? etc. Let's check them. BB: (18) (3 × 9) (9 + 3 × 3) (40 − 22) (3 + 15) ✔ (e.g. 3 × 9, as it has value 27 and all the others have value 18.) ———— *3 min* ————	Whole class activity Drawn on BB or use copy master, enlarged, cut out and stuck to BB Reasoning, agreement, praising Accept other valid reasoning

2	**Chain calculations**
	Listen carefully, do each calculation in your head and write the final result in your *Ex. Bks*. (*Heading*: Lesson number and date.)
	Nod your heads when you have done each step.
	
	a) T: 'Multiply 5 by 3' . . . 'add 5' . . . 'divide into 4 equal parts', . . .
	    'multiply by 8', . . . 'add 8'. Write down the final result. (48)
	
	    B, what did you write? Who agrees? Who thinks something else?
	    P who answered correctly comes out to BB to explain to those who did not.
	    BB: 5 × 3 = 15, 15 + 5 = 20, 20 ÷ 4 = 5, 5 × 8 = 40, 40 + 8 = <u>48</u>
	
	b) T: 'One tenth of 30' . . . 'multiply by 9 ' . . . 'add 16', . . .
	    'take away 35'. Write down the final result (8)
	
	    C, what did you write? Who agrees? Who thinks something else?
	    P who answered correctly comes out to BB to explain to those who did not.
	    BB: 30 ÷ 10 = 3, 3 × 9 = 27, 27 + 16 = 43, 43 − 35 = <u>8</u>
	
	c) T: 'Write down the sum and the difference of the results in a) and b).'
	
	    D, what did you write? Who agrees? Who thinks something else?
	    P who answered correctly comes out to BB to explain to those who did not. Who did not understand sum and difference?
	    BB: 48 + 8 = <u>56</u>, 48 − 8 = <u>40</u>
	
	d) T: 'How many 8s are in 48?' (Class shouts out: '6') Who can write the operation on the BB? Who agrees? etc. BB: 48 ÷ 8 = <u>6</u>
	
	Who had all 4 parts correct? Who made a mistake? etc.
	———— *9 min* ————
		Whole class activity
		(Develops calculation skills and memory)
		
		T waits until majority of Ps nod their heads before moving to next step
		T repeats each step slowly while P writes on BB
		Reasoning, agreement, praising
		
		T repeats each step slowly while P writes on BB
		Reasoning, agreement, praising
		
		Reasoning, agreement, praising
		
		In unison. (or show n/cards)
		Agreement, praising
		Evaluation. Feedback for T

3
 	
Extension
	Sets
	T has BB or SB already prepared with cards stuck to side of BB.
	Daffy Duck is collecting all the cards which have value 24 and *Piggy* is collecting cards which have value 36. Let's help them.
	Ps come to BB to choose a card and stick in the appropriate set, explaining reasoning. Class agrees/disagrees.
	BB:
	
	        24 **36**
	      3 × 3 + 3 × 5 7 × 5 + 1
	      51 − 3 × 9 4 × 8 + 4
	      45 − 21 8 × 6 − 12
	
	Who can tell me other calculations which would go in *Daffy Duck*'s (*Piggy's*) set?
	———— *13 min* ————
		Whole class activity
		Use copy master, enlarged, coloured, cut out and stuck to BB
		
		At a good pace
		
		Reasoning, agreement, praising
		
		Orally, or written in *Ex. Bks*.
		Praise creativity
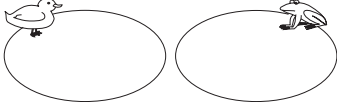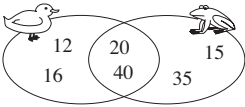
Bk3		*Lesson Plan 8*

Activity		*Notes*
4	**Missing numbers and signs** Study these diagrams. What do you think the missing numbers and signs could be? Ps come out to fill in the missing items, explaining reasoning. Class agrees/disagrees. BB: a) $9 \xrightarrow{\times 6} \boxed{54} \xrightarrow{+27} 81$, $\times \boxed{9}$ b) $\boxed{8} \xrightarrow{\times 7} 56 \xrightarrow{+8} 64$, $\times \boxed{8}$ In each part, discuss why the two steps are equal to the single step.	Whole class activity Drawn on BB or use enlarged copy master or OHP Reasoning, agreement, checking, praising Involve several Ps
	17 min	
5 **Extension**	***Book 3, page 8*** Q.1 Read: *Ollie Owl collects operations which result in 28, Dennis Deer collects those which result in 40 and Freddy Fox collects the others. Join them up.* Ps first write value beside each operation, then join up to the appropriate animal. Review at BB with whole class. Which numbers did *Freddie Fox* collect? (32, 45) Who had least cards? (*Dennis Deer*) If problems, write details on BB. Mistakes corrected. BB: 	8×4	$2 \times 5 + 6 \times 3$	$6 \times 3 + 7 \times 2$ = 32
$9 \times 4 + 4$	7×4	$2 \times 5 + 6 \times 3$	5×9 = 45 | T says an operation, Ps say which animal's set it belongs to.	Individual work, monitored Use enlarged copy master or OHP Ps can use different coloured pencils, one for each animal Discussion, reasoning, agreement, self-correction praising Class points out errors. Ps chosen at random. Praising
	22 min	

6	**Problem**
	
	Listen carefully, picture the story in your head, write a plan and do the calculation in your *Ex. Bks.*
	
	Alice had saved up 48 p. She bought 3 ribbons at 15 p each. How much money does she have now?
	
	X, tell us how you got your answer. Who agrees? Who did it a different way? Who made a mistake? What kind of mistake? etc.
	
	BB: Had: 48 p Spent: 3×15 p = 45 p
	
	        Has left: 48 p – 45 p = <u>3 p</u>
	
	        (or done in one step: $48 – 3 \times 15 = 48 – 45 = \underline{3}$)
	
	Answer: Alice has 3 p now.
		Individual work, monitored (helped)
		
		T repeats slowly and P repeats in own words
		
		Discussion at BB. T writes plan and calculation as dictated by Ps
		
		Agreement, self-correction, praising. Feedback for T.

	26 min	

7	***Book 3, page 8***
	
	Q.2 Read: *Colin had £48. He was given £15 for his birthday by each of his three aunts.*
	
	          How much money does he have now?
	
	Write a plan, do the calculation and write the answer in a sentence. Review at BB with whole class.
	
	Y, tell us how you did it. Who agrees? etc. Mistakes corrected.
		Individual work, monitored
		
		Discussion at BB. Reasoning agreement, self-correction.
		
		BB: Had: £48
		         Was given: $3 \times £15$
		$48 + 3 \times 15 = 48 + 45 = \underline{93}$
		Answer: Colin has £93 now.

	30 min	
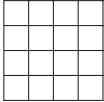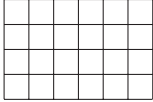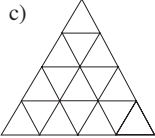
Bk3		*Lesson Plan*

Activity		*Notes*
8	***Book 3, page 8*** Q.3 Read: *Fill in the missing numbers*. Elicit that there are $3 \times 6 = 18$ calculations (12 multiplications and 6 divisions). Let's see how many you can do in 5 minutes! Try to do them without using your multiplication table. You can write details in your *Ex. Bks* if it will help you. Sit up with your arms folded when you have finished. Start . . . now! . . . . . Stop! Review orally round class. If problems write details on BB. e.g. $15 \times 6 = 10 \times 6 + 5 \times 6 = 60 + 30 = \underline{90}$ Ps change to coloured pencil, mark own (or neighbour's) work and count how many correct out of 18. Who had all correct? Who had 1 (2, 3, 4) mistakes? What were your mistakes? Who did the same? etc. ——— *38 min* ———	Individual work, monitored (helped) Time-limit differentiation Ps check work if they finish early Agreement, self-correction, evaluation, praising Award stars, stickers, badges, etc. for good work
9 **Extension**	***Book 3, page 8*** Q.4 Read: *Do the calculation in each part and colour it according to the result*. T explains task. Revise order of operations. Ps do calculations first and write the results above (or beside) the operations. Review at BB with whole class. Mistakes corrected. Then Ps colour the picture according to the key. (This could be done, or finished off, at home.) *Solution:* ——— *45 min* ———	Individual work, monitored (helped) Use enlarged copy master or OHP Write details on BB if there are problems Reasoning, agreement, self-correction, praising Ps could draw their own patterns or simple pictures and make up their own keys and operations for other Ps to solve.

Bk3	R: Mental calculation **C: Revision: division tables (2, 5, 10)** E: *Factors*	*Lesson Plan* *9*

Activity		*Notes*
1	**Secret numbers** I am thinking of a number. You must find out what it is by asking me questions but I can answer only 'yes' or 'no'. e.g. <u>51</u>: it is 1-digit? (No) Is it 2-digit? (Yes) Is it less than 50? (No) Is it more than 60? (No) Is it even? (No) Is it more than 55? (No) Is the difference between its digits 2? (No) It <u>is</u> 51. (Yes) (Ps can think of numbers and answer questions about it too.) ———— *5 min* ————	Whole class activity Encourage Ps to ask logical questions and keep in mind clues already given Develops memory and concentration Praise creative questions

2
 	
Extension
	Book 3, page 9
	Q.1 Read: *Answer the questions with divisions. Check with multiplications.*
	   a) *For how many 2 p coins can you exchange these 20 1 p coins?*
	   b) *For how many 5 p coins can you exchange these 20 1 p coins?*
	   c) *For how many 10 p coins can you exchange these 20 1 p coins?*
	
	Deal with one part at a time. Ps can have model money on desks if necessary, or can circle the coins in relevant groups.
	
	Review at BB with whole class. **A**, what division did you write and how did you check it? Who agrees? Who wrote something else? etc. Similarly for parts b) and c).
	
	T uses the words 'dividend', 'divisor', 'quotient' and shows what they are on the BB.
	
	———— *10 min* ————
		Individual work, monitored, helped
		
		T could have model coins stuck to BB or 3 copies of enlarged copy master or OHP
		
		Discussion at BB (SB, OHP)
		
		Agreement, checking, self-correction, praising
		
		BB:
		a) $20 \div 2 = \underline{10}$, $\underline{10} \times 2 = 20$
		b) $20 \div 5 = \underline{4}$, $\underline{4} \times 5 = 20$
		c) $20 \div 10 = \underline{2}$, $\underline{2} \times 10 = 20$
		
		BB: $20 \div 10 = 2$
		        dividend divisor quotient

3	**Jumps along the number line** a) *Frog* is jumping 10 units at a time back along the number line. How many jumps will he need to reach 0 if he starts at 40? **B**, come and show us *Frog*'s jumps while we keep count. '1, 2, 3, 4' BB: Who can write it on the BB. Who agrees? Who thinks something else? etc. Let's check. BB: $40 \div 10 = \underline{4}$ *Check:* $\underline{4} \times 10 = 40$ Let's think of it in another way. (subtraction) Repeat for starts at 100 and 170. b) *Sparrow* is jumping 5 units at a time back along the number line. How many jumps will he need to reach 0 if he starts at 35? **C**, come and show us *Sparrow*'s jumps while we keep count. BB: Who can write it on the BB. Who agrees? Who thinks something else? etc. Let's check. BB: $35 \div 5 = \underline{7}$ *Check:* $\underline{7} \times 5 = 35$ Let's think of it in another way. (subtraction) Repeat for starts at 65 and 100. ———— *15 min* ————	Whole class activity Use enlarged copy master or OHP or show jumps on class number line. At a good pace Reasoning, agreement, checking, praising BB: $40 - 10 - 10 - 10 - 10 = 0$ (10 is contained in 40 <u>4</u> times) In unison: '1, 2, 3, . . ., 6, 7' Reasoning, agreement, checking, praising BB: $35 - 5 - 5 - 5 - 5 - 5 - 5 - 5 = 0$ (5 is contained in 35 <u>7</u> times)

Bk3		*Lesson Plan 9*

Activity		**Notes**
4	*PBY3a. page 9*	Individual work, monitored, helped
	Q.2 Read: *Answer the questions with divisions. Check with multiplications.*	T could have counters stuck to BB or 5 copies of enlarged copy master or OHP
	How many marbles would each child get if these marbles were shared equally among:	Discussion at BB (SB, OHP)
	a) 2 children b) 5 children c) 10 children	Agreement, checking, self-correction, praising
	d) 20 children e) 1 child?	BB:
	How many marbles are there? (20)	a) $20 \div 2 = \underline{10}$, $\underline{10} \times 2 = 20$
	Deal with one part at a time. Ps can have counters, etc. on desks if necessary, or can circle the marbles in relevant groups.	b) $20 \div 5 = \underline{4}$, $\underline{4} \times 5 = 20$
	Review at BB with whole class. **D**, how many marbles would 2 children get? (10) Who agrees? Who thinks something else? What division did you write? etc. Similarly for parts b) to e).	c) $20 \div 10 = \underline{2}$, $\underline{2} \times 10 = 20$ d) $20 \div 20 = \underline{1}$, $\underline{1} \times 20 = 20$ e) $20 \div 1 = \underline{20}$, $\underline{20} \times 1 = 20$
	T uses the words 'divisible by' and 'factor'. e.g. 20 is <u>divisible by</u> 5 (i.e. with no remainder); 5 is a <u>factor</u> of 20.	Use these words with other parts too. Feedback for T.
	Also $4 + 4 + 4 + 4 + 4 = 20$. There are 5 groups of 4 in 20. 20 divided by 5 is 4. 1 <u>fifth</u> of 20 is 4.	
	——— 20 min ———	
5	**Money 1**	Whole class activity
	I want to exchange 1 p coins for 10 p coins. How many 10 p coins would I get and how many would remain if I had:	Ps come out to write a division on BB and check it with a multiplication.
	a) 20 1 p coins BB: $20 \div 10 = \underline{2}$ *Check:* $\underline{2} \times 10 = 20$	Class agrees/disagrees
	b) 40 1 p coins BB: $40 \div 10 = \underline{4}$ *Check:* $\underline{4} \times 10 = 40$	Reasoning, agreement, checking, praising
	c) 27 1 p coins BB: $27 \div 10 = \underline{2}$, remainder 7 *Check:* $\underline{2} \times 10 + 7 = 20 + 7 = 27$	If problems, demonstrate with model money
	d) 46 1 p coins BB: $46 \div 10 = \underline{4}$, remainder 6 *Check:* $\underline{4} \times 10 + 6 = 40 + 6 = 46$	(Or done as individual work in *Ex. Bks.*)
	e) 100 1 p coins? BB: $100 \div 10 = \underline{10}$ *Check:* $\underline{10} \times 10 = 100$	Ps give other examples
	T revises 'factors' and 'multiples'. e.g. 10 is a <u>factor</u> of 40, 40 is a <u>multiple</u> of 10. (Similarly for <u>all</u> whole tens.)	
	——— 24 min ———	
6	**Money 2**	
	This time I want to exchange 1 p coins for 5 p coins. How many 5 p coins would I get and how many would remain if I had: BB:	Individual work in *Ex. Bks*, monitored, helped
	a) 10 1 p coins ($10 \div 5 = \underline{2}$ *Check:* $\underline{2} \times 5 = 10$)	Ps have model money on desks if needed
	b) 30 1 p coins ($30 \div 5 = \underline{6}$ *Check:* $\underline{6} \times 5 = 30$)	
	c) 70 1 p coins ($70 \div 5 = \underline{14}$ *Check:* $14 \times 5 = 70$)	T has SB or BB already prepared
	d) 100 1 p coins ($100 \div 5 = \underline{20}$ *Check:* $\underline{20} \times 5 = 100$)	
	e) 25 1 p coins ($25 \div 5 = \underline{5}$ *Check:* $\underline{5} \times 5 = 25$)	Review at BB with whole class Agreement, checking, self-correcting, praising
	f) 55 1 p coins ($55 \div 5 = \underline{11}$ *Check:* $\underline{11} \times 5 = 55$)	
	g) 46 1 p coins ($46 \div 5 = \underline{9}$, remainder 1, *Check:* $\underline{9} \times 5 + 1 = 45 + 1 = 46$)	Write details on BB if problems, e.g.

	h) 74 1 p coins? ($74 \div 5 = \underline{14}$, remainder 4
	       Check: $\underline{14} \times 5 + 4 = 70 + 4 = 74$)
		$55 \div 5 = 50 \div 5 + 5 \div 5$
		     $= 10 + 1 = 11$

	Elicit that, e.g., 5 is a <u>factor</u> of 30, 30 is a <u>multiple</u> of 5. (Similarly for all numbers greater than 0 which have 0 or 5 as the units digit.)	Ps give other examples too.
	——— 29 min ———	

Bk3		*Lesson Plan 9*

Activity			*Notes*
7	**Fractions**		Whole class activity
	Study these diagrams. What part of each shape is shaded?		Drawn on BB or use enlarged copy master or OHP
	BB:		Deal with one part at a time
	a) b) c) d)		a) 8 shaded out of 16
			b) 5 shaded out of 25
			c) 2 shaded out of 10
	1 half 1 fifth 1 fifth 1 half		d) 5 shaded out of 10
	$(16 \div \underline{2} = 8)$ $(25 \div \underline{5} = 5)$ $(10 \div \underline{5} = 2)$ $(10 \div \underline{2} = 5)$		
	Ps come out to count the total number of inner rectangles, then the number shaded, and write the fraction, explaining reasoning. Who agrees? Who thinks something else? etc. Who can write it as a division?		Reasoning, agreement, checking, praising
Extension	What part of each shape is <u>not</u> shaded? (1 half, 4 fifths, 4 fifths, 1 half)		Discussion, agreement
	———— *32 min* ————		
8	**Dolphins**		Whole class activity
	In the water park show, the balls of the dolphins have been mixed up. Let's help the dolphins to find their own balls!		Use copy master, enlarged, coloured and cut out
	BB: ⑧ ⑤ ⑦ ⑨ ⑩ ⑥		
	$45 \div 5$ $70 \div 10$ $20 \div 2$ $25 \div 5$ $12 \div 2$ $40 \div 5$		At a good pace
			Ps may use their multiplication tables if necessary
	Ps come out to choose a dolphin and put the correct ball beneath it, saying the complete division. Class points out errors.		Agreement, checking, praising
	What numbers would be on the balls belonging to these dolphins? T says a division (involving 2, 5 or 10). Ps say the quotient.		At speed. Ps chosen at random. Class agrees/disagrees.
	e.g. $22 \div 2$ (11); $40 \div 10$ (4); $25 \div 5$ (5); $15 \div 5$ (3), $24 \div 2$ (12); etc.		Praising. (or Ps could give other divisions for each ball)
	———— *37 min* ————		
9	***Book 3, page 9***		Individual work, monitored
	Q.3 Read: *Colour different fractions of the shape*.		Drawn on BB or use enlarged copy master or OHP
	T elicits that parts a), b) and c) have the same shape. What can you say about it? (4 rows of 5 squares: $4 \times 5 = 20$ squares)		Discussion, agreement
	Think how many squares would be in each fraction before you start to colour the shapes.		BB:
	Review at BB with whole class. Deal with all mistakes.		a) 1 half of 20 = 20 ÷ 2 = <u>10</u>
	Discuss the fact that the shaded squares can be in different positions, but that the <u>number</u> of shaded squares is the same.		b) 1 fifth of 20 = 20 ÷ 5 = <u>4</u> c) 1 tenth of 20 = 20 ÷ 10 = <u>2</u>
			(Ps show different solutions)
	———— *41 min* ————		
10	***Book 3, page 9***		*Ps have rulers on desks*
	Q.4 Read: *Draw a line 9 cm long. Divide it into thirds*.		Individual work, monitored, helped
	T revises how to draw a certain length of line accurately. Ps draw 9 cm line first. Discuss how to divide it into thirds. (3 equal parts, each part is 1 third)		9 cm BB: |————|————|————| 3 cm 3 cm 3 cm
	BB: 3 thirds (1 whole): 9 cm, 1 third: 9 cm ÷ 3 = <u>3 cm</u>		Discussion, agreement, checking, praising accuracy
	Ps mark with short, vertical lines every 3 cm starting from LHS.		*Check:* 3×3 cm = 9 cm
	———— *45 min* ————		

Bk3	R: Mental calculation **C: Revision: division tables (2, 4, 8); (1, 0)** E: *Factors and multiples*	*Lesson Plan* *10*

Activity		**Notes**
1	**Sequences** a) The first term of this sequence is 100. Each following term is 4 less than the previous term. Continue the sequence. T: 100, P_1: 96, P_2: 92, P_3: 88, P_4: 84, etc. b) What could the rule be for this sequence? T: '80, 72, 64, 56, . . .' **A**, what do you think? Who agrees? Who thinks something else? (decreasing by 8) Let's continue the sequence: 48, 40, 32, 24, 16, 8, 0, (– 8, . . .) —— *4 min* ——	Whole class activity T chooses Ps at random As far as Ps are able Ask several Ps Agreement, praising Whole class in unison
2	***Book 3, page 10*** Q.1 Read: *Write a division about each picture.* *Check with a multiplication.* Talk about the pictures first: a) 7 squares, each made up of 4 sticks, 28 sticks altogether. b) 7 rows of circles, 8 circles in each row, 56 circles altogether. Review at BB with whole class. Deal with all mistakes. What do you notice about the total numbers in parts a) and b)? (56 is twice 28; 28 is half of 56) Let's find them in our multiplication table. (In columns/rows for 4, 7, 8) —— *8 min* ——	Individual work, monitored Use enlarged copy master or OHP Discussion, agreement, self-correction, praising Feedback for T Ps come out to point. (Ps can use own tables too.)

3	***Book 3, page 10***
	
	 Q.2 Read: *Write a division to show how 32 marbles can be shared equally among: a) 2 children, b) 4 children, 8 children.*
	
	 Deal with one part at a time. Ps can have counters, etc. on desks if necessary and put into 2 (4, 8) equal groups.
	
	 Review at BB with whole class. **B**, how many marbles would 2 children get? (16) Is **B** correct? How did you calculate it? Who did it another way? etc. (e.g. 1st group of 10 to A, 2nd group of 10 to B, half of 3rd group of 10 (5) to A and half to B, 1 of the remaining pair to A, the other to B)
	
	 How can we write it as a division? Who agrees? etc.
	
	 Similarly for b) and c).
	
	 BB:
	
	 a) $32 \div 2 = 20 \div 2 + 10 \div 2 + 2 \div 2 = 10 + 5 + 1 = \underline{16}$
	    Check: $\underline{16} \times 2 = 10 \times 2 + 6 \times 2 = 20 + 12 = 32$
	
	 b) 32 marbles $\div 4 = \underline{8}$ marbles *Check:* $\underline{8} \times 4 = 32$
	
	 c) 32 marbles $\div 8 = \underline{4}$ marbles *Check:* $\underline{4} \times 8 = 32$
	
	 —— *13 min* ——
		Individual work, monitored, (helped)
		
		 T could have counters stuck to BB as in diagram in *Pb*
		
		 Discussion at BB (SB, OHP)
		
		 Demonstrate with Ps at front of class only if necessary
		
		 Agreement, checking, self-correction, praising
		
		 Feedback for T
		
		 T uses the words 'factor', 'multiple':
		
		 e.g. 4 is a <u>factor</u> of 32
		    32 is a <u>multiple</u> of 4

4	**Division practice** T says a division (involving 2, 5, 10, 4 or 8). Ps say the quotient and check it with a multiplication. e.g. T: '48 $\div 8$' (P_1: '6, because 6 times 8 is 48'); T: '40 $\div 4$', (P_2: '10, because 10 times 4 is 40') Similarly for $16 \div 2$, $30 \div 10$, $45 \div 5$, $40 \div 5$, $48 \div 8$, etc. —— *16 min* ——	Whole class activity At speed. Ps chosen at random Ps may use their multiplication tables if needed Praising, encouragement only

Bk3		*Lesson Plan 10*
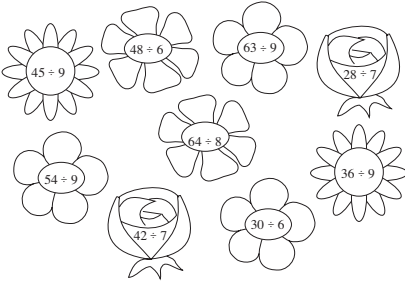
Activity		*Notes*
5	**Sets**	Whole class activity
	Duck is collecting numbers divisible by 4 and *Frog* is collecting numbers divisible by 5. Let's help them!	Use copy master, enlarged, coloured and cut out, with numbers stuck to side of BB as in diagram (or use OHP with Ps writing in the numbers)
	BB: 20 12 15 16 35 40	
	Ps come out to choose a number and put in the correct set, explaining reasoning. Class agrees/disagrees.	At a good pace
		Reasoning, agreement, checking, praising
	Debate on placing 20 and 40 (as both are divisible by 4 and also by 5). What can we do to make it fair? (Could provide 2 cards for each of these numbers so that there is no argument!) T: I have another idea!	Ask several Ps what they think
	T shows how the circles for *Duck* and *Frog* can be redrawn so that they overlap or intersect). Where would 20 and 40 go now? (in the overlap or intersection)	BB: 12 20 15 16 40 35
Extension	Let's call *Duck*'s set, set D and *Frog*'s set, set F. How many numbers (elements) are in:	Discussion, demonstration BB
	a) i) set D (4) ii) set F (4)	a) n (D) = 4, n (F) = 4
	b) sets D and F altogether (6)	b) n (D ∪ F) = 6
	c) set D and also in set F (i.e. in the intersection of set D and set F)? (2)	c) n (D ∩ F) = 2
	T introduces the symbols : n (D) [number of elements in set D], ∪ [union] , ∩ [ntersection].	Praising, encouragement only
	Do not expect Ps to learn them yet, just to become familiar with them.	[Preparation for intersection of two sets]
	20 min	
6	**Operations**	Whole class activity
	I am going to show you some operations. If you think it is correct, clap once but f you think it is wrong, put your hands on your heads when I say.	T has SB already prepared and uncovers one operation at a time (or has operations on flash cards and holds up one at a time)
	T shows one operation at a time. Is it correct? Show me . . . now!	
	a) 32 ÷ 4 = 8 (clapping)	Responses given in unison
	b) 40 ÷ 10 + 24 ÷ 8 = 8 (hands on heads) 4 + 3 ≠ 8, 4 + 3 = 7	Done in good humour
	c) 20 ÷ 5 – 1 × 3 = 1 (clapping) 4 – 3 = 1	Ps explain why some responses are wrong and correct them.
	d) 9 × 4 + 2 × 3 = 42 (clapping) 36 + 6 = 42	
	e) 28 – 3× 4 = 10 (hands on heads) 28 – 12 ≠ 10, 28 – 12 = 16	
	25 min	
7	***Book 3, page 10***	Individual work, monitored, helped
	Q.3 Read: *Complete the table*.	
	T first elicits how many legs a spider (chair) has. How many people, chairs and spiders are there if you can see this number of legs? (T points to top row of table.)	Drawn on BB or use enlarged copy master or OHP
	Review at BB with whole class. **C**, which numbers did you write in the 2nd row? Why? (Each person has 2 legs, so the number of people is half the number of legs, or number of legs divided by 2.) Who agrees? etc. Similarly for 3rd and 4th rows.	Reasoning, agreement, self-correction, praising.
		Compare the rows and write the rules. e.g.
	Why are there only zeros in the first column? (No legs, so no people, chairs or spiders) Why are there dashes in the table? (numbers not exactly divisible by 2, 4, or 8, so there would be legs remaining – not possible in reality!)	*L* = 2 × *P* = 4 × *C* = 8 × *S*
		Discuss the role of zero:
		e.g. 0 ÷ 2 = 0, as 0 × 2 = 0
	33 min	
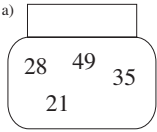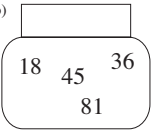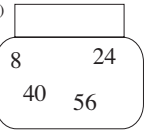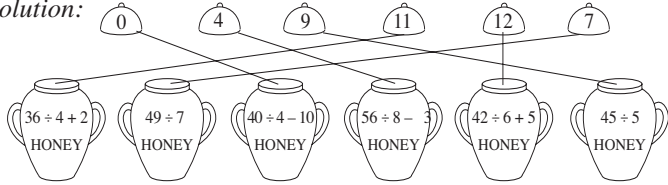
Bk3		*Lesson Plan 10*

Activity		*Notes*
8	**Inequalities** Which is more? How many more? T has BB or SB already prepared: BB: a) $60 \div 10$ $\boxed{<}$4 $20 \div 2$ 6 10 b) $18 \div 2$ $\boxed{=}$ $36 \div 4$ 9 9 c) $35 \div 5$ $\boxed{<}$2 $18 \div 2$ 7 9 d) $64 \div 8$ $\boxed{=}$ $32 \div 4$ 8 8 e) $10 \div 2$ 4$\boxed{>}$ $10 \div 10$ 5 1 Ps come out to write result above LHS, then RHS, then fill in the missing signs (and numbers where relevant). Class agrees/disagrees. ————— *36 min* —————	Whole class activity Or use enlarged copy master or OHP At a good pace Reasoning, agreement, checking, praising Refer to class number line if there are problems.
9	**Fractions** Ps have copies of copy master on desks. What are these shapes? (square, rectangle, triangle) BB: a) b) c) Colour in the part I say. After each part, show me your colouring when I tell you. P who responds correctly explains to Ps who are wrong. a) 1 quarter Show me . . . now! (4 squares coloured) $16 \div 4 = \underline{4}$ b) 1 eighth Show me . . . now! (3 squares coloured) $24 \div 8 = \underline{3}$ c) 1 half Show me . . . now! (8 triangles coloured) $16 \div 2 = \underline{8}$ ————— *40 min* —————	Whole class activity but colouring as individual work T uses enlarged copy master or OHP At a good pace Ps show colouring in unison Reasoning, agreement, praising Praise creative colouring (Or done as whole class activity with Ps coming to BB)

10	***Book 3, page 10***
	
	Q.4 Read: *Practise division*.
	
	         Elicit that there are $3 \times 6 = 18$ divisions and that in part b) the answer is obtained by dividing the dividend by the quotient.
	
	         Let's see how many you can do in 3 minutes! Try to do them without using your multiplication table. Sit up with your arms folded when you have finished. Start . . . now! . . . . . Stop!
	
	         Review orally round class. (Check with inverse operation.)
	
	         Ps change to coloured pencil, mark own work and count how many correct out of 18.
	
	         Who had all correct? Who had 1 (2, 3, 4) mistakes? What were your mistakes? Who did the same? etc.
	
	         Discuss similar divisions:
	
	         e.g. $16 \div 8 = \underline{2}$, $160 \div 8 = \underline{20}$, $160 \div 80 = \underline{2}$
	
	         • if dividend is 10 times more, quotient is also 10 times more;
	         • if dividend <u>and</u> divisor are 10 times more, then quotient stays the same
	
	         Discuss zero as dividend and divisor:
	
	         e.g. $\underline{0} \div 4 = 0$, because $0 \times 4 = \underline{0}$
	
	              BUT $4 \div 0$ is impossible because $\boxed{} \times 0 \neq 4$
	
	         Consolidate with similar divisions orally if there is time
	         (e.g. $12 \div 6$, $120 \div 6$, $120 \div 60$; $\underline{0} \div 10$)
	
	————— *45 min* —————
		Individual work, monitored
		
		Initial discussion with class
		
		Keep to time limit
		
		(Time differentiation)
		
		Agreement, checking, self-correction, praising
		
		Feedback for T
		
		Discussion, agreement
		
		Inverse operation used as a check or proof
		
		At speed round class. Praising
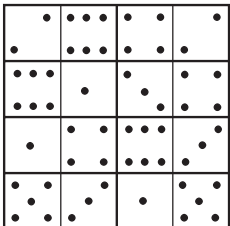
Bk3	R: Mental calculation C: **Revision: division tables (3, 6, 9)** E: *Factors and multiples*	*Lesson Plan* *11*

Activity		Notes

1	**Boom!**
	
	Let's play Boom! Everyone stand up!
	
	a) Start at 10 and say 'boom' instead of every number divisible by 3.
	    Ps: 10, 11, boom, 13, 14, boom, 16, 17, boom, . . .
	
	b) Start at 13 and say 'boom' instead of every number divisible by 6.
	    Ps: 13, 14, 15, 16, 17, boom, 19, 20, 21, 22, 23, boom, 25, . . .
	
	c) Start at 18 and say 'boom' instead of every number divisible by 9.
	    Ps: boom, 19, 20, 21, 22, 23, 24, 25, 26, boom, 28, . . .
	
	———— *5 min* ————
		Whole class activity
		
		T chooses Ps at random.
		
		If P makes a mistake he/she sits down and T points to another P to say it correctly.
		
		Elicit that the 'boom' numbers are <u>multiples</u> of 3 (6, 9)
		
		Done in good humour!

2	**Mental practice** T says divisions and multiplications. Ps write only answers in *Ex. Bk*s. (*Heading:* Lesson number and date) a) $32 \div 4$ b) 3×6 c) $30 \div 3$ d) $24 \div 4$ e) $56 \div 8$ f) $70 \div 10$ g) 9×7 h) $45 \div 9$ Review orally round class. Ps change pencils and mark own work. Who had 8 (7, 6, 5, less than 5) correct? Mistakes corrected. ———— *9 min* ————	Whole class activity but individual work in *Ex. Bks*. At a good pace Agreement, self-correction, evaluation, praising
3	**Oral work** Tell me a true statement about the number 6. Think of different ones. (e.g. 6 is an even number; 6 is a 1-digit number; 6 is equal to 2×3; 6 is half of 12; 6 is 1 quarter of 24; 6 is a multiple of 2 (1, 3, 6); 6 is divisible by 3 (1, 2, 6); 6 is equal to $10 - 4$; 6 is a factor of 12 (18, 24, . . .); 6 is 1 tenth of 60, 6 is 2 thirds of 18; 6 is 94 less than 100, etc.) ———— *13 min* ————	Whole class activity T chooses Ps at random Class agrees/disagrees Encourage creativity Praising

4	***Book 3, page 11***
	
	Q.1 Read: *Write a division about each picture. Check it with a multiplication.*
	
	      Talk about each picture first. (e.g. 7 triangles, each triangle has 3 sides, 21 sides altogether; 8 hexagons, each hexagon has 6 sides, 48 sides altogether; 6 dominoes, each domino has 9 dots, 54 dots altogether)
	
	      Review at BB with whole class. Mistakes corrected.
	
	      BB: a) $21 \div 3 = 7$ *Check:* $7 \times 3 = 21$
	              b) $48 \div 6 = 8$ *Check:* $8 \times 6 = 48$
	              c) $54 \div 9 = 6$ *Check:* $6 \times 9 = 54$
	
	      T uses the words 'dividend', 'divisor', 'quotient', 'factor', 'divisible by', 'factor'.
	
	———— *19 min* ————
		Individual work, monitored
		
		Use enlarged copy master or OHP
		
		Initial class discussion
		
		Involve several Ps
		
		Reasoning, agreement, self-correction, praising (Feedback for T)
		
		Ps find in × tables (class and individual tables)
		
		e.g. 54 is a <u>multiple</u> of 9
		    54 is <u>divisible</u> by 6
		    9 is a <u>factor </u> of 54

Bk3		*Lesson Plan 11*

Activity		*Notes*
5	***Book 3, page 11*** Q.2 Read: *Write a division to show how 54 sweets can be shared equally among: a) 3 children, b) 6 children, 9 children.* Deal with one part at a time. Ps can have counters, etc. on desks if necessary and put into 3 (6, 9) equal groups. Review at BB with whole class. **A**, how many sweets would each of the 3 children get? (18) Is **A** correct? How did you work out the answer? Who did it another way? etc. (e.g. each child would get one row of sweets each.) How can we write it as a division? Who agrees? etc. Similarly for b) and c). BB: a) $54 \div 3 = 30 \div 3 + 24 \div 3 = 10 + 8 = \underline{18}$ *Check:* $\underline{18} \times 3 = 10 \times 3 + 8 \times 3 = 30 + 24 = 54$ b) 54 sweets $\div 6 = \underline{9}$ sweets *Check:* $\underline{9} \times 6 = 54$ c) 54 sweets $\div 9 = \underline{6}$ sweets *Check:* $\underline{6} \times 9 = 54$ T (Ps) points out the dividend, divisor, quotient in each division. ———— *24 min* ————		Individual work, monitored, (helped) Use enlarged copy master or OHP (or real sweets!) Discussion at BB (SB, OHP) Demonstrate with Ps at front of class only if necessary Agreement, checking, self-correction, praising Feedback for T Ps find in × tables Ps start to use the words factor, multiple, divisible by: 3, 6 and 9 are <u>factors</u> of 54, 54 is a <u>multiple</u> of 3, 6 and 9 54 is <u>divisible by</u> 3, 6 and 9
6	**Division practice** Let's practise division! T says a division, Ps say quotient and check with multiplication (inverse operation). (Ps can ask the divisions too.) e.g. $48 \div 6$, $27 \div 3$, $18 \div 9$, $30 \div 5$, $72 \div 8$, etc. ———— *27 min* ————		Whole class activity T chooses Ps at random At speed. Ps may use × table Agreement, praising

7	**Chain calculation**
	Listen carefully, do the calculations and write the final result in your *Ex. Bks*. (*Heading*: Lesson number and date.)
	
	Nod your heads when you have done each step.
	
	a) T: 'One eighth of 32' . . . 'multiply by 9' . . . 'divide by 6', . . . 'add 14'. Write down the final result. (20)
	
	    B, what is your answer? Who agrees? Who thinks something else? P who answered incorrectly comes out to BB to work through it.
	    BB: $32 \div 8 = 4$, $4 \times 9 = 36$, $36 \div 6 = 6$, $6 + 14 = \underline{20}$
	
	b) T: 'One ninth of 90' . . . 'add 17 ' . . . 'divide by 9' . . . 'add 15'. . . 'divide by 6'. Write down the final result (3)
	
	    C, what is your answer? Who agrees? Who thinks something else? P who answered incorrectly comes out to BB to work through it.
	    BB: $90 \div 9 = 10$, $10 + 17 = 27$, $27 \div 9 = 3$, $3 + 15 = 18$,
	       $18 \div 6 = \underline{3}$
	
	———— *33 min* ————
			Whole class activity
			(Develops calculation skills and memory)
			
			T gives Ps time to calculate
			(or Ps can show result with number cards/on scrap paper)
			Reasoning, agreement, praising
			T (or P) repeats each step while P writes on BB
			
			As above
			
			Feedback for T

Bk3		*Lesson Plan 11*

Activity		*Notes*
8	**Book 3, page 11**	Individual work, monitored, helped
	Q.3 Read: *Complete the table*.	
	We have made some shapes with sticks (rods). What can you tell me about the shapes?	Drawn on BB or use enlarged copy master or OHP
	(*Row 2*: triangle, 3 sticks; *Row 3*: hexagon, 6 sticks; *Row 4*: 1 large triangle made from 3 small triangles, $3 \times 3 = 9$ sticks)	Initial whole class discussion
	Why are there only zeros in the first column? (No sticks, so no shapes can be made.) Why are there dashes in the table? (numbers not exactly divisible by 3, 6, or 9, so there would be sticks remaining.)	Time differentiation (only more able Ps expected to get beyond 30) Reasoning, agreement, self-correction, praising.
	Review at BB with whole class. **D**, which numbers did you write in the 2nd row? Why? (1 third of numbers in top row) Who agrees? etc. Who wrote something else? etc.	Compare the rows and write the rules. e.g.
	Similarly for 3rd and 4th rows.	$S = 3 \times t = 6 \times H = 9 \times T$
Extension	Instead of the dashes, let's write the number of shapes which could be made and the number of sticks remaining.	$H = 2 \times t$, $T = t \div 3$, $t = 1$ third of S, etc.
	———— *40 min* ————	
9	**Book 3, page 11**	Individual work, monitored
	Q.4 Elicit that there are $3 \times 6 = 18$ divisions; in part b) the missing number (divisor) is found by dividing the dividend by the quotient; in the last three in part c) the missing dividend is found by multiplying the divisor by the quotient.	Initial discussion with class
	Let's see how many you can do in 3 minutes! Try to do them without using your multiplication table. Sit up with your arms folded when you have finished. Start . . . now! . . . . . Stop!	Keep to time limit (Time differentiation)
	Review orally round class. (Check with inverse operation.)	
	Ps change to coloured pencils, mark own work and count how many correct out of 18.	Agreement, checking, self-correction, praising
	Who had all correct? Who had 1 (2, 3, 4) mistakes? What were your mistakes? Who did the same? etc.	Feedback for T
	Discuss similar divisions:	
	e.g. $18 \div 3 = \underline{6}$, $180 \div 3 = \underline{60}$, $180 \div 30 = \underline{6}$	Discussion, agreement
	• if dividend is 10 times more, quotient is also 10 times more;	
	• if dividend <u>and</u> divisor are 10 times more, then quotient stays the same	Inverse operation used as a check or proof
	Discuss zero as dividend and divisor:	
	e.g. $0 \div 3 = 0$, because $0 \times 3 = \underline{0}$	Consolidate with other examples orally if necessary
	BUT $3 \div 0$ is impossible because $\square \times 0 \neq 3$	
	———— *45 min* ————	

Bk3	R: Mental calculation **C: Revision: division table for 7** *E: Order of operations. Equations*	*Lesson Plan* *12*

Activity		**Notes**

1	**Boom!**
	
	Let's play Boom! Everyone stand up!
	
	a) Start at 10 and say 'boom' instead of every multiple of 7.
	   Ps: 10, 11, 12, 13, boom, 15, 16, 17, 18, 19, 20, boom, . . .
	
	b) Start at 20 and say 'boom' instead of every number which is either divisible by 7 or has 7 as the units digit.
	   Ps: 20, boom, 22, 23, 24, 25, 26, boom, boom, 29, 30, 31, . . .
	
	———— *5 min* ————
		Whole class activity
		
		If Ps make a mistake they sit down and next P answers correctly.
		
		At speed round class
		
		(Develops concentration and quick thinking)
		
		Done in good humour!

2	**Matching pairs** Let's put these flowers into pairs. BB: How could we do it? (Type or value) Let's pair them up according to their value. Ps come out to BB to choose a pair, explaining reason for choice. Class agrees/disagrees. Ps give inverse operation (multiplication). What do you notice? ($63 \div 9$ does not have a partner) Let's think of one. T asks several Ps for a matching division. (e.g. $35 \div 5$, $14 \div 2$) ———— *10 min* ————	Whole class activity Drawn on BB and Ps join up or use copy master, enlarged, coloured, cut out and flowers stuck to BB. At a good pace (Practice of division tables. T notes Ps' knowledge of 7) Reasoning, agreement, checking, praising
3	***Book 3, page 12*** Q.1 Read: *Complete the table*. Elicit that a dash means that there is not an exact number of weeks – there would be days remaining. Review orally round class. Mistakes corrected. Write details on BB if there are problems. e.g. 21 days $\div$ 7 days $= 3$ (times), $84 \div 7 = 70 \div 7 + 14 \div 7 = 10 + 2 = \underline{12}$ Let's change the dashes to the number of whole weeks and the number of days left over. e.g. e.g. $25 \div 7 = 3$, remainder 4; 25 days is 3 weeks and 4 days BUT 25 is <u>not</u> a multiple of 7, 25 is <u>not</u> divisible by 7 and 7 is <u>not</u> a factor of 25! ———— *15min* ————	Individual work, monitored, helped Table written on BB or use enlarged copy master or OHP Reasoning, agreement, self-correcting, praising Whole class discussion Refer to calendar if necessary T says a number, Ps say whether or not it is a multiple of 7.
4	***Book 3, page 12*** Q.2 Read: *Divide the 35 sticks into 7 equal groups. Check your calculation in two ways*. Review at BB with whole class. **A**, how many sticks are in each group? (5) What calculation did you write? How did you check it? Who agrees with **A**? Who did it another way? etc. (e.g. half each of the 3 groups of 10 sticks to make 6 groups of 5 sticks plus the remaining group of 5 gives 7 groups of 5) ———— *20 min* ————	Individual work, monitored, (helped with the checking) Ps can have sticks on desks if needed Reasoning, agreement, self-correction, praising BB: $35 \div 7 = 5$ *Check:* $5 \times 7 = 35$, $7 \times 5 = 35$

Bk3		*Lesson Plan 12*
Activity		***Notes***
5	**Sets** Study the sets of numbers. What could be written in the labels? BB: a) 28 49 35 21 b) 18 45 36 81 c) 8 24 40 56 Deal with one part at a time. Ps suggest labels and T writes on BB. Class agrees/disagrees. e.g. Ps: a) Multiples of 7; divisible by 7 b) Multiples of 3 (9); divisible by 3 (9); the sum of their digits is 9 c) Multiples of 8 (4, 2); divisible by 8 (4, 2) Ps give other numbers which would belong to the various sets (to match each of the suggested labels). Class agrees/disagrees. ——— *25 min* ———	Whole class activity Drawn on BB or use enlarged copy master or OHP Ps give reason for choice of label Agreement, praising Additional numbers: e.g. a) <u>7</u>: 42, 63, 56, 14, . . . b) <u>9</u>: 9, 27, 54 . . . c) <u>8</u>: 16, 32, 48, . . .
6	***Book 3, page 12*** Q.3 Read: *Help Barry Bear find the matching lids for these honey pots.* T reminds Ps about order of operations. (division before addition or subtraction) Review at BB with whole class. Mistakes corrected. *Solution:* 0 4 9 11 12 7 $36 \div 4 + 2$ HONEY $49 \div 7$ HONEY $40 \div 4 - 10$ HONEY $56 \div 8 - 3$ HONEY $42 \div 6 + 5$ HONEY $45 \div 5$ HONEY ——— *30 min* ———	Individual work, monitored Use enlarged copy master or OHP (or cut out lids and pots and stick to BB) Reasoning, agreement, self-correction, praising Feedback for T
7 **Extension**	***Book 3, page 12*** Q.4 Read: *Follow the arrows, do what they tell you and write the final number in the house.* Start at 20 and write the results of each step above the animals. Show me your answer with your fingers . . . now! (20) Ps who responded incorrectly work through calculations on BB with help of rest of class. Mistakes corrected. BB: $20 \div 2 = 10$, $10 \div 5 = 2$, $2 \times 8 = 16$, $16 + 24 = 40$, $40 \div 8 = 5$, $5 \times 7 = 35$, $35 - 15 = 20$, $20 \times 1 = \underline{20}$ If the arrows pointed in the opposite direction, what would the operations be? ——— *35 min* ———	Individual work, monitored Use enlarged copy master or OHP In unison Reasoning, agreement, self-correction, praising Orally round class. Praising

# Bk3		*Lesson Plan 12*

Activity		*Notes*
8	**Missing numbers**	Whole class activity

T has BB or SB already prepared. What numbers could the shapes represent?

BB:

a) $42 \div 7 = 54 \div \boxed{9}$ (6 above 42)

b) $18 \div 9 = 16 \div \triangle{8}$ (2 above 18)

c) $\boxed{24} \div 8 = 21 \div 7$ (3 above 21)

d) $\boxed{63} \div 7 = 81 \div 9$ (9 above 81)

What should we do first? (Write value above complete side of equation).

Ps come to BB to write results above LHS (RHS) and then fill in the values of the shapes, explaining reasoning.

What are these shapes? (square, rectangle triangles)

Extension

If you were putting them into pairs how would you do it and why? (rectangle and square, as both are quadrilaterals, and the two triangles as they both have 3 sides)

Are the 2 triangles exactly the same? (No, one triangle has equal sides; one triangle has a square corner or <u>right angle</u>.) T marks it.

What is the same about the square and rectangle? (both have 4 sides, <u>right angles</u> at all corners (<u>vertices</u>), opposite sides <u>parallel)</u>. Ps come out to mark the right angles. Elicit that a square is also a rectangle.

What is different about the square and rectangle? (square has all 4 sides of equal length, rectangle has <u>opposite</u> sides of equal length)

Notes column:
Whole class activity

Written beforehand on SB or use enlarged copy master or OHP

At a good pace

Reasoning, agreement, checking, praising

Whole class discussion

Involve several Ps

BB: <u>right angle</u>

Revision of properties of shapes (also right angles, vertices, parallel lines)

Praising if Ps remember them

———— 40 min ————

| **9** | ***Book 3, page 12, Q.5*** | Whole class activity |

Read: *Try to solve this difficult puzzle! Draw dominoes in the square so that each row, column and diagonal has the same number of dots.*

T has dominoes stuck to BB. Ps also have small cut-out (or real) dominoes on desks to try out for a couple of minutes.

If nobody has solved it, T asks Ps to think logically.

How many dots will be in the square altogether?

BB: $2 + 6 + 3 + 4 + 6 + 3 + 1 + 5 + 1 + 6 + 1 + 4 + 5 + 3 + 4 + 2 = \underline{56}$

How many rows (or columns) are in the square? (4)

So if all 4 rows have an equal number of dots, how can we find what that number is? (Divide 56 into 4 equal groups.)

BB: $56 \div 4 = 40 \div 4 + 16 \div = 10 + 4 = 1\underline{4}$

How many dominoes fit in a row? (2) Which pairs of dominoes have 14 dots altogether? ($7 + 7$, $8 + 6$, $9 + 5$)

Let's fit the dominoes in the square now. T arranges dominoes as directed by Ps. Let's check that we are correct. (rows, columns, diagonals) Ps complete drawing in *Pbs*.

Who knows the name of the special square we have made? (<u>magic square</u>, i.e sums of the numbers in all rows, columns and diagonals are equal)

Notes column:
Whole class activity

Use copy master, enlarged and cut out

Individual or paired trial first, monitored

T directs Ps' thinking (or P explains to class if they have solved it)

Ps also try out on desks

Agreement, checking, praising

BB: <u>Magic Square</u>

———— 45 min ————

Bk3	R: Mental calculation (4 operations) **C: Revision: division with remainders** E: *Problems in context. Order of operations. Brackets*	*Lesson Plan* *13*

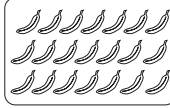| Activity		Notes
1	**Jumps along the number line** *Fox* starts at 52 and jumps 6 units at a time back along the number line. Which numbers does he land on? **A**, come and show us *Fox*'s jumps while we say the numbers. Ps: '52, 46, 40, 34, 28, 22, 16, 10, 4' BB: What is common to all these numbers? (e.g. even, multiples of 2, divisible by 2, <u>not</u> divisible by 60 (50, 100), when divided by 6 there is a remainder of 4) How many jumps of 6 units did **A** take to get from 52 to 4? (8) How many units remained? (4) Who can write it as a division on the BB? Who agrees? Who thinks something else? etc. BB: $52 \div 6 = 8$, remainder 4. How can we check it if there is a remainder? **B**, come and show us. Is **B** correct? etc. *Check:* $8 \times 6 + 4 = 48 + 4 = 52$ Repeat for the other numbers landed on, e.g. BB: $46 \div 6 = 7$, remainder 4; $40 \div 6 = 6$, remainder 4; etc. _____ *4 min* _____	Whole class activity Use enlarged copy master or OHP or show jumps on class number line. At a good pace Ask several Ps what they think. If nobody suggests last property, T gives hint Reasoning, agreement, praising BB: $52 - 6 - 6 - 6 - 6 - 6$ $\quad - 6 - 6 = 4$ (6 is contained in 52 <u>8</u> times and 4 units remain) T uses the words 'dividend', 'divisor', 'quotient', 'remainder'
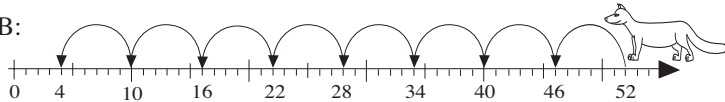
2	***Book 3, page 13***
	
	Q.1 Read: *Grandpa gave 23 marbles to his 3 grandchildren. They want to share out the marbles equally.*
	
	       How many marbles will each grandchild get and how many marbles will remain?
	
	Ps can have counters, etc. on desks if necessary (or circle or colour marbles in *Pbs)*.
	
	Review at BB with whole class. **B**, how many marbles would each of the 3 children get and how many would remain? (7) Is **B** correct? How did you work out the answer? Who did it another way? etc. (e.g. each child would get one row of 6 marbles + 1 marble each from 4th row, leaving 2 marbles)
	
	(Note that marbles are too hard to cut into thirds, so the two remaining marbles cannot be shared out equally.)
	
	How can we write it as a division? Who agrees? etc.
	
	BB: *Data*: 23 marbles, 3 grandchildren
	
	      Plan: 23 marbles $\div$ 3 (or $m \div g$)
	
	      Calculation: $23 \div 3 = \underline{7}$, remainder 2
	
	      Check: $\underline{7} \times 3 + 2 = 21 + 2 = 23$
	
	Answer: Each child gets 7 marbles and 2 marbles remain.
	
	_____ *9 min* _____
		Individual work, monitored
		
		Use enlarged copy master or OHP (or real marbles)
		
		Discussion at BB (SB, OHP)
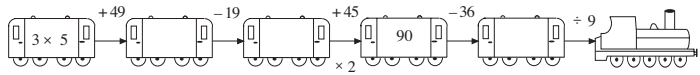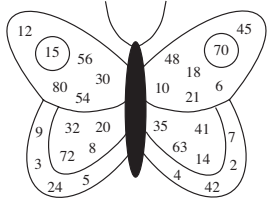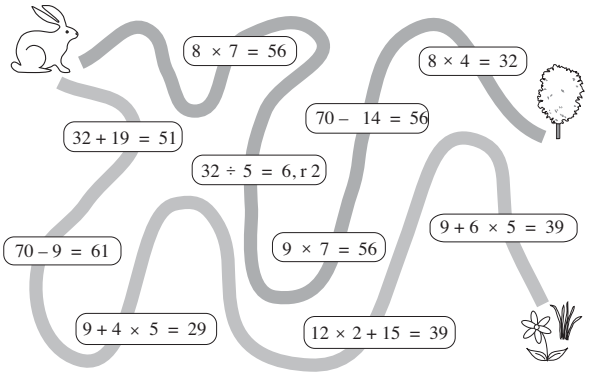		
		Agreement, checking, self-correction, praising
		
		Discussion, agreement
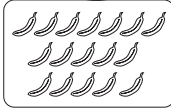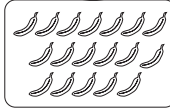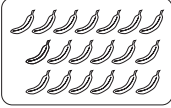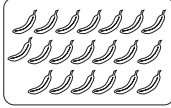		
		Ps who made a mistake should write it out again correctly in their *Ex. Bks*.

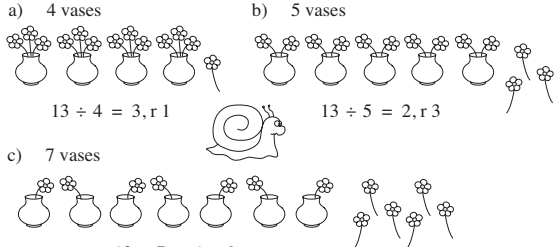|		
# Bk3		*Lesson Plan 13*

Activity		*Notes*
3	**Money**	Whole class activity to start
	Let's exchange 37 £1 coins for £5 notes. How many £5 notes would we get and how many £1 coins would remain?	Ps may have model money on desks
	C, come and write an operation about it. Who agrees? Who thinks something else? etc. Let's check.	Reasoning, agreement, checking, praising
	BB: £37 ÷ £5 = 7 (times), remainder £2; 37 ÷ 5 = 7, remainder 2	
	Check: 7 × 5 + 2 = 35 + 2 = 37	
	Repeat for £2 coins and £10 notes, with Ps writing divisions in *Ex. Bks* as above. Review at BB with whole class. Mistakes corrected.	Individual work, monitored, (helped)
	BB: £37 ÷ £2 = 18 (times), remainder £1, 37 ÷ 2 = 18, remainder 1	Reasoning, agreement, self-correction, praising
	Check: 18 × 2 + 1 = 36 + 1 = 37	
	£37 ÷ £10 = 3 (times), remainder £7; 37 ÷ 10 = 3, remainder 7	Feedback for T
	Check: 3 × 10 + 7 = 30 + 7 = 37	
	————— 15 min —————	
4	***Book 3, page 13***	
	Q.2 Read: *What are the secret numbers? Do the calculations and then check your answer.*	Individual work, monitored
	a) Ps read problem and write the calculation without help in *Pbs*. Write your answer on a scrap of paper (or show with number cards) and show me . . . now! (57)	In unison
	D, tell us how you got your answer. Who agrees? Who did it a different way? Who made a mistake? What kind of mistake? etc.	Reasoning, agreement, checking, praising Deal with all mistakes
	BB: $\boxed{57}$ ÷ 9 = 6, remainder 3 or 6 × 9 + 3 = 57	
	b) Ps read problem and write the calculation without help in *Pbs*.	Reasoning, agreement, checking, praising
	E, tell us how you got your answer. Who agrees? Who wrote something else? (First subtract 2 from 47, then find two numbers which multiply to give a product of 45.)	
	BB: 47 ÷ $\boxed{5}$ = $\boxed{9}$, remainder 2; 9 × 5 + 2 = 47	Creative question – more than one solution.
	BB: 47 ÷ $\boxed{9}$ = $\boxed{5}$, remainder 2; 5 × 9 + 2 = 47	
	or 47 ÷ $\boxed{3}$ = $\boxed{15}$, remainder 2; 15 × 3 + 2 = 47	Feedback for T
	or 47 ÷ $\boxed{15}$ = $\boxed{3}$, remainder 2; 15 × 3 + 2 = 47	
	————— 21 min —————	
5	**Competition**	
	T divides class into similar ability groups. I will give you half a minute to continue this sequence in your *Ex. Bks* for as many terms as you can. Start and stop when I say.	Individual work in *Ex. Bks* Differentiation
	The first term is 83. Each of the following terms is 6 less than the previous term.	T (P) repeats slowly once or twice
	Start . . . now! . . . . . Stop!	Ps start/stop in unison
	Review at BB with whole class. Ps dictate terms and T writes on BB. Ps change pencils and mark own (or neighbour's) work. Mistakes discussed and corrected.	BB: 83, 77, 71, 65, 59, 53, 47, 41, 35, 29, 23, 17, 11, 5, (– 1, . . .)
	P with most correct terms is the winner of each group. Class applauds winners.	Stars (stickers, etc) awarded
	————— 26 min —————	

Bk3		*Lesson Plan 13*

Activity		**Notes**

6	**True or false?**
	
	T has BB or SB already prepared. Are these statements true or false?
	
	If you think it is true clap your hands once and if you think it is false, put your hands on your heads when I say.
	
	Deal with one part at a time. T reads statement and says, 'True or false?' Show me . . . now!'
	
	Ps who responded correctly explain to Ps who did not. (One P for each side of inequality.)
	
	BB:
	   a) $\overset{25}{3 \times 9 - 2}$ $<$ $\overset{21}{3 \times (9 - 2)}$ (F)
	   b) $\overset{32}{4 \times 5 + 12}$ $>$ $\overset{68}{4 \times (5 + 12)}$ (F)
	   c) $\overset{12}{32 \div 8 + 8}$ $>$ $\overset{2}{32 \div (8 + 8)}$ (T)
	   d) $\overset{30}{5 + 5 \times 5}$ $<$ $\overset{50}{(5 + 5) \times 5}$ (T)
	   e) $\overset{19}{7 + 4 \times 3}$ $<$ $\overset{33}{(7 + 4) \times 3}$ (T)
	
	———— *31 min* ————
			Whole class activity
			
			Written on BB (SB) or use enlarged copy master or OHP
			
			In unison
			
			Reasoning, agreement, praising
			
			False statements modified to make a true one, either by using ≮ or ≯ or by changing the signs.

7	***Book 3, page 13***
	
	Q.3 Read: *a) Circle in blue the numbers which give a remainder of 1 when divided by 2.*
	
	             b) Circle in green the numbers which give a remainder of 2 when divided by 3.
	
	             c) Circle in red the numbers which give a remainder of 3 when divided by 4.
	
	Review at BB with whole class. Elicit that the numbers circled in part a) are odd numbers.
	
	———— *36 min* ————
			Individual work, monitored
			
			Agreement, checking, praising
			
			Feedback for T
			
			BB:
			a) 5, 7, 15, 21, 23,
			b) 2, 5, 20, 23, 26
			c) 7, 15, 23

8	***Book 3, page 13***
	
	Q.4 Read: *Tom has 78 stamps in his collection. He has already filled 2 stamp albums. How many stamps will go into a third album if each album can hold 30 stamps?*
	
	Review at BB with whole class. **X**, come and explain to us how you worked out the answer. Who agrees with **X**? Who did it a different way? etc.
	
	Plan: Stamps altogether: 78 Stamps in 1 full album: 30
	          Stamps in 2 full albums: 2 × 30
	          Stamps in 3rd album: 78 − 2 × 30
	
	Calculation: 78 − 2 × 30 = 78 − 60 = <u>18</u>
	       or 78 = 2 × 30 + $\boxed{18}$
	
	Check: 2 × 30 + 18 = 60 + 18 = 78, and 18 < 30
	
	Answer: 18 stamps will go into a third album.
	
	———— *41 min* ————
			Individual work, monitored, helped
			
			Discussion at BB
			
			Reasoning, agreement, checking, praising
			
			Self-correction (in *Ex. Bks* if no room in *Pbs*)
			
			Feedback for T

9	***Book 3, page 13*** Q.5 Read: *One quarter of a line is 2 and a half cm. Draw the whole line.* How many quarters are in a whole? (4) Elicit that length of whole line will be 4 × 2 and a half cm = 8 cm + 2 cm = <u>10</u> cm ———— *45 min* ————		*Ps have rulers on desks* Whole class discussion followed by individual work in drawing the line Praise accuracy

Bk3	R: Addition, subtraction, multiplication and division **C: Division with remainder** E: *Order of operations. Problems in context*	*Lesson Plan* *14*

Activity		*Notes*
1	**Missing numbers** Which number will go in the engine? BB: Ps come out to do the calculations and fill in the missing numbers, explaining reasoning. Class agrees, disagrees BB: $3 \times 5 = 15$, $15 + 49 = 64$, $64 - 19 = 45$, $45 \times 2 = 90$, $90 - 36 = 54$, $54 \div 9 = \underline{6}$ ———— *4 min* ————	Whole class activity Drawn on BB or use enlarged copy master or OHP Reasoning, agreement, praising At a good pace

2
 	
Extension
	Making multiplications and divisions
	
	Study this butterfly carefully. Let's make as many multiplications and divisions from its numbers as we can.
	
	BB: e.g.
	
	$6 \times 7 = 42$ $70 \div 10 = 7$
	$7 \times 8 = 56$ $45 \div 9 = 5$
	$2 \times 7 = 14$ $63 \div 9 = 7$
	$3 \times 5 = 15$ $56 \div 8 = 7$
	$2 \times 5 = 10$ $10 \div 2 = 5$
	                etc.
	
	T (or Ps from groups) write what Ps dictate. Class points out errors.
	
	Which multiplication facts are <u>not</u> shown on the butterfly?
	
	———— *9 min* ————
		Whole class activity
		
		Use enlarged copy master or OHP
		
		(Can be done as a competition, e.g. between boys and girls – group with most correct in a given time are the winners)
		
		At a good pace
		
		Agreement, praising
		
		e.g. $9 \times 9 = 81$,
		      $10 \times 10 = 100$, etc.

3	**Meadow or Woods?** *Robin Rabbit* has two favourite walks – the path to the woods and the path to the meadow. Each gate can be opened only if the operation is correct. Where does *Robin Rabbit* end up today? BB: $8 \times 7 = 56$ $8 \times 4 = 32$ $70 - 14 = 56$ $32 + 19 = 51$ $32 \div 5 = 6, r\ 2$ $9 + 6 \times 5 = 39$ $70 - 9 = 61$ $9 \times 7 = 56$ $9 + 4 \times 5 = 29$ $12 \times 2 + 15 = 39$ Ps come to BB to check each operation in turn and to colour it if it is correct. *Solution:* *Robin Rabbit* ends up at the meadow today because the route to the woods is closed at the 3rd gate: $9 \times 7 \neq 56$ ($9 \times 7 = 63$) ———— *14 min* ————	Whole class activity Use enlarged copy master or OHP Remind Ps about the order of operations (multiplication or division before addition or subtraction) Instead of writing 'remainder' we have shortened it to 'r'. Ps can write 'r' for remainder to save time in future calculations Reasoning, agreement, praising

Bk3		*Lesson Plan 14*
Activity		***Notes***
4	***Book 3, page 14*** Q.1 Read: *Practise division. What is the remainder? Check it with a multiplication*. Ps try do do it without using their multiplication tables. Review at BB with whole class. What did you notice? ($24 \div 6$ and $54 \div 6$ have no remainder, as 24 and 54 are multiples of 6. Who had all correct? Who made a mistake? What kind of mistake? etc. ———— *20 min* ————	Individual work, monitored, helped Drawn on BB or use enlarged copy master or OHP Reasoning, checking, agreement, self-correction, praising Feedback for T
5 **Extension**	**Missing numbers** What could the missing numbers be? BB: Ps come out one at a time to fill in a missing number and explain reasoning. Class agrees/disagrees. Who can tell me something mathematical about the diagram? (e.g. circle divided into 4 equal parts (quarters); sum of numbers in circle is 253; 4 pairs of ellipses (ovals); 50 is half of 100, etc.) ———— *25 min* ————	Whole class activity Drawn on BB or use enlarged copy master or OHP At a good pace Reasoning, agreement, praising Ps could suggest another calculation for each quarter.

6	**Problem**
	Listen carefully and picture the story in your head. Write a plan, do the calculation and write the answer in your *Ex. Bks*.
	
	Alice put 2 p in her piggy bank each day for 5 weeks. How much money did she save?
	
	Show me the number of pence she saved . . . now! (70)
	
	A, come and show us how you worked it out. Who agrees? Who did it a different way? etc.
	
	BB: *Plan:* 5 weeks $= 5 \times 7$ days $= 35$ days
	
	            Each day: 2 p 35 days: 2 p $\times$ 35
	
	    Calculation: $2 \times 35 = 2 \times 30 + 2 \times 5 = 60 + 10 = \underline{70}$
	            or $2 \times 5 \times 7 = 10 \times 7 = \underline{70}$
	
	Answer: Alice saved 70 p .
	
	———— *30 min* ————
		Individual work in *Ex. Bks*
		
		T repeats slowly, P repeats in own words
		
		With number cards or written on scrap paper. In unison.
		
		Reasoning, agreement, checking, praising
		
		Check: $70 \div 2 = 35$
		         $35 \div 7 = 5$
		
		Ps who got wrong answer write it out again correctly in *Ex. Bks*.

Bk3		*Lesson Plan 14*

Activity		*Notes*
7	***Book 3, page 14***	Individual work, monitored, helped
	Q.2 Read: *During one week, Billy took 8 p out of his piggy bank every day. How much money was in Billy's piggy bank at the beginning of the week if 4 p remained at the end?*	
	Picture the story in your head. Is the amount getting bigger or smaller? Write a plan in your *Ex. Bks* if it will help you.	
	Review at BB with whole class. B, come and explain your answer to us. Who agrees? Who did it a different way? etc.	Reasoning, agreement, checking, self-correction, praising
	BB: *Plan:* 1 week = 7 days Had left: 4 p	
	Each day: 8 p 7 days: 7 × 8 p	
	Calculation: 7 × 8 = 56; 56 + 4 = <u>60</u>	*Check:* 60 – 7 × 8 = 60 – 56
	or 7 × 8 + 4 = 56 + 4 = <u>60</u>	= 4
	or 60 – 7× 8 = 4	
	Answer: Billy had 60 p at the beginning of the week.	Demonstrate with model (real) money and P as Billy only if there are problems.
	———— *35 min* ————	
8	***Book 3, page 14***	
	Q.3 Read: *Change £1 coins into £5 notes. Complete the table.*	Individual work, monitored
	T (or P) explains task using completed column of table. Ps fill in remaining columns in *Pbs*. (Only more able Ps are expected to complete the whole table.)	Table drawn on BB or use enlarged copy master or OHP
		Differentiation – time limit
	Review at BB with whole class. Ps come out to fill in columns, explaining reasoning. Class agrees disagrees. Mistakes corrected.	Reasoning, agreement, checking, self-correcting, praising
	Solution: Number of:	

£1	10	16	24	43	18	35	52	61	77	99	100
£5	2	3	4	8	3	7	10	12	15	19	20
£1 remaining	0	1	4	3	3	0	2	1	2	4	0

	Write details on BB if necessary, e.g.	Notation:
	BB: 10 × 5 + 2 = 50 + 2 = <u>52</u>	'r' means 'remainder'
	77 ÷ 5 = 50 ÷ 5 + 27 ÷ 5 = 10 + 5, r 2 = <u>15</u>, r <u>2</u>	
	———— *40 min* ————	
9	***Book 3, page 14***	
	Q.5 Read: *Which number does each letter represent? Fill in the missing numbers.*	Individual work, monitored, helped
	Do first few equations on BB if necessary. Review orally round class. Mistakes corrected. If problems, write details on BB.	Demonstration on BB if necessary
	T uses names of the components: multiplicand', 'multiplier', 'product', 'dividend', 'divisor', 'quotient', 'remainder'.	Reasoning, agreement, self-correction
	Solution:	If poblems, write details on BB
	a = 2; *b* = 4; *c* = 8; *d* = 6; *e* = 4; *f* = 63;	e.g. *l* = 9 × 7 + 1
	g = 56; *h* = 7; *i* = 4; *j* = 8; *k* = 84; *l* = 64	= 63 + 1 = <u>64</u>
Extension	Ps make up own equations, with a letter instead of a number, for neighbour (or class) to solve.	Praising, encouragement only
	———— *45 min* ————	

Bk3	R: Mental calculation. 4 operations: $+, -, \times, \div$ **C:** **Division with remainder** E: *Problems in context. Brackets. Order of operations.*	*Lesson Plan* *15*

Activity		**Notes**
1	**Sequences** a) The first term of a sequence is 10. Each following term is 7 more than the previous one. Let's continue the sequence: Ps: 10, 17, 24, 31, 38, 45, . . ., What else can you say about the numbers in this sequence? (When divided by 7 there is a remainder of 3.) b) T: Here is another number sequence. 100, 92, 84, . . . What could the rule be? (e.g. decreasing by 8, but accept others) Let's continue the sequence: . . ., 76, 68, 60, 52, 44, 36, 28, 20, (12, 4, -4, . . .) (or as far as Ps are able) What else can you say about the numbers in this sequence? (When divided by 8 there is a remainder of 4.) ———— *5 min* ————	Whole class activity T chooses Ps at random Class points out errors. (Develops calculation skills) Agreement, praising Ask several Ps what they think. In chorus Agreement, praising T notes Ps having difficulty
2	**Mental practice** Revise order of operations. (If only $+$ or $-$, or $\times$ or $\div$, then work from left to right; if $+$ or $-$ and $\times$ or $\div$, do $\times$ or $\div$ first.) T says divisions and multiplications. Ps write only answers in *Ex. Bk*s. (*Heading:* Lesson number and date) a) $74 - 28$ b) $32 + 19$ c) $21 - 19$ d) $9 \times 4 + 5$ e) $40 \div 8 \times 2$ f) $7 \times 7 - 49$ Review orally with whole class, with Ps explaining how they did each calculation. (e.g. $74 - 28 = 74 - 20 - 8 = 54 - 8 = 46$) Ps change to coloured pencils and mark/correct own work. Who had 6 (5, 4, less than 4) correct? What mistakes did you make? Who did the same? etc. Let's say the results in increasing order: '0, 2, 10, 41, 46, 51' ———— *10 min* ————	Whole class activity but individual work in *Ex. Bks*. Ps show they are ready for next one by nodding heads Reasoning, agreement, self-correction, evaluation, praising Write details on BB if there are problems. a) 46 b) 51 c) 2 d) 41 e) 10 f) 0 In unison
3	**Dividing by 3** Let's help *Mick the Monkey* to sort the bananas into groups of 3. BB: a) $16 \div 3 = 5, r\,1$ b) $17 \div 3 = 5, r\,2$ c) $18 \div 3 = 6$ d) $19 \div 3 = 6, r\,1$ e) $20 \div 3 = 6, r\,2$ f) $21 \div 3 = 7$ 6 Ps come out to BB to circle the bananas and to write a division about it. Class agrees/disagrees. What do you notice about the divisions? (divisor is 3 in each case; dividend increases by 1; remainders are 1, 2, 0, 1, 2, 0.) Who can think of a division by 3 which has a remainder of 3? (Impossible, as there would be enough for another group of 3.) ———— *16 min* ————	Whole class activity Drawn on BB or use enlarged copy master or OHP (P can have copy on desks too) Reasoning, agreement, praising Ps will probably express it in other words, but T repeats using the names of the components.

Bk3		*Lesson Plan 15*

Activity		*Notes*
4	**Sharing 13** *Sam Snail* is having trouble arranging 13 flowers in the vases so that there is the same number in each vase. Let's help him! (4, 5, 7 vases) BB: a) 4 vases b) 5 vases 13 ÷ 4 = 3, r 1 13 ÷ 5 = 2, r 3 c) 7 vases 13 ÷ 7 = 1, r 6 Ps come out to BB to stick flowers in the vases and write a division for each part, explaining reasoning. Class agrees/disagrees. — *22 min* —	Whole class activity Use 4 copies of copy master, enlarged, coloured, cut out and elements stuck to BB (or use plastic flowers or card flowers stuck to straws, and real vases or jam-jars or Ps holding bunches at front of class) At a good pace Reasoning. agreement, checking, praising
5 **Extension**	**Book 3, page 15** Q.1 Read: *If the 1st of January was a Saturday, which dates in January were: a) Saturdays, b) Tuesdays, c) Fridays?* How many days are there in January? (31) Ps write initial letters of days above, and relevant numbers below, the number line in *Pbs* to help them. S T F S T F S T F S T F S 1 4 7 8 10 11 14 15 18 20 21 22 25 28 29 30 Then they write the dates beside each named day. Review with whole class. Refer to calendar if necessary. What do you notice about the dates? (increasing by 7) Why? (because there are 7 days in a week) If the first day in November is a Wednesday, which dates will be Sundays? (5th, 12th, 19th, 26th) — *27 min* —	Individual work, monitored (or done as a whole class activity with Ps coming out to write on Bb or enlarged copy master or OHP) Under T's direction Discussion, agreement, self-correction, praising a) Sat: 1st, 8th, 15th, 22nd, 29th b) Tue: 4th, 11th, 18th, 25th c) Fri: 7th, 14th, 21st, 28th T chooses Ps at random Agreement, praising
6	**Inequalities** T has BB or SB already prepared. What numbers could the shapes be? BB: a) 3 × 4 < ▨ < 2 × 9 ▨ : . . . . b) 24 ÷ 4 < ⌒ < 24 ÷ 3 ⌒: . . . . Ps read out inequalities (from left to right: '3 times 4 is less than the square and the square is less than 2 times 9'; from the square: 'the square is more than 3 times 4 and less than 2 times 9'; from RHS: '9 times 2 is more than the square and the square is more than 3 times 4'). Ps come to BB to calculate the results for LHS and RHS and fill in the possible numbers for each shape. Class agrees/disagrees. — *30 min* —	Whole class activity Written on BB (SB or OHP) Reasoning, agreement, checking, praising a) ▨ : 13, 14, 15, 16, 17 b) ⌒ = 7 Show on class number line if there are problems.
7 **Extension**	**Book 3, page 15** Q.2 Read: *List the whole numbers which make the inequalities true*. Ps first write results above each side of inequality, then list possible numbers. Review at BB with whole class. *Solution: a*: 49, 50, 51, 52, 53, 54, 55 *b*: 6, 7 *c*: 8, 7, 6, 5, 4, 3, 2, 1, 0, (– 1, – 2, . . .) *d*: 7, 8, 9, 10, . . . — *35 min* —	Individual work, monitored, helped Reasoning, agreement, self-correction, praising Ps show on class number line d) Discuss 'endless' results: symbol for <u>infinity</u> : ∞

Bk3		*Lesson Plan 15*

Activity		*Notes*
8	**Book 3, page 15, Q3** Read: *Write the operations without brackets if possible so that the result is the same. Do the calculations as a check.* Remind Ps that calculations inside brackets are done first. a) **X**, come and show us how we could write it without brackets. Is **X** correct? Who thinks something else? Let's check that the result is the same for both. Ps calculate results for both. Repeat with other Ps for parts b) to f). Ps can write results in *Pbs* too. BB: a) $(2 + \overset{10}{8}) \times 7 \quad = \quad 2 \times 7 + \overset{14}{8} \times \overset{56}{7} \quad = \quad \underline{70}$ b) $(11 - \overset{8}{3}) \times 9 \quad = \quad 11 \times \overset{99}{9} - 3 \times \overset{27}{9} \quad = \quad \underline{72}$ c) $(21 + \overset{35}{14}) \div 7 \quad = \quad 21 \overset{3}{\div} 7 + 14 \overset{2}{\div} 7 \quad = \quad \underline{5}$ d) $(24 - \overset{16}{8}) \div 4 \quad = \quad 24 \overset{6}{\div} 4 - 8 \overset{2}{\div} 4 \quad = \quad \underline{4}$ *e) $80 \div (12 - 4) \quad = \quad 80 \div 8 \quad\quad\quad = \quad \underline{10}$ *f) $72 \div (3 + 6) \quad = \quad 72 \div 9 \quad\quad\quad = \quad \underline{8}$ *———— 40 min ————*	Whole class activity T has SB or BB already prepared (or use enlarged copy master or OHP) Reasoning, agreement, checking, praising Elicit that it is impossible to write parts e) and f) without brackets and obtain the same result: e) 80 is <u>not</u> divisible by 12 (or $80 \div 12 - 80 \div 4 =$ 6 and 2 thirds $- 20 \neq 8$) f) $72 \div 3 + 72 \div 6 =$ $24 + 12 = 36 \neq 8$ Feedback for T

9	**Book 3, page 15**
	
	 Q.4 Read: *Do the calculations with and without brackets.*
	
	 Ps read problems, then write the calculations in two ways, checking that the results are the same.
	
	 Review at BB with whole class. **Y**, come and explain to us how you worked out the answer. Who agrees with **Y**? Who did it a different way? etc.
	
	 a) *Grandma has 3 grandsons and 3 granddaughters. On her birthday, each grandchild gave her 7 flowers. How many flowers was she given altogether?*
	
	 Plan: No. of grandchildren: 3 + 5 Each gave: 7 flowers
	
	 Calculations: $(3 + 5) \times 7 = 8 \times 7 = \underline{56}$
	      or $3 \times 7 + 5 \times 7 = 21 + 35 = \underline{56}$
	
	 Answer: She was given 56 flowers.
	
	 b) *The 3 children in a family were given 90 p by Dad and 60 p by Mum. They shared the money equally. How much did they each get?*
	
	 Plan: Given: 90 p + 60 p No. of children: 3
	
	 Calculations: $(90 + 60) \div 3 = 150 \div 3 = \underline{50}$
	      or $90 \div 3 + 60 \div 3 = 30 + 20 = \underline{50}$
	
	 Answer: Each child got 50 p.
	
	 ———— 45 min ————
		Individual trial, monitored, helped
		
		 Discussion, reasoning, agreement, checking, praising
		
		 Ps who were wrong write out again correctly in *Ex. Bks*
		
		 (Or answers could be shown in unison on command)
		
		 Differentiation – time limit
		 Only the more able Ps should be expected to do both parts.
		
		 Feedback for T

Bk3	R: Mental calculation **C: The four operations. Order of calculation. Brackets** *E:*	*Lesson Plan* *16*

Activity		Notes
1	**Boom!** Let's play Boom! Everyone stand up! Let's start at 10 and say 'boom' instead of every number which is either divisible by 4 or has 4 as a digit. Ps: 10, 11, boom, 13, boom, 15, boom, 17, 18, 19, boom, 21, 22, 23, . . . Continue until only one P is left standing. *4 min*	Whole class activity If Ps make a mistake they sit down and next P answers correctly. At speed round class In good humour! Class applauds the winner.
2	**Addition** Study the picture carefully. BB: What has *Bennie Bunny* done with the numbers whispered in his ears? Elicit that *Bennie Bunny* adds the numbers whispered in his right ear, then adds the numbers whispered in his left ear, then adds the two sums together. Let's complete the table. BB: Who can explain to us what each row means? <table><tr><td>Right ear</td><td>50 40</td><td>20 9</td><td>12 17</td><td>24 17</td><td>9 7</td><td>19 45</td><td>8 24</td></tr><tr><td>Left ear</td><td>7 2</td><td>12 8</td><td>15 9</td><td>32 9</td><td>12 19</td><td>3 7</td><td>4 17</td></tr><tr><td>Total</td><td>99</td><td>**49**</td><td>**53**</td><td>**82**</td><td>**47**</td><td>**74**</td><td>**53**</td></tr></table> Ps come out to choose a column and fill in the total, explaining reasoning. Class agrees/disagrees. *10 min*	Whole class activity Use enlarged copy master or OHP Ask several Ps what they think BB: *Right ear Left ear* $50 + 40 = \underline{90}$ $7 + 2 = \underline{9}$ Total: $90 + 9 = \underline{99}$ Table drawn on BB or use enlarged copy master or OHP At a good pace Reasoning, agreement, praising

3	**Competition**
	
	What numbers and signs could go in the rectangles to make the statements true? BB:
	
	T divides class into 3 teams (one for each animal)
	
	□ < 40 □ = 17 □ > 50
	
	Ps come out to BB to write a calculation below their animal.
	
	e.g. $39 - 15$ $9 \times 5 + 2$ $100 - 25$
	  $(54 - 14) \div 8$ $24 + 23$ $12 \times 4 + 5$
	  $37 - 11$ $(54 - 20) \div 2$ $21 + 45 - 6$
	
	Rest of team makes sure they are correct.
	
	T says 'Stop!' after 4 minutes. Class agrees/disagrees with calculations.
	The team with most correct statements is the winner!
	
	16 min
		Whole class activity
		
		Drawn on BB or use enlarged copy master or OHP, or animals stuck to BB and statements written below.
		
		Encourage creativity
		
		At speed
		
		Agreement, checking, praising
		
		Class applauds winning team
		
		T awards stars, stickers, etc. to most creative statements.

4	**Days of the week** If today is Thursday, what day will it be in a) 7 days (Thursday) BB: $7 \div 7 = 1$ b) 10 days (Sunday) $10 \div 7 = 1, r\ 3$ c) 14 days (Thursday) $14 \div 7 = 2$ d) 17 days (Sunday) $17 \div 7 = 2, r\ 3$ e) 35 days (Thursday) $35 \div 7 = 5$ f) 40 days? (Tuesday) $40 \div 7 = 5, r\ 5$ *20 min*	Whole class activity T asks several Ps what they think T writes divisions as dictated by Ps Check on calendar if necessary Reasoning, agreement Praising

Bk3		*Lesson Plan 16*

Activity		*Notes*
5	**Book 3, page 16**	Individual work, monitored
	Q.1 Read: *Do the calculations in the correct order.*	T has SB or BB already prepared
	Which operations should be done first? (multiplication/division)	
	Review at BB with whole class. Mistakes corrected.	Reasoning, agreement, self-correcting
	BB:	
	a) $54 + 5 \times 4 + 6 \div 2 \ = \ 54 + 20 + 3 \ = \ \underline{77}$	Evaluation, praising
	b) $40 + 3 \times 8 + 18 \div 9 = 40 + 24 + 2 \ = \ \underline{66}$	
	c) $76 - 7 \times 8 - 8 \div 4 \ = \ 76 - 56 - 2 \ = \ \underline{18}$	
	d) $92 - 4 \times 3 - 72 \div 8 \ = \ 92 - 12 - 9 \ = \ \underline{71}$	
	Who had them all correct? Who made a mistake? What kind of mistake? etc.	
	25 min	
6	**Book 3, page 16, Q.3**	Whole class activity
	Read: Do the calculations in the correct order.	Written on BB or SB or use enlarged copy master/OHP
	Talk about order of operations. (First the brackets, then multiplication and division from left to right, then addition and subtraction from left to right. Within the brackets the same rules apply.)	
	Ps come out to do the calculations on the BB, explaining reasoning.	Initial discussion about order of operations (Ps try to explain in own words)
	Class agrees/disagrees. Ps write calculations in *Pbs* too.	
	BB:	Involve as many Ps as possible
	a) $60 \div 6 + 4 \times 2 - 2 = 10 + 8 - 2 \ = \ \underline{16}$	
	b) $60 \div 6 + 4 \times (2 - 2) = 60 \div 6 + 4 \times 0 \ = \ 10 + 0 \ = \ \underline{10}$	At a good pace
	c) $60 \div (6 + 4) \times 2 - 2 = 60 \div 10 \times 2 - 2 = 6 \times 2 - 2 = 12 - 2 \ \underline{10}$	Reasoning, agreement, praising
	d $(60 \div 6 + 4) \times 2 - 2 = (10 + 4) \times 2 - 2 = 14 \times 2 - 2 \ = \ 28 - 2$ $= \ \underline{26}$	
	e) $60 \div (6 + 4 \times 2 - 2) = 60 \div (6 + 8 - 2) = 60 \div 12 = \underline{5}$	(Or done as individual work, reviewed with whole class)
	f) $60 \div (6 + 4) \times (2 - 2) = 60 \div 10 \times 0 = 6 \times 0 = \underline{0}$	
	31 min	
7	**Problem**	
	Listen carefully, picture the story in your head, write a plan and do the calculation in your *Ex. Bks*. Show me the answer when I say.	Individual work in *Ex. Bks*
	A florist had 36 red and 54 yellow roses. She decided to tie them in bunches of 3. How many bunches could she make?	T repeats slowly, P repeats in own words
	Show me with number cards (or on scrap paper) . . . now! (30)	With number cards or written on scrap paper. In unison.
	A, come and tell us how you got your answer. Who agrees? Who did it another way? etc.	Reasoning, agreement, checking, praising
	BB: *Plan:* No. of roses: $36 + 54$ No. in each bunch: 3	
	Calculation: $(36 + 54) \div 3 = 90 \div 3 = \underline{30}$	*Check:* $30 \times 3 \ = \ 90$
	or $36 \div 3 + 54 \div 3 = 12 + 18 = \underline{30}$	Ps who got wrong answer write it out again correctly in *Ex. Bks*.
	Answer: She could make 30 bunches of roses.	
	35 min	

Bk3		*Lesson Plan 16*

Activity		*Notes*
8	***Book 3, page 16***	Individual work, monitored
	Q.4 Read: *Four children were given £90. They spent £30 and then shared the remaining money equally.*	
	How much money did they each get?	Discussion at BB
	Review at BB with whole class. **B**, come and explain to us how you worked out the answer. Who agrees with **B**? Who did it a different way? etc.	Reasoning, agreement, checking, praising
	Plan: No. of children: 4 Given: £90 Spent: £30	Self-correction (in *Ex. Bks* if no room in *Pbs*)
	Had left: £90 – £30	
	Calculation: $(90 - 30) \div 4 = 60 \div 4 = \underline{15}$	(Demonstrate with model money and Ps at front of class only if necessary)
	(or $£90 \div 4 - £30 \div 4 = £22\,50\,p - £7\,50\,p = \underline{£15}$)	
	Check: $15 \times 4 + 30 = 10 \times 4 + 5 \times 4 + 30 = 40 + 20 + 30$	Feedback for T
	$= 90$	
	Answer: They each got £15.	
	40 min	
9	***Book 3, page 16, Q.4***	
	Read: *Fill in the missing numbers so that the equations are true, both horizontally and vertically.*	Whole class activity to start, then group work.
	T revises what 'horizontal' and 'vertical' means. Hold your arms vertically, horizontally; be vertical, horizontal (Ps stand up, lie down).	Drawn on BB or use enlarged copy master or OHP
	Elicit that horizontal equations are in the rows and vertical equations are in the columns.	Ps have extra copies of puzzle on desks for trying out
	What do you think we should do first? (Think of all possible formations of 3 factors which multiply to give the products.)	Let Ps suggest what to do but if nobody knows, T gives hint.
	e.g. *1st column:* $\underline{27} = 1 \times 1 \times 27 = 1 \times 3 \times 9 = 3 \times 3 \times 3$	Class agrees/disagrees
	3rd row: $\underline{18} = 1 \times 1 \times 18 = 1 \times 2 \times 9 = 1 \times 6 \times 3$	
	$= 2 \times 3 \times 3$	
	so number common to both must be 1, 3 or 9.	Praising
	Ps work in 3 groups, each group trying one of these possible numbers in the common square (1st column, 3rd row).	Group work, monitored
	Rest can be done by 'trial and error', but choices confined to relevant factors or multiples . [Algebra would be too difficult at this stage.]	**Note**
	Solution: e.g,	This can be made easier by not allowing '1' as a factor.
		Thus only possible solution to *1st column* would be
	or	$3 \times 3 \times 3$
		and *3rd row* would be
		$3 \times 2 \times 3$ or $3 \times 3 \times 2$
	Can be finished off in *Lesson 20* or at home if Ps wish.	Extra praise if Ps solve it by themselves!
	45 min	
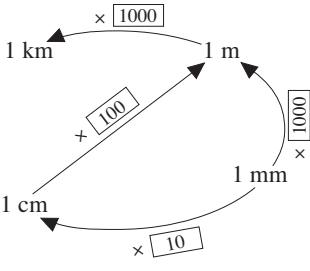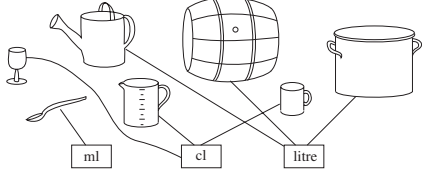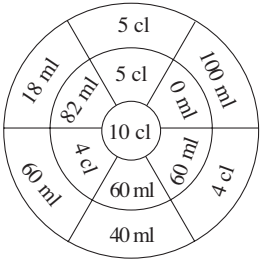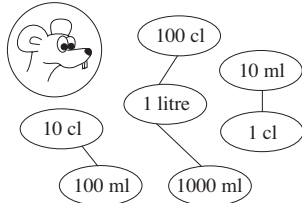
Bk3	R: Calculation **C: Measurement: length. Numbers up to 200** *E: Whole hundreds to 1 thousand (or over)*	*Lesson Plan* *17*

Activity		Notes
1	**What am I?** Listen to the clues and think what I could be! • People buying material and ribbon make use of me. • I am used to name some events in athletics. • I have a big brother whose name is on maps of the country. • My big brother is one thousand times as long as I am. What am I? T asks several Ps what they think. (metre) What is my big brother? (kilometre) (BB: 1000 m = 1 km) What other standard unit is used to measure length? (cm, mm, mile, inch) Everyone stand up! Hold your hands 1 cm (1 m) apart. (T walks round and adjusts where necessary. What do you think is about 1 km from the school? (T should have ascertained this beforehand.) *———— 5 min ————*	Whole class activity Ps stand up when they think they know Agreement Discussion on other units and when they are used. T could show a metre stick, ruler, tape measure, etc. Practice in estimation
2	**Sequences** Let's continue these sequences. a) 85, 90, 95, . . . (100, 105, 110, 115, 120, . . .) b) 100, 200, 300, . . . (400, 500, 600, 700, 800, . . .) c) 1000, 800, 600, . . . (400, 200, 0, − 200, . . .) d) 100, 300, 500, . . . (700, 900, 1100, . . .) *———— 8 min ————*	Whole class activity In unison. At speed T takes note of what Ps already know. Praising, encouragement only
3	**Standard Units** Who can remember how many mm are in 1 cm? (BB: 1 cm = 10 mm) Ps confirm by finding on their rulers. Which units would you use to measure these objects? T has flash cards stuck at random on BB with standard units at the side of BB: 	Motorway	Book	Your height
km	cm	m and cm | | Rubber	Pin head	Length of the classroom
cm and mm	mm	m	 Ps come out to BB to choose an object and put the appropriate unit of length below it. Discuss the use of two units for, e.g,. height. What other things would we measure in mm (cm, m, km)? *———— 12 min ————*	Whole class acivity Use copy master, enlarged, cut out and cards stuck to BB (or use pictures cut from magazines) Agreement, praising (e.g. height can be measured in m and cm) Ps make suggestions (with T's help)
4	**Ordering units of length** a) Let's put these units of length in <u>decreasing</u> order. BB: 1 m 1 cm 1 km 1 mm Ps come to BB to write out again, crossing off each unit as it is used (or to rearrange cards). What sign could we put between them? (>) BB: 1 km > 1 m > 1 cm > 1 mm	Whole class activity Written on BB or use flash cards Agreement, praising Ps copy into *Ex. Bks* too. (Lesson number and date)

Bk3		*Lesson Plan 17*

Activity		*Notes*
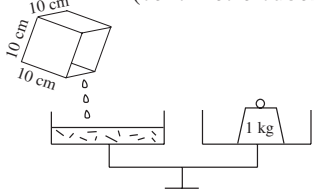
	b) What could the arrows mean?
	
	Ps come out to write numbers in the rectangles, saying complete equation (in correct direction.)
	
	e.g. ' 1 mm times ten equals 1 cm'
	
	    '1 cm divided by 10 equals 1 mm'
	
	Class agrees/disagrees.
	
	$\times \boxed{1000}$
	1 km 1 m
	$+\boxed{100}$ $\boxed{1000}\times$
	1 cm 1 mm
	$\times \boxed{10}$
	
	c) Let's complete the equations. Ps come out to fill in missing numbers.
	
	BB: 1 km = $\boxed{1000}$ m 1 m = $\boxed{1000}$ mm
	
	      1 m = $\boxed{100}$ cm 10 mm = $\boxed{1}$ cm
	
	      1 cm = $\boxed{10}$ mm 100 cm = $\boxed{1}$ m
	
	———— *18 min* ————
		Drawn on BB or use enlarged copy master or OHP
		
		Reasoning, agreement, praising
		
		What if the arrows were turned in the opposite direction?
		
		At a good pace
		
		Agreement, praising
		
		Ps copy into *Ex. Bks* too.

5	*Book 3, page 17*
	
	Q.1 Read: *Imagine the size of these things in real life. Estimate their real lengths.*
	
	        Which letter could be written in which box?
	
	      Think about if you were holding the object, or standing beside it. Which would be the biggest (smallest)?
	
	      Review at BB with whole class. Have a metre rule or measuring tape at hand to confirm if there is disagreement.
	
	Solution:
	
	1 m < e < 2 m; 8 cm < b < 10 cm; 20 cm < a < 30 cm;
	4 m < d < 5 m; 10 m < c < 20 m
	
	———— *23 min* ————
		Individual work, monitored, helped
		
		Use enlarged copy master or OHP
		
		Discussion, agreement, checking (e.g. soap, book, table), self-correction, praising
		
		T chooses Ps to read out inequalities starting at LHS, letter and RHS.

6	*Book 3, page 17*
	
	Q.2 Read: *Estimate, then measure exactly, the total length of the lines.*
	
	      Think of how long a cm is and estimate how many cm you think the lines in each part will be. Write the number of cm in the box at the top of each shape. Review orally with whole class.
	
	      Now use your rulers to measure the lines accurately and write the total accurate length in the box at the bottom of each diagram.
	
	      What do you notice? (Each grid square has side 5 mm or half a cm, so every 2 sides are 1 cm long)
	
	      Review at BB with whole class. (Wildly inaccurate measures should be done again but allow small discrepencies.)
	
	Solution:
	
	a = 3 cm + 5 cm + 3 cm = <u>11</u> cm, b = 5 × 2 cm = <u>10</u> cm,
	
	c = 2 × (2 cm + 4 cm) = 2 × 6 cm = <u>12</u> cm,
	
	d = 2 × 4 cm + 2 cm = <u>10</u> cm,
	
	e = 1 cm + half a cm + 1 cm + half a cm + 2 cm = <u>5</u> cm
	
	———— *30 min* ————
		Individual work, monitored, helped
		
		Let's check who is correct!
		
		Ps may write additions or multiplications for each part in their *Ex. Bks*
		
		Ps dictate their answers and T writes on BB.
		Class agrees/disagrees
		
		Self-correction
		
		Praising, encouragement only
		
		Use enlarged copy master for demonstration only!

Bk3		*Lesson Plan 17*

Activity		*Notes*
7	**Ordering lengths** Let's put these lengths in increasing order. a) BB: 127 cm, 150 cm, 105 cm, 90 cm, 1 m 20 cm Ps come to BB to write out again, crossing off each length as it is used (or to rearrange cards). Elicit that 1 m 20 cm = 120 cm. What sign could we put between them? (<) BB: 90 cm < 105 cm < 1 m 20 cm < 127 cm < 150 cm b) BB: 6 m, 250 cm, 5 m 20 cm; 10 m 50 cm Ps come to BB to write out again, crossing off each length as it is used (or to rearrange cards). Elicit that 250 cm = 2 m 50 cm BB: 250 cm < 5 m 20 cm < 6 m < 10 m 50 cm c) BB: 4 m 90 cm, 3 m, 200 cm, 9 m, 3 and a half metres Ps come to BB to write out again, crossing off each length as it is used (or to rearrange cards). Elicit that 200 cm = 2 metres BB: 200 cm < 3 m < 3 and a half metres < 4 m 90 cm < 9 m *———— 35 min ————*		Whole class activity Written on BB or SB or OHP or on flash cards stuck to BB Reasoning, agreement, praising T gives Ps (or elicits from Ps) an idea of what the lengths are: e.g. a child is about 1 m 20 cm; a house is about 6 m high, etc. or by using a measuring tape or metre rule, or comparing with height of Ps, etc.
8	***Book 3, page 17*** Q.3 Read: *Fill in the missing numbers*. Review orally with whole class. Ps change to coloured pencils and mark own work, correcting mistakes. a) 1 m 30 cm = 130 cm b) 1 m 50 cm = 150 cm c) 1 m 100 cm = 2 m = 200 cm d) 1 m 26 cm = 126 cm e) 1 m 80 cm = 180 cm f) 1 m 7 cm = 107 cm Who had 6 (5, 4, less than 4) correct? What were your mistakes? Who did the same? Who does not understand where they went wrong? *———— 40 min ————*		Individual work, monitored (helped) Discussion, agreement, self-correction Evaluation, praising Feedback for T Show lengths on a measuring tape if necessary.
9	***Book 3, page 17*** Q.4 Read: *Mr. Silly estimated some quantities. If you agree with him, write a tick. If you disagree, write a cross and correct his mistake.* Review orally with whole class. Check 'silly' lengths with the real thing where possible. a) My friend Bob is about 135 m tall. ✗ (135 <u>cm)</u> b) A matchbox is about 5 mm wide. ✗ (5 cm or 50 mm) c) A pupil's desk is about 70 mm high. ✗ (70 <u>cm)</u> d) My pencil is about 15 cm long. ✔ (possible) e) My pet rabbit has ears about 120 mm long. ✔ (possible, but ear lengths vary a lot, depending on age, type, etc.) *———— 45 min ————*		Individual trial, monitored Ps read out statements and class shows 'thumbs up' or 'thumbs down' on command. Discussion, agreement on what the correct statements should be. Done in good humour!

Bk3	R: Calculation	*Lesson Plan*
	C: Measurement: capacity. Numbers up to 200 (or over)	*18*
	E: *Hundreds and 50s to 1 thousand (or over)*	

Activity		Notes
1	**What am I?** Listen to the clues and think what I could be! • People measuring liquids make use of me. • My name is on bottles of water and cartons of milk and orange juice. • I have a brother who is one hundred times smaller than me. He is used to measure doses of medicines when you are ill. • You will see my name on petrol pumps at service stations. What am I? T asks several Ps what they think. (litre) What is my little brother? (centilitre) (BB: 100 cl = 1 litre) What other standard unit is used to measure how much liquid something can hold (capacity)? (pint, gallon) T demonstrates that 1 litre of water fills a cube 10 cm by 10 cm by 10 cm, i.e. 1000 centimetre cubes (cc) *————— 5 min —————*	Whole class activity Ps stand up when they think they know Agreement, praising Discussion on other units and when they are used. T could show measuring jugs, milk bottle, medicine spoons, etc. BB: 1 litre of water = 1000 cc 1 cl of water = 10 cc
2	**Measuring capacity** T has a measuring jug with, e.g., a 10 cl scale, a bucket of water and various containers on the table at the front of the class. Ps come out to choose a container, fill it with water and pour into the measuring jug. They then read its capacity out to the class. After one or two times, class could try to estimate the capacity first. T writes cqpacity of each container on the BB. e.g. glass: 50 cl *————— 10 min —————*	Whole class activity e.g. wine glass, bottle, mug, jam jar, flower vase, tumbler Choose 3 Ps at a time: 1st to hold measuring jug, 2nd to pour the water and 3rd to read out the quantity.
3	**Units of capacity** T has various utensils and containers at front of class, e.g. spoon, glass, jug, cup, bucket, ice-cream tub. T holds up one item at a time and asks Ps to say which unit of capacity they would use to measurehow much liquid each could hold. (e.g. spoon: cl or ml; glass: cl; cup: cl; jug: litre; bucket: litre) *————— 15 min —————*	Whole class activity Ps say the name of each container and the unit Agreement, praising

4	***Book 3, page 18***
	
	Q.1 Read: *Which capacity would be measured by which unit?*
	             Join up the containers to a suitable standard unit.
	
	Talk about the containers first and what each would be used for. Which container (unit) is biggest (smallest)?
	
	Review at BB with whole class. Discuss the fact that the measuring jug could be a litre jug, so could be measured in litres.
	
	Solution:
	
	Let's put these units in <u>decreasing</u> order and write the correct sign between them.
	
	Complete these equations in your *Ex. Bks.*.
	
	BB: 1 litre = 100 cl; 1 cl = 10 ml; 1 litre = 1000 ml
	————— 20 min —————
		Individual work, monitored, helped
		
		Drawn on BB or use enlarged copy master or OHP
		
		Ps come to BB to join up.
		
		Discussion, reasoning, agreement, praising
		
		T on BB and Ps in *Ex. Bks*:
		  1 litre > 1 cl > 1 ml
		
		Compare British units of pint and gallon with the litre.

Bk3		*Lesson Plan 18*

Activity		*Notes*

5	***Book 3, page 18, Q.2***
	
	Read: *What could the rule be? Fill in the missing numbers and complete the diagram*.
	
	What have the equations on the LHS to do with the diagram? Elicit that they are the calculations needed for each segment of the circle.
	
	What is the rule for the diagram? (The sum of the two quantities in each segment is 10 cl.) How many millilitres is 10 cl? (10 cl = 100 ml)
	
	Ps come out to BB to fill in a set of equations, find the matching segment and write in the missing quantity, explaining reasoning. Class agrees/disagrees.
	
	Solution
	
	BB:
	10 cl = 100 ml, 100 ml + <u>0</u> ml = 100 ml
	50 ml = <u>5</u> cl, 5 cl + <u>5</u> cl = 10 cl
	60 ml = <u>6</u> cl, 60 ml + <u>40</u> ml = 100 ml
	4 cl = <u>40</u> ml, 40 ml + <u>60</u> ml = 100 ml
	                18 ml + <u>82</u> ml = 100 ml
	
	————— 25 min —————
		Whole class activity
		
		Drawn on BB or use enlarged copy master or OHP
		
		Discussion, agreement
		
		Ps complete in *Pbs* at the same time
		
		Reasoning, agreement, praising
		
		Let's not forget what 'cl' and 'ml' are short for .
		
		BB: ml millilitre
		       cl centilitre
		
		1 ml = 1 thousandth of a litre
		1 cl = 1 hundredth of a litre

6	**Equal quantities** Let's help *Maurice Mouse* to join up the equal quantities. BB: 100 cl 10 ml 10 cl 1 litre 1 cl 100 ml 1000 ml Ps come to BB to join up the quantities, explaining reasoning. Class agrees/disagrees. Let's write them as equations. (T on BB and Ps in *Ex. Bks*) BB: 10 cl = 100 ml, 1 litre = 100 cl = 1000 ml, 1 cl = 10 ml *————— 30 min —————*	Whole class activity Drawn on BB or use enlarged copy master or OHP (or quantities cut out and stuck to BB and Ps arrange in groups) Reasoning, agreement, praising Class reads them in unison

7	**Missing quantities**
	T has BB or SB already prepared and containers which would hold approximately these quantities.
	
	BB: a) 1 litre = ⟨100⟩ cl d) 1 litre 50 cl = ⟨150⟩ cl
	        b) 2 litres = ⟨200⟩ cl e) half a litre = ⟨50⟩ cl
	        c) 5 litres = ⟨500⟩ cl f) 3 litres 10 cl = ⟨310⟩ cl
	
	Ps come out one at a time to fill in the missing quantity and to choose the container which they think would hold it. Who agrees? Who thinks another one? Let's check!
	
	Which is the biggest (smallest) quantity? (5 litres, half a litre)
	
	————— 35 min —————
		Whole class activity
		Written on BB, SB or OHP
		
		(Containers could have capacity written on bottom beforehand, or T could pour water from a measuring jug into chosen container.)
		
		Agreement, checking, praising
		
		Class shouts in unison

Bk3		*Lesson Plan 18*

Activity			*Notes*
8	**Exercises** T reads statatement, Ps write in *Ex. Bks* and then complete the missing numbers and/or units.		Individual work but class kept together T repeats each part slowly Ps nod their heads when they are ready for next part

BB: a)   1 litre =   100 ☐   d)   2 litres 50 cl =   250 ☐

         b)   3 litres =   ☐   cl   e)   1 and a half litres =   ☐   cl

         c)   7 litres =   ☐   cl   f)   50 cl =   ☐   ml

Review orally round class. Ps change to coloured pencils and mark own work, correcting mistakes.

Agreement, self-correction

Who had 6 (5, 4, less than 4) correct? What were your mistakes? Who did the same? Who does not understand?

Evaluation. Praising

—— *40 min* ——

9	***Book 3, page 18***	

Q.3   Read: *For a picnic, we made some lemonade and poured it into 50 cl, 80 c, and 1 litre bottles.*

                The graph shows the number of each size of bottle that we filled.

                Do the calculations and answer the questions in your Exercise Books.

Whole class discussion to start

Use enlarged copy master or OHP

T explains task. Elicit that each shaded grid square represents 1 bottle and that the height of the columns shows how many of each size of bottle was filled.

Make sure that Ps understand the graph.

Deal with one part at a time. Do first part (50 cl) of a) and b) on BB with whole class, then 80 cl and 1 litre as individual work, reviewed.

Whole class work followed by individual work in Ex. Bks, monitored, helped

Part c) as individual work, reviewed at BB. Mistakes corrected.

Solution:

a)   *50 cl:* 8 bottles;   *80 cl*: 4 bottles;   *1 litre*: 13 bottles

Reasoning, agreement, self-correcting, praising

b)   *50 cl:*   8 × 50 cl =   400 cl =   4 litres, or
               8 × 50 cl =   4 × (2 × 50 cl) =   4 × 100 cl =   <u>4 litres</u>

Feedback for T

     80 cl: 4 × 80 cl =   320 cl =   <u>3 litres 20 cl</u>

     1 litre: 13 × 1 litre =   <u>13 litres</u>

(or all done as a whole class activity)

c)   4 litres + 3 litres 20 cl + 13 litres =   <u>20 litres 20 cl</u>

—— *45 min* ——

Bk3	R: Calculation	*Lesson Plan*
	C: Measurement: mass (weight). Numbers up to 200 (or over)	*19*
	E: Hundreds and 50s to 1 thousand (or over)	

Activity		**Notes**
1	**Weight and mass**	Whole class activity
	T has a 1 litre measuring jug, an open-topped transparent cube (glass or plastic) measuring 10 cm by 10 cm by 10 cm and a balance with a 1 kg weight on table at front of class.	T explains and demonstrates
	T pours 1 litre of water into jug, and then fills the cube.	BB: 1 litre water = 1000 cc
	Who can write an equation about it?	(centimetre cubes)
	T pours the water from the glass cube into one side of the scales and puts a 1 kg weight on the other.	
	What do you notice? (They balance, so they must weigh the same.)	
	Who can write an equaiton about it? (BB)	BB: 1 litre water = 1 kg
	When we say that the weight of water is 1 kg, we should remember that we really mean 'mass' (how much water there is).	BB: <u>Weight</u> <u>Mass</u>
	Here are two examples to show the difference between weight and mass:	<u>For T's information:</u>
	• Suppose we ate a loaf of bread here on Earth, then went to the Moon on a spaceship and ate the same size of loaf there. The amount of bread (mass) we ate would be the same but the bread would weigh about six times lighter on the moon than on the earth.	A 1 kg loaf of bread would weigh about 10 Newtons on Earth and just less than 2 Newtons on the Moon.
	• An astronaut is able to jump about 6 times further on the Moon than on the Earth but his mass is the same.	Agreement that Ps can use either word and T will know what they mean.
	Anything weighs less on the Moon than it does on th Earth but its mass stays the same.	
	5 min	
2	**Units of mass (weight)**	Whole class activity
	The weight on the balance is 1 kg and is quite heavy. What unit would we use if we wanted to weigh very small things? (g)	(from previous activity)
	Who knows how many grams are in 1 kilogram? (1000)	Ask several Ps what they think
	T writes on BB and Ps in *Ex. Bks*: BB: 1 kg = 1000 g	
	T has various items (small and large) and sets of scales to show kg and g. Ps come out to choose an item and read its weight from the appropriate scale (with T's help if necessary).	e.g. pencil, straw, £1 coin, book, pupil, teacher, etc.
	There is a unit of mass which is 1 thousand times larger than 1 kg. Who knows what it is called? (tonne)	Ps suggest what things might be weighed in tonnes: e.g.
	Who can write an equation about it? BB: 1 tonne = 1000 kg	elephant, tanker, crane, rhino
	Who knows other standard units for measuring mass (weight)? (British)	e.g. ounces, pounds, stones
	10 min	
3	***Book 3, page 19***	Whole class introduction
	Q.1 Read: *How much do you think they weigh in real life?*	Use enlarged copy master or OHP
	Join up each picture to the suitable quantity.	Discussion, agreement
	Talk about the pictures first and compare their weights. Which do you think would be heaviest (lightest) in real life? Which of the measures is biggest (smallest)?	BB: dog: 16 g; jam: 700 g; crisps: 25 g; woman: 60 kg; lorry: 1 tonne; milk: 1 kg
	Review at BB with whole class. T could have a real pot of jam (packet of crisps, carton of milk, herself) to weigh if problems.	Ps fill in missing numbers:
	Let's put the units in <u>decreasing</u> order and write the correct sign between them. (T on BB and Ps in *Ex. Bks*.)	1 tonne = ⌐1000¬ kg
	BB: 1 tonne > 60 kg > 16 kg > 1 kg > 700 g > 25 g	1 kg = ⌐1000¬ g
	15 min	

Bk3	*Lesson Plan 19*

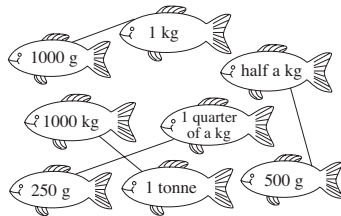| *Activity*		*Notes*
4	**Equal mass** Let's join up the equal measures. BB: Ps come to BB to join up the fish, explaining reasoning. Class agrees/disagrees. Let's write them as equations. (T on BB and Ps in *Ex. Bks)* BB: 1 kg = 1000 g, 1 tonne = 1000 kg, half a kg = 500 g, 1 quarter of a kg = 250 g = half of 500 g *——— 20 min ———*	Whole class activity Drawn on BB or use enlarged copy master or OHP (or fish coloured, cut out and stuck to BB and Ps arrange in pairs) Reasoning, agreement, praising Joking about possibility of fish really weighing these amounts and the size they would be!

5	***Book 3, page 19***
	 Q.2 Read: *Fill in the missing numbers and units*.
	   Review orally with whole class. Ps change to coloured pencils and mark own work, correcting mistakes.
	   a) 1 kg = 1000 g d) 1 quarter of a kg = 250 g
	   b) half a kg = 500 g e) 1 tonne = 1000 kg
	   c) 1 and a half kg = 1500 g f) half a tonne = 500 kg
	
	   Who had 6 (5, 4, less than 4) correct? What were your mistakes? Who did the same? Who does not understand where they went wrong?
	 ——— 25 min ———
		Individual work, monitored (helped)
		
		 Discussion, agreement, self-correction
		
		 Evaluation, praising
		
		 Feedback for T
		
		 Show on different segments of the number line if necessary.

6	**Weight table and bar chart** The pupils in a class were all weighed and the data displayed in this table. Then they drew a chart to show the data more clearly. BB: T explains the table and bar chart (with the help of Ps). Revise inequality signs and tally marks if necessary. Let's read the inequalities together: e.g. 'twenty-five kilograms is less than or equal to *a* and *a* is less than thirty kilograms', etc. Ps can show numbers on class number line. Study the chart carefully and tell me the answer to these questions. a) How many girls (boys) are in each weight group? b) How many girls (boys) are in the class? (11, 12) c) How many Ps are in each weight group? d) How many Ps are in the class? (23) e) Which is the most (least) common weight group? (*b*, *d* and *e*) How heavy are you? Which group would you be in? (T has scales at hand if Ps do not know their weights.) Come and draw where you would be on the chart. (Ask a few Ps if there is time.) *——— 33 min ———*	Whole class activity Use enlarged copy master or OHP Ps could have copies on desks too Give Ps opportunity to study table and bar chart and to explain connections In unison. T asks several Ps what they think. P who responds correctly explains to others. Class agrees/disagrees. Ps come to BB to add their tally mark and to amend the chart. Class agrees/disagrees.
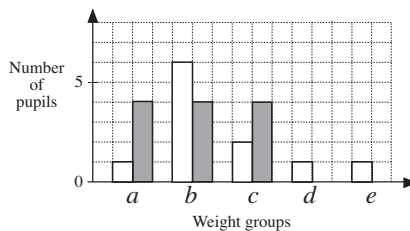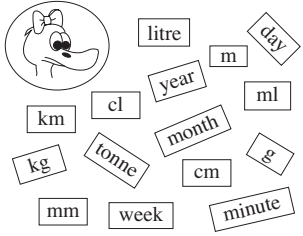
Bk3		*Lesson Plan 19*

Activity		*Notes*
7	**Sequences** T says first few terms. Ps continue the sequence and give the rule. a) T: 30 g, 60 g, 90 g, . . . Ps: 120 g, 150 g, . . . (+ 30 g) b) T: 200 kg, 400 kg, 600 kg, . . . Ps: 800 kg, , . . . (+ 200 kg) c) T: 900 g, 800 g, 700 g, . . . Ps: 600 g, 500 g, . . . (– 100 g) ——————— *37 min* ———————	Whole class activity In unison at speed Praising, encouragement only (Practice of numbers over 100)

8
 	
Extension
	Book 3, page 19
	Q.3 Read: *All the 23 pupils in a class were weighed.*
	                The results are arranged in increasing order.
	                Boys are shown by black bars and girls by white bars.
	Talk about the bar chart first. Elicit that each bar represents one pupil and that they are arranged in <u>increasing</u> order of weight.
	Elicit that there is a horizontal grid line for each 'tick' on the weight line (*y* axis) to show every kg.
	How can we find the weight of, e.g. Pupil 22?
	P comes out to BB to point to top of bar and to run finger along grid line to mark on *y* axis. (40 kg)
	T shows how a ruler placed horizontally at top of bar can be used to find weights which are not exactly on a grid line.
	Read: *a) Which weight is the most common?*
	          b) What is the weight of the 6th pupil from the left?
	          c) What is the weight of the 6th pupil from the right?
	          d) What is the weight of the pupil in the middle?
	Review at BB with whole class. All mistakes dealt with and corrected.
	In part a), T starts to use the word 'frequent' instead of 'common'.
	In part d), elicit that middle pupil is Pupil 12 (11 pupils to the left of him and 11 to the right of him)
	Who can think of other questions to ask about the chart?
	e.g. How many more girls are in the class than boys? (1 more)
	     Is the pupil who weighs most (least) a boy or a girl? etc.
	——————— *45 min* ———————
		Whole class activity to start
		
		Use enlarged copy master or OHP
		
		Ps have enlarged copies of bar chart on desks
		
		Initial discussion, involving several Ps
		
		Agreement, praising
		
		Demonstration.
		
		Individual work, monitored, helped
		
		Agreement, self-correction, praising
		
		BB: a) 34 kg b) 30 kg
		     c) 36 kg d) 34 kg
		
		BB: 11 + 1 + 11 = 23
		
		T repeats vague or inaccurate questions correctly, or give hints for questions if needed
		Agreement, praising

Bk3	R: Mental calculation **C: Measurement: time** E: *Numbers up to (and beyond) 2000*	*Lesson Plan* *20*

Activity		Notes
1	**Standard units of measurement** Let's help *Daffy Duck* sort out this mess! How do you think we could do it? T asks several Ps what they think. BB: Elicit that the units are all mixed up and that similar measures should be put together. Ps come to BB to put measures into matching sets: BB: <u>Length:</u> km, m, cm, mm <u>Capacity:</u> litre, cl, ml <u>Mass</u> (weight): tonne, kg, g <u>Time:</u> year, month, week, day, minute Can you think of other standard units for each set? e.g. foot, inch, mile; gallon, pint; stone, pound, ounce; hour, second, (millennium) ————— *5 min* —————	Whole class activity Written on BB or use copy master, enlarged, cut out and cards stuck to BB Discussion, agreement T elicits names of sets and encourages logical order for each (e.g. decreasing) Ask several Ps what they think. Class agrees/ disagrees. Praising

2	**Missing numbers**
	
	T has BB (SB) already prepared:
	
	BB: 1 year = ▢ months 1 day = ▢ hours
	      1 month ≈ ▢ weeks 1 hour = ▢ minutes
	      1 week = ▢ days 1 minute = ▢ seconds
	
	Ps come to BB to write in missing numbers, saying whole equation.
	
	Let's think of other equations about time! e.g.
	
	BB: 1 year = <u>4</u> seasons (spring, summer, autumn, winter)
	      1 year = 365 days <u>but</u> 1 <u>leap</u> year = 366 days
	
	Discuss that leap years are divisible by 4 (e.g. 1996, 2000) but only every <u>4th</u> whole hundred is a leap year (e.g. 1900 was <u>not</u> a leap year, 2000 <u>is</u> a leap year and 2100 will <u>not</u> be a leap year).
	
	————— *10 min* —————
		Whole class activity
		
		Written on BB or SB or OHP beforehand
		
		Agreement, praising
		
		Give Ps the chance to suggest them but if Ps cannot, T starts equations on BB and Ps complete them.
		
		Discussion. Where does the extra day occur? (February 29th) Praising

3	**Year 2020 calendar**
	
	Let's look at the calendar for this year.
	
	a) Let's say the days of the week. (Monday, Tuesday, . . . Sunday)
	
	b) Let's say the months of the year. (January, February, . . . December)
	
	c) Let's find:
	   i) the 25th of August. What day is it? (Tuesday)
	   ii) the 30th of February What day was it? (No such day)
	   iii) the 31st of April What day was it? (No such day)
	
	d) What is the date today? Let's write it in our *Ex. Bks*. (*Heading:* Lesson number and date) T shows how to write it in different ways and Ps copy into *Ex. Bks*: e.g.
	   BB: 22 October 2020, 22nd October 2020 October 22, 2020, 22/10/2020. T circles the form class uses (will use in future)
	
	e) Find your birthday. Write it in your *Ex. Bks*.
	   T asks several Ps what they have written.
		Whole class activity
		
		Use real calendar (down-loaded from the internet)
		
		Ps have copy of calendar on desks too
		
		Discussion, agreement, praising
		
		Individual work, monitored
		
		d) Today's date is . . .
		
		e) My birthday is (was) on . . .
		
		Agreement, praising

Bk3		*Lesson Plan 20*

Activity		*Notes*

	f) Let's say the poem about how many days there are in each month:
	
	    '30 days hath September, April, June and November.
	    All the rest have 31, except for February alone,
	    which has but 28 days clear and 29 in each leap year.'
	
	g) How many weeks and how many days remaining are there in the different lengths of month?
	
	    BB: 31 = 4 × 7 + 3, 30 = 4 × 7 + 2, 28 = 4 × 7 (29 = 4 × 7 + 1)
	
	    e.g. January has 4 weeks and 3 days, June has 4 weeks and 2 days
	
	 ———— 18 min ————
		Whole class activity
		
		If Ps do not know it, T says one line at a time and Ps repeat it, then T says 2 lines and Ps repeat them, then T says whole poem and Ps repeat it.
		
		Discussion, agreement, praising

4	**Clock**
	a) Look at this clock (or at your watch).
	    Let's say the numbers on it. (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12)
	
	    What do these numbers mean? (whole hours when the little hand points to them and groups of 5 minutes when the big hand points to them.) Let's say how many minutes the numbers mean.
	    T points to 1, 2, 3, etc. and Ps say '5, 10, 15, . . ., 50, 55, 60 minutes'.
	
	    T reminds Ps that the minutes shown on right half of clock are said to be <u>past </u> the hour (e.g. five past one) and the minutes shown on left half of clock are read as the number of minutes <u>before</u> the next hour, i.e. are said to be 'to' the hour,) e.g. 12.55 is read as 'five to one'.
	
	    T sets the clock to various times and T chooses Ps to read the time to the class. Class agrees/disagrees.
	
	    T shows different ways of writing the times and what they mean, e.g.
	
	    3 o'clock or 3:00 = 3 whole hours
	
	    half past 3 or 3:30 = 3 and a half hours or 3 hours and 30 minutes
	
	    ten past two or 2:10 = 2 hours and 10 minutes
	
	    ten to four or 3:50 = 3 hours and 50 minutes
	                      = 10 minutes before 4 o'clock
	
	b) Watch the minute hand on the class clock. Knock on your desk once when a whole minute has passed and knock twice when 2 minutes have passed (i.e. a minute later) Start . . . now!
	
	    This time I will clap once and you must clap 1 minute later. How do we measure the length of time in 1 minute? (using seconds) Let's watch the second hand carefully and count in time. Class: '1, 2, 3, . . ., 58, 59, 60'
	
	c) Let's play a game! Close your eyes. Open them and stand up when you think a minute has passed from . . . now!
	
	d) Open your *Ex. Bks*. (*Heading*: Lesson number and date)
	
	    How many numbers do you think you could write, starting from 1, in 1 minute? Write down an estimate.
	
	    Let's check it! Write down the whole numbers in increasing order from 1, starting . . . now! . . . Stop!
	
	    A, how many did you write? Who agrees? Who wrote more (less)? Compare your result with your estimate. Who wrote more (less)? How many more (less)?
	
	 ———— 26 min ————
		Whole class activity
		
		Use real clock with hour, minute and second hands
		
		Agreement, praising
		
		BB: 1 hour = 60 minutes
		
		Use a large model clock
		
		T notes Ps having difficulty
		
		T starts class at beginning of a minute (when second hand is at 12)
		
		Praising
		
		BB: 1 minute = 60 seconds
		
		T asks Ps who are accurate to explain to others how they did it
		
		T asks several Ps what they estimated
		
		Ps write continuously for 1 minute
		
		Discussion on why Ps think their estimates were bigger (smaller) than the actual time.

Bk3		*Lesson Plan 20*
Activity		**Notes**
5	**Book 3, page 20** Q.1 Read: *a) Colour in the same colour the clocks where the hands are mirror images.* *b) Write below each clock the number of whole hours it shows.* Who can tell us what a 'mirror image' is? Who agrees? Who thinks something else? (T explains if no P can remember.) Review at BB with whole class. Demonstrate with a real mirror if there are problems. *Solution:* 10 hours – 2 hours; 7 hours – 5 hours; 3 hours – 9 hours ———— *31 min* ————	Individual work, monitored, helped Drawn on BB or use enlarged copy master or OHP Discussion, demonstration Agreement, self-correction, praising. Feedback for T
6	**Book 3, page 20** Q.2 Read: *Write below each clock how many hours and minutes the hands show.* T explains that Ps should write the whole hours and the number of minutes <u>after</u> that whole hour (not the minutes to the next hour). Do first clock with whole class if necessary. Review at BB with whole class. Mistakes corrected. *Solution:* 6 hours, 15 minutes; 9 hours, 35 minutes; 2 hours, 50 minutes; 12 hours 0 minutes In what other way could we express these times? (e.g. a quarter past six, 6:15; 9:35, twenty-five to ten; etc.) ———— *35 min* ————	Individual work, monitored, helped Drawn on BB or use enlarged copy master or OHP Discussion, agreement, self-correction, praising. Orally round class. Praising

7	**Book 3, page 20, Q.3**
	
	Read: *There are 24 hours in a day. The clock started at midnight.*
	       Draw where the hour and minute hands would be after these times.
	
	Let's set the clock at 12 midnight. **B**, come and show where the hands would be after 9 hours and 45 minutes have passed. Who agrees with **B**? Who thinks something else?
	
	What time does the clock show? (a quarter to ten) Is it in the morning or at night? (morning) How can we show whether a time is in the morning or at night? (Use am and pm – T explains)
	
	So we could write this time as 9.45 am or we could write it as 09:45 using the 24 hour clock. (T has a digital clock to demonstrate.)
	
	Repeat in a similar way for the other times.
	
	BB: 22 hours and 15 minutes: 10.15 pm or 22:15;
	       15 hours and 30 minutes: 3.30 pm or 15:30;
	       7 hours and 45 minutes: 7.45 am or 07:45; etc.
	
	———— *40 min* ————
		Whole class activity
		
		Use model clock and enlarged copy master or OHP
		
		Reasoning, agreement, praising
		
		Discussion
		
		BB: am: <u>before</u> mid-day
		      pm: <u>after</u> mid-day
		
		Ps can complete clocks in *Pbs* too if they wish
		
		Involve several Ps (with T's help throughout)

8	**Book 3, page 20**
	
	Q.4 and Q.5 Let's see if you can do these without any help!
	              Review at BB with whole class. Mistakes corrected.
	
	Solutions:
	
	Q.4: a) 8 weeks 6 days = 8 × 7 + 6 = 56 + 6 = <u>62</u> days
	       b) 3 days 8 hours = 3 × 24 + 8 = 72 + 8 = <u>80</u> hours
	       c) 2 hours 45 min. = 2 × 60 + 45 = 120 + 45 = <u>165</u> minutes
	       d) 3 min. 10 sec. = 3 × 60 + 10 = 180 + 10 = <u>190</u> seconds
	
	Q.5: 8.20 to 9.00: <u>40 min</u>; 9.00 to 10.00: <u>1 hour</u>; 10.00 to 10.10: <u>10 min</u>
	
	———— *45 min* ————
		Individual work, monitored, (helped)
		
		Quick revision of number of days/week, hours/day, minutes/hour, seconds/minute
		
		Reasoning, agreement, self-correction, praising
		
		Show on model clock that time passed is 1 hour and 50 min.

			Lesson Plan
Bk3	R: Calculation **C: Collecting and recording data** E: *Numbers up to 2000*		*21*

Activity		Notes
1	**Boom!** Let's play Boom! Everyone stand up! Let's start at 12 and say 'boom' instead of every number which is either divisible by 7 or has 7 as a digit. Ps: 12, 13, boom, 15, 16, boom, 18, 19, 20, boom, 22, 23, 24, 25, 26 . . . Continue until only one P is left standing. _____ *4 min* _____	Whole class activity If Ps make a mistake they sit down and next P answers correctly. At speed round class In good humour! Class applauds the winner.

| **2** | **Finding the average**

In a class test, the most that pupils could score was 20 marks. These were the pupils' scores:

BB: 20, 5, 20, 19, 11, 14, 18, 20, 18, 17, 17, 12, 15, 17, 17

First let's put the scores in <u>increasing</u> order. T writes scores as dictated by Ps, crossing each off the original list as it is dealt with:

BB: 5, 11, 12, 14, 15, 17, 17, 17, 17, 18, 18, 19, 20, 20, 20

Let's fill in this table to show how many pupils had these scores.

BB: | Whole class activity
T has BB already prepared

Ps shout numbers out in unison

Drawn on BB or use enlarged copy master or OHP

Ps cross off scores in ordered list as they are dealt with. |

BB:

Marks scored	5	11	12	14	15	17	18	19	20
Number of pupils	1	1	1	1	1	4	2	1	3

Ps come out to fill in bottom row of table. Class agrees/disagrees. How many marks did the pupils in the class have altogether? How could we work it out? (By using only addition, or by addition and multiplication) BB: $\underbrace{5 + 11 + 12 + 14 + 15}_{57} + \underbrace{4 \times 17}_{68} + \underbrace{2 \times 18}_{36} + 19 + \underbrace{3 \times 20}_{60}$ $= \underbrace{57 + 68}_{125} + \underbrace{36 + 19}_{55} + 60 = \underbrace{125 + 55}_{180} + 60 = 180 + 60 = \underline{240}$ How many pupils were in the class? (15) So 15 pupils collected 240 marks altogether. Who is clever enough to tell me how we could work out the <u>average</u> score for the class? (Divide 240 by 15.) BB: Total marks: 240 Number of pupils: 15 <u>Average score</u>: 240 ÷ 15 Who can think of an easy way of dividing 240 by 15? e.g. 240 ÷ 15 = $\underbrace{240 \div 3}$ ÷ 5 = 80 ÷ 5 = 50 ÷ 5 + 30 ÷ 5 $\qquad\qquad\qquad\qquad = 10 + 6 = \underline{16}$ or 240 ÷ 15 = 480 ÷ 30 = $\underbrace{480 \div 10}$ ÷ 3 = 48 ÷ 3 $\qquad\qquad\qquad\qquad = 30 \div 3 + 18 \div 3$ $\qquad\qquad\qquad\qquad = 10 + 6 = \underline{16}$ If all 15 pupils had scored 16 marks each, the <u>total</u> marks scored would be the same as before, 240 marks. *Check:* 16 × 15 = 10 × 15 + 6 × 15 $\qquad\qquad = 10 \times 10 + 10 \times 5 + 6 \times 10 + 6 \times 5$ $\qquad\qquad = 100 + 50 + 60 + 30$ $\qquad\qquad = 150 + 90 = \underline{240}$ _____ *14 min* _____	Ps suggest how to do it. T leads Ps through the calculations, showing easy methods where possible, e.g. 4 × 17 = 4 × 10 + 4 × 7 $\qquad = 40 + 28 = 68$ 57 + 68 = 60 + 65 = 125 36 + 19 = 35 + 20 = 55 Discussion, reasoning, agreement, praising T helps Ps explain, or gives hints, or explains if nobody knows what to do For less able classes, T (or Ps) could use a calculator. Or use calculator as a check after doing calculation on BB T checks on BB with help of Ps Praising, encouragement throughout

Bk3

Activity		Notes
3	***Book 3, page 21, Q.1***	

a) Read: *Toss a coin 20 times with a partner so that you have 10 tosses each.*

Keep a tally of your results in this table.

Paired work but class kept together

Make sure that Ps know which side of the coin is 'head' and which is 'tail'. T demonstrates by tossing a coin and noting which side is face up. Ps have a practice toss first

Discussion, demonstration

Real (or model) coins on desks

T reminds Ps of how to keep a tally. Why do we use a tally? (Easier to count in 5s than in 1s)

T puts Ps into pairs and Ps decide who goes first.

T: '1st toss: Toss your coin . . .now!' (P_1 tosses and P_2 draws tally mark in relevant row of table in both *Pbs*, then vice versa for next toss, etc.) Repeat in similar way for 20 tosses.

In unison

At a good pace. T monitors entering of data

Pupil data

Head	⁍ㄣㅣ ‖‖‖	9
Tail	ㄣㅣ ㄣㅣ ‖	11
	Total number of throws	20

Ps count number of tally marks in each row of table and write totals on RHS. e.g.

Agreement, praising

How many tally marks should you have in total? (20, one for each toss)

b) Read: *Write the results for the whole class in this table.*

T asks each pair in turn how many heads and tails they had and data is written in *Class data* table. e.g.

Tables drawn on BB or use enlarged copy master or OHP

Class data

Heads	9	12	11	10	7	11	11	8	13	10	9	10
Tails	11	8	9	10	13	9	9	12	7	10	11	10

Total number of Heads	121
Total number of Tails	119
Total number of Tosses	240

Ps in *Pbs*, T on BB

How many heads (tails) did we toss altogether? What was the total number of tosses? Ps calculate and write totals for class in 3rd table. **A**, what did you write? Who agrees? Who thinks something else? Let's check. (BB)

Individual work, monitored

Agreement, checking, self-correcting

(or on BB with whole class)

c) Read: *Which result happened most often?*

If you think heads, put your hands on your head. If you think tails, sit on your hands. Show me . . . now!

In unison. (If results are the same, Ps put one hand on head and sit on other hand!)

Extension

Discuss the chance (probability) of a coin landing head up or tail up. Agree that there would be an <u>equal</u> chance, i.e. it is just as likely to land head up as tail up.

Discussion. Comparison of experimental and expected data

If we tossed a coin lots of times, we would expect half the number of times to be heads and half the number of times to be tails. We say that the chance (probability) of a coin landing head up (tail up) is 1 chance out of 2 or 1 half. Compare with results of experiment, e.g. class data:

Or using pair data:

Number of tosses: 20

Possible outcomes: 2 (H or T)

BB: Number of tosses: 240   Possible outcomes: 2 (head or tail)

Chance of a head (tail): $240 \div 2 = 200 \div 2 + 40 \div 2 = 100 + 20 = 120$

(i.e. 120 heads and 120 tails, or half the number of times a head and half the number of times a tail.)

Probability of a head (tail):

$$20 \div 2 = 10$$

(i.e. half the number of times a head, half the number of times a tail)

Elicit that class data from experiment are closer to this than paired data.

Why? (more data)

———— *25 min* ————

4	**Class data on mass (weight)**	Whole class activity

Let's make a tally of how much you each weigh in this table. Choose the nearest kg to your weight. Ps come out 6 at a time to draw a tally mark in the appropriate box. e.g.

T has scales at hand for Ps who do not know how much they weigh and helps them to choose the nearest kg

Bk3		*Lesson Plan 21*

Activity		*Notes*

BB:

24 kg	25 kg	26 kg	27 kg	28 kg	29 kg	30 kg	31 kg	32 kg	33 kg	34 kg	35 kg
||	|	|	|||	|	||	⊪⊦⊦	⊪⊦⊦ |		||	|	|||
2	1	1	3	1	2	5	6	0	2	1	3

Let's write the tally marks as digits. T writes what Ps dictate.

How can we check that everyone has made a tally mark? (Add up the numbers and the total should equal the number of pupils in the class.)

Ps think of questions to ask about the data or point out interesting things.

Notes:
Table drawn on BB or use enlarged copy master or OHP

Ps can copy table into *Ex. Bks* and check the total themselves
Agreement, praising
e.g. Which mass is most (least) common? No P weighs 32 kg.

——— *33 min* ———

5

Book 3, page 21, Q.2

a) Read: *Throw a dice 20 times with a partner so that you have 10 throws each.*

Keep a tally of the results in this table.

What possible numbers could be shown facing up? (1, 2, 3, 4, 5, or 6) T demonstrates by throwing a large dice and noting which number is face up. Ps have a practice throw first

T puts Ps into pairs and Ps decide who goes first.

T: '1st throw: Throw your dice . . .now!' P_1 throws and P_2 draws tally mark in relevant row of table in both *Pbs*, then vice versa for next throw, etc. Repeat in similar way for 20 throws.

Ps count number of tally marks in each row of table and write totals on RHS. How many tally marks should you have in total? (20, 1 for each throw)

b) Read: *Write the results for the whole class in this table.*

T asks each pair in turn how many 1s, 2s, 3s, etc. they had and data is written in *Class data* table. e.g.

e.g.

Number thrown | **Class data** | **Totals**

1	4	3	2	4	3	3	4	4	3	3	4	2	4	2	3	48
2	3	3	4	2	3	3	4	4	5	3	2	4	3	4	3	50
3	2	4	3	4	3	4	4	4	4	3	3	3	3	4	4	52
4	5	3	2	4	3	3	2	4	3	4	4	3	3	2	4	49
5	2	4	4	3	4	5	3	1	3	4	3	4	3	4	3	50
6	4	3	5	3	4	2	3	3	2	3	4	4	4	4	3	51

Total number of throws | 300

Ps write only totals in table in *Pbs*

How many 1s (2s, 3s, 4s, 5s, 6s) did we throw altogether? T does calculations on BB with Ps' help and Ps write totals in *Pb*s.

Then Ps calculate the total number of throws. T points out easy way to do the calculation, e.g.

$(48 + 52) + (50 + 50) + (49 + 51) = 100 + 100 + 100 = 300$

c) Read: *Which number was thrown most (least) often?*

Show me with your fingers . . . now! (e.g. 3, 4)

Extension

Discuss the chance (probability) of throwing a 1 (2, 3, 4, 5, 6). Agree that all the 6 numbers would have an equal chance.

The probability (chance) of a dice landing with a certain number facing up is 1 chance out of 6 or 1 sixth.

If we threw the dice lots of times, we would expect 1 sixth of the throws to be a 1, 1 sixth to be a 2, 1 sixth to be a 3, etc.. Compare with results of experiment. e.g. $300 \div 6 = 50$, which is close to experimental data.

Notes:
Paired work but class kept together

Discussion, demonstration

Ps have real or model dice on desks

In unison. At a good pace
e.g.

Pupil data

1	||||	4
2	|||	3
3	||	2
4	⊪⊦⊦	5
5	||	2
6	||||	4

Total number of throws | 20

Table drawn on BB or use enlarged copy master or OHP

(Or a P from each pair comes to BB to fill in a column)

At a good pace

Class checks that each column adds up to 20

(Or calculations done as individual work in *Ex. Bks*.)
Agreement, checking, self-correcting

In unison. Agreement

Discussion, agreement
BB: Probability

Use other examples.
e.g. if we threw a dice 12 (18) times, how many 5s would you expect to throw? (2, 3)

——— *45 min* ———

Bk3	R: Calculation **C: Organising and writing data. Solving a problem by interpreting data** *E: Numbers up to 200 (and over)*	*Lesson Plan* *22*

Activity		**Notes**
1	**Secret number** I am thinking of a number. You must find out what it is by asking me questions but I can answer only 'yes' or 'no'. e.g. <u>32</u>: it is 2-digit? (Yes) Is it even? (Yes) Is it less than 50? (Yes) Is it between 10 and 30? (No) Is it more than 40? (No) Is it less than 35? (Yes) Is its tens digit less than its unit digit? (No) It <u>is</u> 32. (Yes) (Ps can think of numbers and answer questions about them too.) ――――― *5 min* ―――――	Whole class activity Encourage Ps to ask logical questions and keep in mind clues already given Ps question T in order or T chooses Ps at random Praise creative questions
2	**Sequence competition** I will describe a sequence and then give you half a minute to write as many terms as you can in your *Ex Bks*. (*Heading:* Lesson number/date) The first term is 100 and it decreases by 6. Start . . . now! . . . Stop! Everyone stand up. Ps list the terms in order round class. Ps who made a mistake, or did not have time to write that term, sit down. Let's give the winner(s) a big round of applause! ――――― *9 min* ―――――	Individual work Keep to time limit Checking sequence: 100, 94, 88, 82, 76, 70, 64, . . . Agreement, self-correcting, praising. Stars, etc. awarded.

3	**Probability 1: tossing a coin**
	
	Let's look at the table we made about tossing coins from yesterday's lesson, e.g
	
	BB:
	<table><tr><td>Total number of Heads</td><td>121</td></tr><tr><td>Total number of Tails</td><td>119</td></tr><tr><td>Total number of Tosses</td><td>240</td></tr></table>
	How many:
	• tosses altogether? (e.g. 240)
	• pupils did the tossing? (e.g. 24)
	• heads (tails) did we throw?
	                  (e.g. 121, 119)
	
	I will say something and you must think about whether it is certain, possible or impossible.
	
	I tossed a coin 400 times:
	
	a) and got 190 heads (possible)
	
	b) and got 399 tails (possible, though very unlikely)
	
	c) and got 180 heads and 210 tails (impossible, because
	                             $180 + 210 \; < \; 400$)
	
	d) the numbers of heads and the number of tails added up to 400 altogether. (certain)
	
	How many heads would you <u>expect</u> to get if you tossed a coin 50 (100, 200, 400) times? (Ps: 25, 50, 100, 200) Why do you think that?
	
	(half the number of tosses as only 2 possible outcomes, head or tail, and both have an equal chance.)
	
	[N.B. If a P says, e.g. '4 heads', T asks class, 'Is it possible?' (Yes)
	      'Is it likely to happen?' (No)]
	
	――――― *15 min* ―――――
		Whole class activity
		
		Table drawn on BB or use copy master from *LP 21*
		
		Agreement, praising
		
		T repeats each statement slowly and Ps either write answer in *Ex. Bks* or show flash cards (made from copy masters) on command
		
		Discussion, reasoning, agreement
		
		Praising only
		
		Discussion involving several Ps.
		
		T repeats vague, inaccurate responses correctly

Bk3

Activity		Notes

4

Probability 2: throwing a dice

Let's look at the table we made about throwing a dice from yesterday's lesson, e.g

BB:

Class data

1	2	3	4	5	6	Total number of throws
48	50	52	49	50	51	300

How many:
- throws altogether?   (e.g. 300)
- pupils did the throwing?   (e.g. 30)
- 2s (4s, 1s, 3s, 6s, 5s) did we throw?
  (e.g. 50, 49, 48, 52, 51, 50)

I will say something and you must think about whether it is certain, possible or impossible.

I threw a dice 120 times:

a) and got 60 '2's.   (possible, but not expected)

b) and got 22 '6's   (possible and likely)

c) and got 20 '1's, 40 '2's, 30 '3's, 40 '4's, 5 '5's and 6 '6's
          (impossible, because $20 + 40 + 30 + 40 + 5 + 6 > 120$)

How many 1s (2s, etc.) would you <u>expect</u> to get if you threw a dice 120 times? (Ps: 20) Why do you think that?

(6 possible outcomes: 1, 2, 3, 4, 5 or 6, and each has an equal chance of being thrown, so we would expect each number to be thown 1 sixth of the number of times: $120 \div 6 = \underline{20}$, so 20 times)

[N.B. If a P says, e.g. '100 1s', T asks class, 'Is it possible?' (Yes)
       'Would you expect it to happen?' (No)]

Notes:
Whole class activity

Table drawn on BB or use copy master from *LP 21/3*

Agreement, praising

T repeats each statement slowly

Ps either write answers in *Ex. Bks.* or show flash cards on command

Discussion, reasoning, agreement

Praising only

Discussion. T asks several Ps what they think.

T repeats any vague or inaccurate responses correctly

———— *20 min* ————

5

Probability 3: mass (weight)

Let's look at the table we made about how heavy you all are from yesterday's lesson, e.g

BB:

24 kg	25 kg	26 kg	27 kg	28 kg	29 kg	30 kg	31 kg	32 kg	33 kg	34 kg	35 kg
||	|	|	|||	|	||	☓☓	☓☓ |		||	|	|||
2	1	1	3	1	2	5	6	0	2	1	3

How many pupils were in the lesson yesterday? (e.g. 27)
What standard unit did we use? (kg)

I will ask some questions about the table and you can write the answers in your *Ex. Bks.* Remember to write the standard unit too where needed.

a) Which mass (weight) was most common (frequent)?   (e.g. 31 kg)

b) Which mass (weight) was least common (frequent)?   (e.g. 32 kg)

c) How many pupils weighed more than 28 kg?   (e.g. 19 pupils)

d) How many pupils weighed less than 24 kg?   (e.g. 0 pupils)

e) How many pupils weighed not more than 30 kg?   (e.g. 15 pupils)

Review with whole class. Ps who answered correctly explain to Ps who did not. All mistakes dealt with.

Extension

How could we find the <u>average</u> mass (weight) for the class? (Find the total mass (weight) and divide by the number of Ps.) e.g.

BB: Total mass (weight):

$2 \times 24 + 25 + 26 + 3 \times 27 + 28 + 2 \times 29 + 5 \times 30 + 6 \times 31 + 2 \times 33 + 34 + 3 \times 35$

$= 48 + 51 + 81 + 28 + 58 + 150 + 186 + 66 + 34 + 105 = 807$ (kg)

Notes:
Whole class activity at start and end

Table drawn on BB or use W

Agreement, praising

Individual work in *Ex. Bks.*

Deal with one part at a time

Reasoning, agreement, self-correction, praising

Whole class activity

Ps suggest only <u>how</u> to do it! T uses a calculator and shows result to class.

No. of Ps: 27 Average mass:
 807 kg $\div 27 \approx \underline{30 \text{ kg}}$

———— *28 min* ————

Bk3	R: Calculation **C: Lists, tables, graphs** *E: Numbers up to 200 (and over)*	*Lesson Plan* *23*

Activity		**Notes**
1	**Sequences** a) The first term of this sequence is 160. Each following term is 7 more than the previous term. Continue the sequence. Ps: '16, 23, 30, 37, 44, 51, 58, 65, 72, 79, . . .' b) What could the rule be for this sequence? T: '100, 97, 94, 91, . . .' **A**, what do you think? Who agrees? Who thinks something else? (decreasing by 3) Let's continue the sequence: '88, 85, 82, 79, 76, 73, 70, 67, 64, . . .' ———— *5 min* ————	Whole class activity At speed round class If P makes a mistake the next P corrects it Ask several Ps Agreement, praising Whole class in unison

2	**Secret Code**
	
	I have written some additions and multiplications on the BB and each has a letter beside it. In your *Ex. Bks*, write only the answers and the letters. (*Heading*: Lesson number and date)
	
	BB: $34 + 17$ P (51) $4 \times 8 - 12$ G (20)
	       $20 + 19$ R (39) 6×9 H (54)
	       $3 \times 9 + 14$ A (41)
	
	Review with whole class. Ps change their pencils (to red) and mark their work, correcting any mistakes. Ps read answers and T writes on BB.
	Who had all 5 correct? Who made a mistake? What kind of mistake?
	
	Write the answers out again in increasing order and write the letters underneath. What word have you written? Class shout, 'GRAPH'
	
	BB: 20, 39, 41, 51, 54
	          G R A P H
	
	———— *10 min* ————
		Whole class activity but Ps write results individually
		
		T has BB or SB already prepared
		
		Discussion, agreement, self-correcting, praising (Feedback for T)
		
		In unison
		P comes to BB to show it.
		Mistakes corrected

3	**Head size** Let's make a tally of how big your heads are in this table. T demonstrates with a P at front of class how to measure all the way round the outside (circumference) of a Ps' head at forehead level. Ps measure each other in pairs (to nearest cm) then come out to draw their tally mark in the appropriate box in the table. e.g. BB | Size of head (cm)	47	48	49	50	51	52	53
---	---	---	---	---	---	---	---
Number of pupils	| 1	|||| 4	₩ 5	₩| 6	|||| 4	|| 2	| 1 | Let's show the data in a graph. T draws graph on squared grid with help of Ps. e.g. T asks questions about the data. Ps show answers with number cards or scrap paper or write in *Ex. Bks*. a) How many pupils are in the class? (e.g. 23) b) Which size is most frequent? (e.g. 50 cm) c) What is the size of the smallest head in the class? (e.g. 47 cm) d) What is the size of the biggest head in the class? (e.g. 53 cm) e) How many pupils have heads with circumference 48 cm? (e.g. 4) f) How many pupils have heads with circumference not more than 50 cm? (e.g. 16) ———— *20 min* ————	Whole class activity Use a measuring tape if possible (or a plastic neck measure, or a piece of string which can then be laid out straight along a ruler) Table and graph drawn on BB or use enlarged copy master or OHP Discuss what the *x* and *y* axes show Review with whole class if answers written in *Ex. Bks*. Reasoning, agreement, praising **Extension** Talk about shape of graph ('normal' spread: most in middle, becoming fewer at each end)
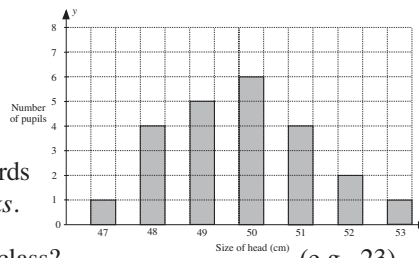
Bk3			*Lesson Plan 23*

Activity			*Notes*
4	**Arm length**		Whole class acivity
	Let's measure the length of your left arm (from shoulder to tip of finger) T demonstrates with P at front of class.		Ps could make a table in their *Ex. Bks* from tally chart on BB
	Repeat the procedure as in *Activity 3*.		
	T discusses with Ps how to collect the data, display and interpret them (measuring in pairs, tally chart, changing to numerical values, drawing a graph on a square grid, making observations and asking questions about the data)		Ps could attempt to draw graph on squared paper
			Discussion, agreement, praising
	Ps can suggest other data which could be collected in a similar way.		

——— *30 min* ———

5	***Book 3, page 23***

Q.1 Read: *Kanga the kangaroo is teaching little Tangy to jump further. They practise jumping only on weekdays and have a rest at the weekend.*

The graph shows the longest jumps they each made every weekday for 2 weeks.

Who has seen a kangaroo? Where? Which country do they come from? Why is one kangaroo bigger than the other? etc.

B, come and show us Kanga's jumps on the graph. **C**, come and show us Tangy's jumps. Colour Tangy's jumps in a bright colour in your *Pbs* so that they stand out more clearly.

D, come and show us where the *x* axis is. Is **D** correct?

What does the *x* axis show? (days in 1st and 2nd week)

Let's say them together. 'Monday, Tuesday, . . ., Friday, Monday, . . . Friday)'

Why are Saturday and Sunday not shown? (Kangaroos jumped only on weekdays)

E, come and show us where the *y* axis is. Is **E** correct?

What does the *y* axis show? (lengths of the jumps in metres) What does each grid line show? (every metre)

Let's start from zero and count up the *y* axis in 2s: 'zero metres, 2 metres, . . ., 12 metres' T points to grid lines at same time.

Let's see if you can answer the questions by yourselves. For part a) T explains that the <u>range</u> means from the smallest to the largest. Ps write answers in *Pbs*.

Review at BB with whole class, with Ps pointing to relevant bar or grid line on graph. Mistakes corrected.

Solution: a) from 6 m to 12 m b) Thursday in 2nd week

        c) Friday of 1st week d) 2nd week

How else could we show the data? (in a table)

Let's complete this table. Ps come to BB one at a time to fill in a column, explaining reasoning and referring to graph.

BB:

Day	Mon.	Tue.	Wed.	Thu.	Fri.	Mon.	Tue.	Wed.	Thu.	Fri.
		1st week					*2nd week*			
Kanga's jumps (m)	6	7	8	8	10	10	11	12	12	11
Tangy's jumps (m)	3	4	4	3	2	3	4	4	5	4

Notes for Activity 5:

Whole class activity to start

Use enlarged copy master or OHP

Initial discussion about background to problem

Ps colour white bars in *Pbs*

Class agrees/disagrees

In unison

Agreement, praising

Class agrees/disagrees

Agreement, praising

In unison

Individual work, monitored, (helped)

Reasoning, agreement, self-correcting, praising

Feedback for T

Drawn on BB or use enlarged copy master or OHP

At a good pace

Reasoning, agreement, praising

Ps think of other questions to ask abut the graph or table.

——— *38 min* ———

Bk3

Lesson Plan 23

Activity		Notes

6

Book 3, page 23

Q.2   Read: *One day, Piggy decided to climb the huge pine tree in Fairy-tale Forest.*

The table shows Piggy's progress.
Use the table to complete the graph.

T explains task, eliciting from Ps the relationship betwen the table and the graph. (1st dot is at the start, so no time has passed and Piggy is still on the ground; 2nd dot shows that after 1 minute Piggy has climbed 20 metres.)

Do next dot and column on BB with whole class. Ps come out to point to the column in the table, then to draw the dot and join it by a vertical line to the *x*-axis.

Let's see if you can draw the rest of the dots and lines by your-selves in your *Pbs*. Use a ruler to draw the vertical lines.

Review at BB with whole class. Mistakes corrected.

Solution:
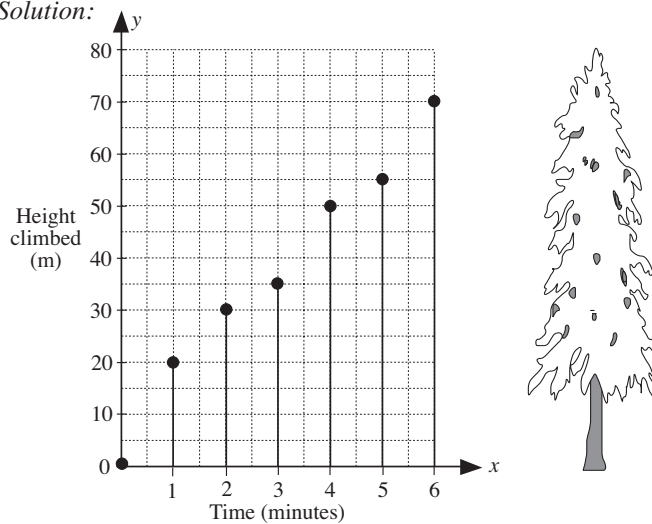
- After how many minutes did *Piggy* reach 35 metres? (3 min.)
- How far had *Piggy* climbed after 5 minutes?   (55 m)

What other questions could we ask about the graph? e.g.

- How tall is the pine tree? (80 m)
- When did *Piggy* find the climb easy (difficult)?
- How far does *Piggy* still have to climb? (10 m)
- Why did Piggy not climb right to the top? (branches too thin)

What is wrong with this problem? (Pigs can't climb trees – only in fairy-tales!) Which animals <u>can</u> climb trees?

Notes:

Whole class activity to start

Table and graph drawn on BB or use enlarged copy master or OHP (or with pig and tree coloured, cut out and stuck to BB)

Discussion, explanation

Demonstration, reasoning, agreement, praising

Ps could move *Piggy* up the tree to relevant height

Individual work, monitored, helped

Reasoning, agreement, self-correction, praising

T asks several Ps what they think and why.

Ps suggest questions.
T gives hints if necessary

Extra praise for creative questions

In good humour!

_____ *45 min* _____

Bk3	R: Calculation **C: Frequency tables. Pictograms, bar charts, Venn diagrams** *E: Numbers up to 200 (and over)*	*Lesson Plan* *24*

Activity		*Notes*
1	**Oral work** Let's see how many different ways we can think of to describe the number 53. (e.g. $5 \times 10 + 3$, $4 \times 8 + 21$, $7 \times 9 - 10$, $31 + 22$, $100 - 47$, . . . Repeat with 77. T (or Ps) writes responses on BB. ————————————— *5 min* —————————————	Whole class activity T chooses Ps at random At speed Class agrees/disagrees with each description
2	**Sequences** T says first 3 terms of a sequence. Ps continue it and give the rule. a) T: 33, 42, 51, . . . Ps: 60, 69, 78, 87, 96, 105, . . . $\quad$ (+ 9) b) T: 120, 112, 104, . . . Ps: 96, 88, 80, 72, 64, 56, . . . $\quad$ (− 8) ————————————— *10 min* —————————————	Whole class activity T chooses Ps at random Class points out errors Praising, encouragement only
3	**Height** Let's measure how tall you are. T makes 2 marks on LHS and RHS of BB, each 1 metre from the floor (using a metre rule). Ps come to BB in groups of 4 (2 pairs). P_1 stands with back to BB and P_2 measures to nearest cm how much taller than 1 metre P_1 is. (2nd pair of Ps do the same at other mark on BB.) Elicit that this length should be added to 1 metre (100 cm) to give their actual height.) Let's record the heights in this table. Ps make a tally mark in relevant boxes in table, than another 4 Ps come to BB to measure their heights. e.g. BB: | 120 cm	121 cm	122 cm	123 cm	124 cm	125 cm	126 cm	127 cm	128 cm	129 cm | |---|---|---|---|---|---|---|---|---|---| | | 1 | | | || 2 | | 1 | | ||| 3 | || 2 | | 1 | || 2 | | | 130 cm	131 cm	132 cm	133 cm	134 cm	135 cm	136 cm	137 cm	138 cm	139 cm	140 cm | What questions could we ask about the data? e.g. • How many pupils are 131 cm tall? (e.g. 2) • How many Ps are not smaller than 134 cm (e.g. $1 + 2 + 1 = 4$) • How many Ps are in the class? (e.g. 30) • Which height is the most frequent? (e.g. 133 cm) ————————————— *23 min* —————————————	Whole class activity T explains what Ps have to do and helps each pair if necessary At a good pace Table drawn on BB or use enlarged copy master or OHP (with extra columns added at beginning and end if necessary) Praise clever questions and correct answers Encourage creativity
4	*Book 3, page 24* Q.1 Read: *Donald Dog was practising weighing. He numbered all his bones and weighed each one.* *Then he made this graph.* How many bones does Donald have? (8) **A**, what does the *x* axis show? (*Donald's* bones, 1 bar per bone) Ps colour the white bars in bright colours so that they stand out. **B**, what does the *y* axis show? (Mass/weight of bones in grams) What does each grid line show? (every 100 grams) Let's start from zero and count up the *y* axis in100s: 'zero grams, 100 grams, . . ., 800 grams' T points to grid lines. What is missing from the *y* axis? (*y*) Write it beside the arrow.	Whole class activity to start Use enlarged copy master or OHP Initial discussion Individual work in *Pbs* Class agrees/disagrees In unison On BB and in *Pbs*

Bk3		*Lesson Plan 24*

Activity		*Notes*
	Let's see if you can answer the questions by yourselves.	Agreement, praising
	For part a) T explains that the <u>range</u> means from the smallest to the largest. Ps write answers in *Pbs*.	Class agrees/disagrees
	Review at BB with whole class, with Ps pointing to relevant bar or grid line on graph. Mistakes corrected.	Reasoning, agreement, self-correcting, praising
	Solution: a) i) Bone 3 ii) Bone 4 b) Bones 1 and 5	
	c)	Drawn on BB or use enlarged copy master or OHP

Bone number	1	2	3	4	5	6	7	8
Mass (g)	300	500	800	200	300	400	600	700

Extension	What other questions could we ask about the data? e.g.	Involve several Ps
	• Which two bones weighed the same as Bone 3? (e.g. 4 and 7)	(Ps do not necessarily need to calculate the answers, only to know <u>how</u> to do it)
	• What did *Donald*'s bones weigh in total?	T shows easy method of addition
	$(300 + 500 + 800 + 200 + 300 + 400 + 600 + 700 = 3800)$ g	
	[Note that: $800 + 200 = 1000$, $400 + 600 = 1000$ and $300 + 700 = 1000$; $3000 + (300 + 500) = 3800$]	
	• What was the <u>average</u> weight of Donald's bones?)	T can use a calculator and show result to class
	$(3800$ g $\div 8 = 475$ g$)$	
	————— 32 min —————	

5	**Pictogram**	Individual drawing, monitored helped
	This table show how many times the pupils in a class went to the cinema during half term.	Table drawn on BB or use enlarged copy master or OHP
	BB:	

Number of times	0	1	2	3	4	5
Number of pupils	5	6	4	5	2	1

	Let's show the data by drawing a pictogram in your *Ex. Bks*. Who remembers what a pictogram is? (using pictures to represent data)	Agreement, praising
	T shows how to draw a 'stick man' to represent each pupil.	BB: ⚲ = 1 pupil
	Elicit that number of visits to cinema should be written vertically and appropriate number of 'stick men' drawn opposite each one	T could show first set of values in table on BB if necessary.
	Review at BB with whole class. Mistakes corrected.	Reasoning, agreement, self-correction, praising

BB: Number of pupils   T asks questions about the data. e.g.

	• Were there any Ps who did not go to the cinema? (Yes, 5)	Ps can show answers with fingers on command.
	• How many Ps went to the cinema 5 times? (1)	Feedback for T
	Then Ps think of their own questions to ask the class.	Praise clever questions
	————— 39 min —————	

Bk3		*Lesson Plan 24*
Activity		***Notes***

6	***Book 3, page 24***	Whole class activity to start

Q.2 Read: *The graph shows the number of inhabitants of Domble Land*.

Use enlarged copy master or OHP

T talks about a special land in fairy tales where the creatures who live there are always happy and fun-loving. Every year the dombles like to count how many of them are living there and they made this graph.

Initial discussion about background to problem

C, come and show us where the *x* axis is. Is **C** correct?

Class agrees/disagrees

What does the *x* axis show? (the years from 1993 to 2001)

Let's say them together. '1993, 1994, . . ., 2001'

In unison

D, come and show us where the *y* axis is. Is **D** correct?

Class agrees/disagrees

What does the *y* axis show? (number of dombles: <u>Population</u>)
What does each grid line show? (every 100 dombles)

Agreement, praising

Let's start from zero and count up the *y* axis in 100s: 'zero dombles, 100 dombles, . . ., 700 dombles' T points to grid lines at same time.

In unison

Elicit that each dot vertically above a year shows how many dombles were living in *Domble Land* that year. Ps come to BB to point to a year on *x* axis, move their finger up the vertical grid line to the dot, then across to the *y* axis and read out the number of dombles in that year.

Discussion, demonstration

Ps can also follow it on graph in *Pbs*

Why do you think the dots are joined up? (to show the change in population more clearly)

Ask several Ps what they think

Let's see if you can answer the questions about the graph by yourselves. Deal with one question at a time.

Individual work, monitored, (helped)

a) Read: *When was the population:*
   i) *highest*   (in 1999: 600 dombles)
   ii) *lowest?*   (in 1993: 200 dombles)

Reasoning, agreement, self-correcting, praising

Feedback for T

b) Read: *When was there no change?*
   (1997 to 1998: 500 dombles)

c) Read: *When was there a decrease?*
   (1994 to 1995: 300 to 250;   1999 to 2000: 600 to 550)

d) Read: *Complete the table.*

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001
Population	200	300	250	350	500	500	600	550	–

Drawn on BB or use enlarged copy master or OHP

• Why is there no dot for the year 2001? (They haven't counted the population yet.)

Discussion, agreement, praising

• Why do you think the population went up and down?

Good basis for creative writing

_____ *45 min* _____