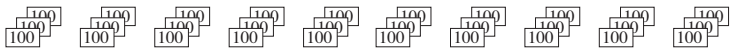
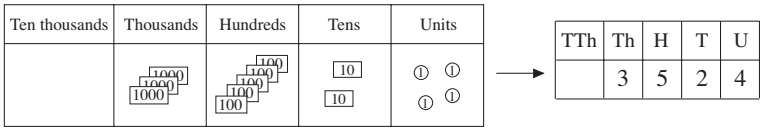
Bk4

R: Place value

C: Extending numbers to 10 000: counting, reading, writing, ordering

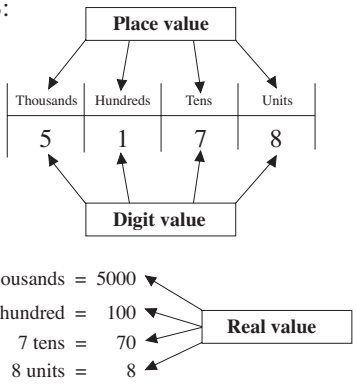
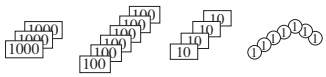
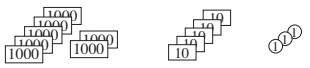
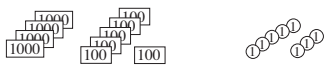
E: Vocabulary

Lesson Plan 25

Activity		*Notes*
1	**Money model** Several countries have larger demonination bank notes than we have in the U.K. (T could explain that their basic units of currency have less value than the £ or pence in the U.K, so they need more of them.) Let's complete the missing items. Ps come to BB to explain diagrams and fill in what is missing. Rest of class writes the equations with words and numbers (no need to draw the money) in *Ex. Bks*. BB: a) ① ① ① ① ① ① ① ① ① ① = [10] — 10, Ten 1 ten = [**10**] ones (units) 1 × 10 = 10 × 1 b) [10] [10] [10] [10] [10] / [10] [10] [10] [10] [10] = [100] — 100, Hundred 1 hundred = 10 [**tens**] = [**100**] units 1 × 100 = 10 × 10 = 100 × 1 c) [100] [100] [100] [100] [100] / [100] [100] [100] [100] [100] = [1000] — 1000, Thousand 1 thousand = [**10**] hundreds = [**100**] tens = [**1000**] units 1 × 1000 = 10 × [**100**] = 100 × [**10**] = 1000 × [**1**] d) [1000] [1000] [1000] [1000] [1000] / [1000] [1000] [1000] [1000] [1000] = [10 000] — 10 000, Ten thousand 1 'ten thousand' = 10 [**thousands**] = [**100**] hundreds = [**1000**] tens = [**10 000**] units 1 × 10 000 = [**10**] × 1000 = [**100**] × 100 = [**1000**] × 10 = 10 000 × [**1**] e)  3 thousand = [**30**] hundreds = [**300**] tens = [**3000**] units — 3000, Three thousand 3 × [**1000**] = 30 × [**100**] = 300 × [**10**] = 3000 × [**1**] *10 min*	Whole class activity BB already prepared with model money drawn or stuck on BB or use enlarged copy master or OHP At a good pace Agreement, praising Feedback for T T points out that when the number of thousands is 2 digits e.g. 10 thousand: it is usually written with a small space (or a comma) after the Th to make the number easier to read: BB: 10 000 ↑ small space but no space is left when it is shown in a place value table!
2	**Place value** How much is there altogether? Let's write it in different ways. Ps come to BB to count how much there is and to write it as digits in the place value table. Class agrees/disagrees. Let's write it in other ways. T starts each line and Ps come to BB to continue. Class points out errors. Ps write equations in *Ex. Bks* too. BB:  3524 = 3000 + 500 + 20 + 4 = 3Th + 5H + 2T + 4U = 3 × 1000 + 5 × 100 + 2 × 10 + 4 × 1 = three thousand five hundred and twenty four *15 min*	Whole class activity Drawn on BB or with model money stuck on table, or use enlarged copy master or OHP Reasoning, agreement, praising Class reads number in unison.

Bk4

Lesson Plan 25

Activity		*Notes*
3	**Vocabulary** Let's revise the names of the different kinds of values connected with numbers. First let's read the number on the BB. ('5 thousand, one hundred and seventy eight') BB:  T points to the row of the table containing the 'thousands, hundreds', etc. **A**, what kind of value does this row show? (Place value) Come and write it in the table. Who can fill in the names missing from the other two boxes? Ps come to BB. Who agrees? etc.	Whole class activity Drawn on BB or use enlarged copy master or OHP Number read in unison. Or Ps stick prepared name cards in correct place on digram. Agreement, praising T writes other numbers on BB and points to a digit randomly. What is its digit value (place value, real value)? Praising, encouragment only
	20 min	
4	**Writing numbers** Write these numbers as digits in your *Ex. Bks*. T dictates some numbers (e.g. 7403) and wites some numbers in words on BB. (e,g, six thousand, four hundred and eighty two) Review with whole class. Ps come to BB to write as digits. Class agrees/disagrees. P points to a digit and asks what its place (digit, real) value is and chooses another P to answer.	Individual work, monitored, but class kept together. Ps can say or write the numbers too! Agreement, self-correcting, praising Feedback for T
	25 min	
5	***Book 4, page 25*** Q.1 Read: *Write each amount in the place-value table and then in the box.* Review at BB with whole class. Ps come to BB or dictate to T. Class agrees/disagrees. Mistakes discussed and corrected. *Solution:* a)  Th H T U: **3 6 4 7** — **3 6 4 7** b)  Th H T U: **7 0 5 3** — **7 0 5 3** c)  Th H T U: **4 6 0 8** — **4 6 0 8** Let's write these numbers in increasing order. Ps dictate to T or come to BB. Let's say the inequality.	Individual work, monitored, helped Drawn on BB (or model money stuck to BB) or use enlarged copy master or OHP Agreement, self-correction, praising. BB: 3647 < 4608 < 7053 In unison
	28 min	
6	***Book 4, page 25*** Q.2 Read: *Write these numbers with words in your exercise book* Deal with one row at a time. Review with whole class. Ps read out out what they have written. T uncovers pre-pared BB or SB or OHT. Class points out errors. Let's write them in increasing (decreasing) order. Ps come to BB or dictate to T.	Individual work, monitored, helped Agreement, self-correction of words and spelling, praising Whole class activity
	34 min	

Bk4

Lesson Plan 25

Activity		*Notes*
7	***Book 4, page 25*** Q.3 Read: *Show each number as the sum of thousands, hundreds, tens and units.* T could do the first number with whole class as a model for Ps to follow if necessary. Set a time limit. Review at BB with whole class. Ps come to BB or dictate to T. Class agrees/disagrees. Mistakes discussed and corrected. *Solution:*	Individual work, monitored, helped Drawn on BB or use enlarged copy master or OHP Reasoning, agreement, self-correction, praising T points to a row in the table and Ps say number in unison.

Th	H	T	U												
1	6	3	4	=	1	0	0	0	+	6	0	0	+	3	0	+	4
3	4	0	7	=	3	0	0	0	+	4	0	0	+		0	+	7
8	0	2	5	=	8	0	0	0	+			0	+	2	0	+	5
7	2	0	5	=	7	0	0	0	+	2	0	0	+		0	+	5
8	0	0	8	=	8	0	0	0	+			0	+		0	+	8
6	0	3	0	=	6	0	0	0	+			0	+	3	0	+	0

Extension	List the numbers in decreasing order in your *Ex. Bks*. Review at BB with whole class. Ps dictate to T or come to BB. Class points out errors . Mistakes discussed and corrected. BB: 8025 > 8008 > 7205 > 6030 > 3407 > 1634	Individual work by the quicker Ps Agreement, self-correcting, praising

39 min

8	***Book 4, page 25*** Q.4 Read: *Fill in the missing digits.* Set a time limit. Review at BB with whole class. Ps come to BB or dictate to T. Mistakes discussed and corrected. *Solution:* a) 2847 = **2** × 1000 + **8** × 100 + **4** × 10 + **7** × 1 b) 6570 = **6** × 1000 + **5** × 100 + **7** × 10 + **0** × 1 c) 4501 = **4** × 1000 + **5** × 100 + **0** × 10 + **1** × 1 d) 6600 = **6** × 1000 + **6** × 100 + **0** × 10 + **0** × 1 e) 965 = **0** × 1000 + **9** × 100 + **6** × 10 + **5** × 1 f) 4059 = **4** × 1000 + **0** × 100 + **5** × 10 + **9** × 1 g) 2874 = **2** × 1000 + **8** × 100 + **7** × 10 + **4** × 1 Let's say the numbers in increasing order.. 965 < 2847 < 2874 < 4059 < 4501 < 6570 < 6600	Individual work, monitored, helped Written on BB or use enlarged copy master or OHP Differention by time limit Reasoning, agreement, self-correction, praising Ps recite in unison and T writes on BB.

45 min

Bk4	R: Place value **C: Extending numbers to 10 000. Counting, reading, writing, ordering** *E: Roman numbers. Sequences*	*Lesson Plan* *26*
Activity		***Notes***
1	**Tens, hundreds, thousands** Let's list: a) the whole tens between 100 and 200 (110, 120, 130, 140, 150, 160, 170, 180, 190) b) the whole hundreds between 1000 and 2000 (1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900) c) the whole thousands between 0 and 10 000 [20 000] (1000, 2000, 3000, 4000, 5000, 6000, 7000, 8000, 9000) [10 000, 11 000, 12 000, 13 000, 14 000, . . ., 19 000] *5 min*	Whole class activity Ps dictate numbers to T and T writes them on BB. At a good pace Agreement, praising Continue to 20 000 if Ps want to try it. Feeedback for T
2	**Numbers** Write the natural numbers I am describing in your *Ex. Bks*. What are natural numbers? (positive, whole numbers: 1, 2, 3, . . .) a) i) The greatest 1-digit number (9) ii) The greatest 2-digit number (99) iii) The greatest 3-digit number (999) iv) The greatest 4-digit number (9999) b) i) The smallest 1-digit number (1) ii) The smallest 2-digit number (10) iii) The smallest 3-digit number (100) iv) The smallest 4-digit number (1000) v) The smallest 5-digit number (10 000) Review orally with whole class after part a) and after part b). Ps dicate numbers and class agrees/disagrees. Mistakes discussed/corrected. *10 min*	Individual work, but class kept together T could have descriptions written on SB or BB or OHT At a good pace Agreement, self-correction, praising
3	**Sequence** Let's start at 1650 and write the next 9 terms if the terms are increasing by 15. Ps come to BB to write and say a number each. Class points out errors. BB: 1650, 1665, 1680, 1695, 1710, 1725, 1740, 1755, 1770, 1785, 1800 Let's write them in Roman numerals. Ps come to BB, explaining reasoning. Class agrees/disagrees. BB: MDCL, MDCLXV, MDCLXXX, MDCXCV, MDCCX, MDCCXXV, MDCCXL, MDCCLV, MDCCLXX, MDCCLXXXV, MDCCC *15 min*	Whole class activity At a good pace Agreement, praising Revise Roman numerals first if necessary. T covers up Arabic numbers, P points to a Roman number and chooses a P to read it.
4	**How many digits?** How many digits would we write if we wrote down all the natural numbers from: a) 1 to 9 (9) b) 10 to 99 (180) Why do you think so? There are $\underline{9}$ tens (as we do not count 0) and for every ten there are 10 possible units (0 to 9), so there are $9 \times 10 = \underline{90}$ 2-digit numbers, so the number of digits we would write is $90 \times 2 = \underline{180}$.	Whole class activity Ask several Ps what they think and why. T clarifies Ps' ideas and reasoning if necessary, or gives hints to set Ps thinking if nobody knows. Agreement, praising

Bk4

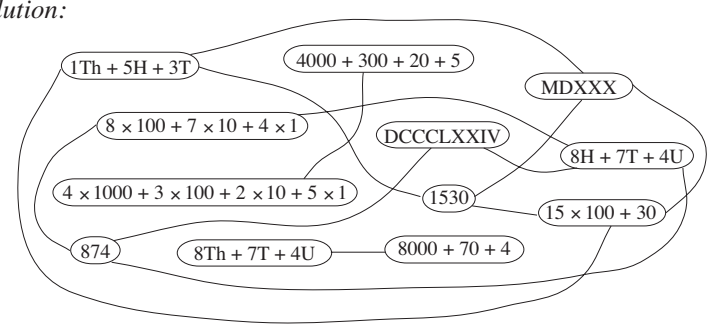
Lesson Plan 26

Activity		*Notes*
4	(Continued) c) How many 3-digit numbers are there? (900) Why do you think so? There are 9 hundreds (as we do not use 0) and for every hundred there are 10 possible tens and for every ten there are 10 possible units, so there are $9 \times 10 \times 10 = 900$ 3-digit numbers. How many digits would we write if we wrote them all down? (900 numbers, 3-digits each, so $900 \times 3 = 2700$ digits)	Ask several Ps what they think. T helps to clarify reasoning, if necessary. or BB: H T U / 9 × 10 × 10 Agreement, praising
	20 min	
5	***Book 4, page 26*** Q.1 Read: *Write the numbers in the place-value table.* What does TTh mean? (Ten Thousands) Set a time limit. Review at BB with whole class. Ps come to BB or dictate to T. Class agrees/disagrees. Mistakes discussed and corrected. Which number is the greatest (smallest)? (9064, 916) *Solution:*	Individual work, monitored, helped Drawn on BB or use enlarged copy master or OHP Differentiation by time limit Reasoning, agreement, praising
Extension	• Write the numbers in decreasing order in your *Ex. Bks*. • Write a number which would have a digit in the ten thousands column. (e.g. 23 671)	For quicker Ps. Ps read their numbers aloud. Agreement, praising
	26 min	
6	**Writing numbers** Write these numbers as digits in your *Ex. Bks*. T dictates: a) i) 76 units (76) ii) 65 tens (650) iii) 95 hundreds (9500) iv) 100 hundreds (10 000) b) i) 2 thousands and 35 hundreds (5500) ii) 3 thousands and 18 hundreds (4800) iii) 31 hundreds + 45 units (3145) iv) 2 thousands + 506 tens (7060) Deal with one part at a time. Review with whole class. Ps dictate to T or come to BB. Class agrees/disagrees. Mistakes discussed and corrected.	Individual work, monitored T walks round class while dictating the numbers. (Or whole class activity. T dictates a number and Ps show on scrap paper or slates in unison on command.) Agreement, self-correction, praising
	31 min	

	TTh	Th	H	T	U
Eight thousand, three hundred and sixty three		8	3	6	3
Nine thousand and sixty four		9	0	6	4
Two thousand, seven hundred and five		2	7	0	5
Six thousand, nine hundred and seventy		6	9	7	0
Nine hundred and sixteen			9	1	6
$4 \times 1000 + 3 \times 100 + 8 \times 10 + 7 \times 1$		4	3	8	7
$2 \times 1000 + 9 \times 100 + 6 \times 10$		2	9	6	0
$5 \times 1000 + 4 \times 10 + 8 \times 1$		5	0	4	8
$1 \times 1000 + 5 \times 100 + 4 \times 1$		1	5	0	4
$8000 + 300 + 40 + 2$		8	3	4	2

Bk4

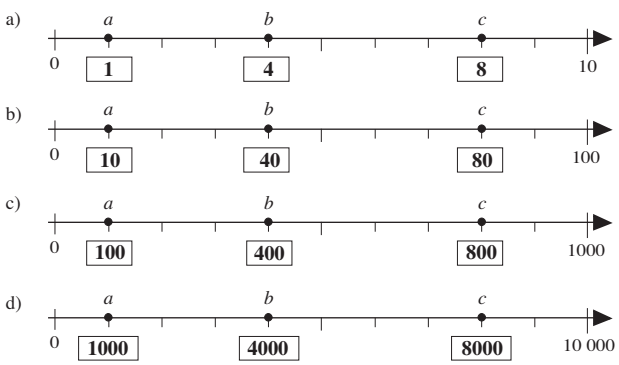
Lesson Plan 26

Activity		*Notes*
7	***Book 4, page 26*** Q.2 Read: *Fill in the missing digits and place values.* Deal with part a) first, then part b). Review at BB with whole class. Ps dictate to T or come to BB. Class agrees/disagrees. Mistakes discussed and corrected.	Individual work, monitored, helped Written on BB or use enlarged copy master or OHP Agreement, self-correction, praising
Extension	What is the real value of the greatest odd digit in each number? Ps come to BB to point to digit, say and write the value. *Solution:* *Ext.* a) i) 7312 = 7 Th + 3 H + 1 T + 2 U (7000) ii) 4067 = 4 Th + 0 H + 6 T + 7 U (7) iii) 9304 = 9 Th + 3 H + 0 T + 4 U (9000) b) i) 6018 = 6 Th + 0 H + 1 T + 8 U (10) ii) 3568 = 3 Th + 5 H + 6 T + 8 U (500) iii) 2605 = 2 Th + 6 H + 0 T + 5 U (5) *35 min*	Whole class activity At a good pace Agreement, praising Feedback for T
8	***Book 4, page 26*** Q.3 Read: *In your exercise book, write ten numbers:* *a) in increasing order, starting at 2478 and counting up 7 at a time.* (2478, 2485, 2492, 2499, 2506, 2513, 2520, 2527, 2534, 2541, 2548) *b) in decreasing order, starting at 5093 and counting down 50 at a time.* (5093, 5043, 4993, 4943, 4893, 4843, 4793, 4743, 4693, 4643) *c) in increasing order, starting at 4803 and counting up 120 at a time.* (4803, 4923, 5043, 5163, 5283, 5403, 5523, 5643, 5763, 5883, 6003)	Individual work, monitored, helped (or whole class activity if time is short) Deal with one part at a time. Review at BB with whole class. Ps dictate to T. Class agrees/disagrees. Mistakes discussed and corrected. Praising, encouragement only
Extension	How could we find the 21st term in a) without having to write all the terms? (2478 + 7 × 20 = 2478 + 140 = 2618) *41 min*	Whole class discussion. Extra praise if Ps remember how to do it.
9	***Book 4, page 26, Q.4*** Read: *Join up the equal values.* Ps come to BB to draw joining lines, explaining reasoning. Class agrees/disagrees. Ps can work in *Pbs* too if they wish (and can identify equal values by colouring instead of drawing lines). *Solution:*  *45 min*	Whole class activity Written on BB or use enlarged copy master or OHP (or values written on cards and stuck to BB. Ps rearrange them in equal value groups) At a good pace Reasoning, agreement, praising In the case of 4 equal numbers, do not expect all 6 lines to be drawn (indirect connections are sufficient) Extra praise if Ps draw all 6!

Bk4

R: Mental calculation
C: Numbers up to 10 000. Rounding. Number line
E: Problems. Divisibility

Lesson Plan 27

Activity		*Notes*
1	**Mental practice** How much do I have altogether if I have this amount of money? T sticks or draws model money on BB and Ps show total amount on scrap paper or slates on command. e.g. a) 3 [10] s Show me . . . now! (30) b) 3 [100] s Show me . . . now! (300) c) 3 [1000] s Show me . . . now! (3000) d) 3 [500] s Show me . . . now! (1500) Repeat for, e.g. 7 [10] s, 7 [100] s , 7 [1000] s, 7 [500] s but this time without using model money. Ps visualise mentally. *4 min*	Whole class activity At speed Ps who responded correctly explain to those who did not. Agreement, praising Feedback for T
2	**Writing numbers** a) T dictates numbers and Ps show as digits in unison on command. b) T shows numbers in words (on pre-pared SB or OHT and Ps show as digits in unison on command. c) T describes a number (orally or written on BB) and Ps show as digits in unison on command. e.g. 8Th + 3H + 4T + 6U = (8346) 2000 + 400 + 20 + 9 = (2429) 5 × 1000 + 6 × 100 + 3 × 10 + 2 × 1 = (5632), etc. *10 min*	Whole class activity. Responses written on scrap paper or slates. (or individual work in *Ex. Bks,* or each P has a worksheet for b) and c) prepared by T) At a good pace Agreement, correcting, praising Ps could dictate/write/describe numbers too!
3	**Sequences** T gives the rule and the first term of a sequence and Ps continue the sequence until T tells them to stop. a) Count down by 10, starting at 6521, (6511, 6501, 6491, 6481, . . .) b) Count up by 50 starting at 4444, (4494, 4544, 4594, 4644, . . .) c) Count up by 1000 starting at 438, (1438, 2438, 3438, 4438, 5438, . . .) d) Count down by 200 starting at 5817, (5617, 5417, 5217, 5017, 4817, . . .) *15 min*	Whole class activity At speed in order round class If Ps cannot keep previous term in their head, T writes it on BB. If a P makes a mistake, the next P corrects it. Agreement, praising
4	**Number line** a) Study the number lines carefully. What numbers are marked by the letters on each number line? Ps come to BB to choose a letter and write the missing number in the box. Class agrees/disagrees. BB:  *20 min*	Whole class activity Drawn on BB or use enlarged copy master or OHP At a good pace Agreement, correcting, praising b) Ps come to BB to mark a number and class says the number in unison If Ps draw dots between ticks, T asks several Ps what they think the number is. P who drew the dot confirms it.

Bk4

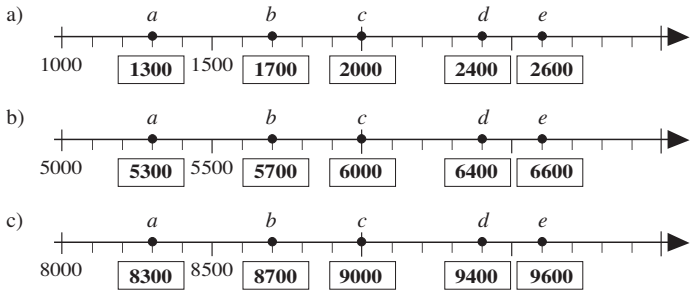
Lesson Plan 27

Activity		*Notes*
5	**Rounding** Let's find the next smaller and greater whole tens, hundreds and thousands to these numbers. Ps come to BB or dictate to T. Class agrees/disagrees. If we rounded the number to the nearest 10 (100, 1000) what would it be? T points to each number in turn and class shouts out the rounded value. T highlights it on the BB. BB:	Whole class activity Written on BB or use enlarged copy master or OHP At a good pace Agreement, praising Elicit that 5 (50, 500) rounds up. If problems, draw relevant segments of number line on BB.

Next smaller 1000		Next smaller 100		Next smaller 10			Next greater 10		Next greater 100		Next greater 1000
3000	<	3800	<	3810	<	3817	< 3820	<	3900	<	4000
6000	=	6000	<	6040	<	6045	< 6050	<	6100	<	7000
8000	<	8400	=	8400	<	8409	< 8410	<	8500	<	9000
4000	<	4500	<	4520	<	4523	< 4530	<	4600	<	5000

25 min

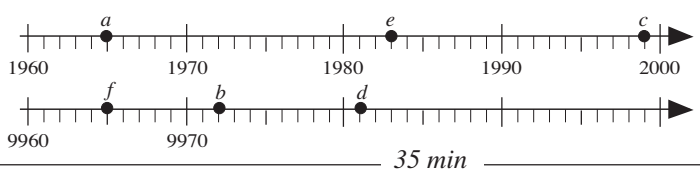
6	***Book 4, page 27*** Q.1 Read: *Which numbers do the letters stand for? Write them in the boxes.* Talk about the number lines first. Elicit that in all 3 number lines there are small ticks at every 100. Set a time limit. Review at BB with whole class. Ps come to BB to write missing numbers. Class agrees/disagrees. Mistakes discussed and corrected. *Solution:*	Individual work, monitored, helped Drawn on BB or use enlarged copy master or OHP Reasoning, agreement, self-correction, praising What do you notice? (For each letter, the hundreds and tens are the same on each number line; only the thousands are different).



30 min

7	***Book 4, page 27*** Q.2 Read: *Mark with a dot where each letter should be on the relevant number line.* Elicit that there is a tick at each unit on both number lines. Ps draw dots and label them with the appropriate letter. Review at BB with whole class. Ps come to BB to draw (stick on) dots. Class agrees/disagrees. Mistakes discussed and corrected. Elicit similarities between number lines. *Solution:*	Individual work, monitored, helped Drawn on BB or use enlarged copy master or OHP Discussion, agreement, self-correction, praising

a = 1965 *b* = 9972 *c* = 1999 *d* = 9981 *e* = 1983 *f* = 9965



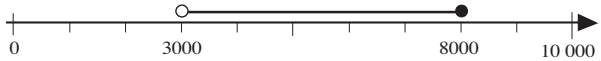
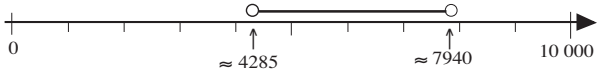
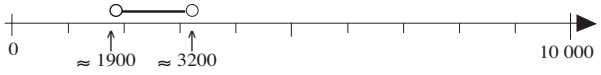
35 min

Bk4		*Lesson Plan 27*
Activity		***Notes***
8	***Book 4, page 27*** Q.3 Read: *Write the next smaller and greater whole tens, hundreds and thousands in the boxes.* Review at BB with whole class. Ps come to BB or dictate to T. Mistakes discussed and corrected. Read: *Colour the nearest ten red, the nearest hundred green and the nearest thousand blue.* Review at BB with whole class. T points to a number, class shouts out rounded values. Mistakes discussed and corrected. *Solution:* 4000 < 4200 < 4260 < **4263** < 4270 < 4300 < 5000 6000 < 6700 < 6720 < **6728** < 6730 < 6800 < 7000 9000 < 9800 = 9800 < **9806** < 9810 < 9900 < 10 000 7000 < 7700 < 7770 < **7777** < 7780 < 7800 < 8000 2000 < 2200 < 2220 < **2222** < 2230 < 2300 < 3000 *40 min*	Inidividual work, monitored, helped Drawn on BB or use enlarged copy master or OHP Agreement, self-correction, praising In unison
9	***Book 4, page 27*** Q.4 Read: *Write in the boxes the numbers described.* Ps read questions themsleves and fill in missing numbers. Review orally with whole class. Mistakes discussed and corrected. *Solution:* a) *The smallest 4-digit: i) number* (1000) *ii) odd number* (1001) b) *The greatest 4-digit: i) number* (9999) *ii) odd number* (9999) c) *The greatest 4-digit number divisible by:* *i) 5* (9995) *ii) 10* (9990) d) *The greatest 4-digit number divisible by 100 which has the same digit in its hundreds and thousands columns.* (9900) *45 min*	Individual work, monitored, helped (or whole class activity, with T reading descriptions and Ps showing numbers on scrap paper or slates in unison on command) Discussion, reasoning, agreement, self-correcting, praising **Extension** Ps tell class descriptions of other 4-digit numbers and class deduces what they are.

Bk4

R: Mental calculation
C: Numbers up to 10 000. Rounding. Number line
E: Inequalities. Divisibility

Lesson Plan
28

Activity		*Notes*
1	**Chain calculations** Listen carefully to each step. Do the calculation in your head and show me the final result (on scrap paper or slates) when I say. a) *Start with 1500, add 200, . . . subtract 300, . . . add 800, . . . subtract 900, . . . and add 700.* Show me the result . . . now! (2000) P who made a mistake goes through the calculations again with help of class: 1500 + 200 = 1700, 1700 – 300 = 1400, 1400 + 800 = 2200, 2200 – 900 = 1300, 1300 + 700 = 2000 Similarly for b) *Start with 6400, subtract 1400, . . . double the result, . . . subtract 400, . . . add 300, . . . and subtract 500.* Show me the result . . . now! (9400) P who made a mistake goes through the calculations with Ps' help. Repeat with similar series of calculations if there is time.	Whole class activity Ps nod heads when they are ready for next step. In unison Reasoning, agreement, praising Ps can think of them too.
	5 min	
2	**Inequalities** Which whole thousands can be written instead of the rectangles? Ps come to BB to list the numbers, explaining reasoning and showing on number lines. Class agrees/disagrees. BB: a) 3000 < □ ≤ 8000 □ : 4000, 5000, 6000, 7000, 8000  b) 4285 < □ < 7940 □ : 5000, 6000, 7000  c) 3200 > □ > 1900 □ : 2000, 3000  	Whole class activity Drawn on BB or use enlarged copy master or OHP At a good pace Discussion, reasoning, agreement, demonstration, praising
Extension	How could we show on the number lines all the numbers (including fractions) which could be written instead of the rectangles? T gives hints if Ps cannot remember from Y2. (Draw circles above the numbers at the extremes of the inequality. If the number is to be included, draw a closed (black) circle above it. If the number is not included, draw an open (white) circle above it. Join up the two circles with a thick horizontal line. All the numbers below the line are possible.) BB: a) 3000 < □ ≤ 8000  b) 4285 < □ < 7940  c) 3200 > □ > 1900  	Praise all positive contributions. If Ps have no idea, T explains first inequality, then helps Ps with b) and c). Positions of numbers in b) and c) need only be approximate.
	10 min	

Bk4

Lesson Plan 28

Activity		*Notes*

3

Numbers

Which numbers could I be describing? **A**, what do you think? Who agrees? Who thinks another number? etc.

a) Its next number is 5999. (5998 or 6000)
b) Its next smaller ten is 5850. (5851, 5852, . . ., 5859, 5860)
c) Its next greater number is 6000. (5999)
d) It next greater whole ten is 7300. (7290, 7291, . . ., 7298, 7299)
e) It rounds to 7300 as the nearest whole 10.
(7295, 7296, 7297, 7298, 7299, 7300, 7301, 7302, 7303, 7304)

Notes: Whole class activity

Ps suggest possible numbers and T lists them on BB.

Class agrees/disagrees.

Extra praise if Ps give all possible numbers in e).

Feedback for T

15 min

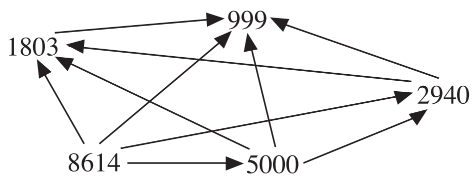
4

Which is less?

T has five 4-digit numbers written on BB. Let's compare the numbers and draw arrows towards the number which is less.

Ps come to BB to draw arrows. Class points out errors.

BB:



What do you notice? (e.g. each number needs 4 arrows, as it is compared with 4 other numbers; 999 is the smallest number and has 4 arrows pointing twards it; 8614 is the greatest number and has 4 arrows pointing away from it; there are 10 arrows altogether)

Notes: Whole class activity

At a good pace

Agreement, praising

Discuss why there should be

$5 \times 4 \div 2 = \underline{10}$ (arrows)

(5 numbers, each compared with 4 other numbers, but each arrow deals with 2 numbers at a time)

Praise all contributions.

20 min

5

Book 4, page 28

Q.1 Read: *Write the numbers in the correct places in the set diagrams.*

Elicit the similarity between the two diagrams. Ps come to BB to show the equivalent regions on each. Make sure that Ps know to use only the numbers in *Set A*.

Set a time limit. Review at BB with whole class. Ps come to BB or dictate to T. Class agrees/disagrees. Mistakes discussed and corrected.

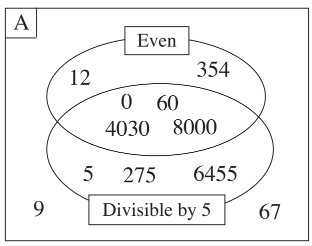
Solution:

A = { 0, 5, 9, 12, 60, 67, 275, 354, 4030, 6455, 8000 }

a)

	Divisible by 5	Not divisible by 5
Even	0 60 4030 8000	12 354
Odd	5 275 6455	9 67

b)



Notes: Individual work, monitored

Drawn on BB or use enlarged copy master or OHP

Initial discussion about the set diagrams.

Reasoning, agreement, self-correcting, praising

Extension

What do you notice? (e.g. only numbers which have 5 or 0 as the units digit are divisible by 5)

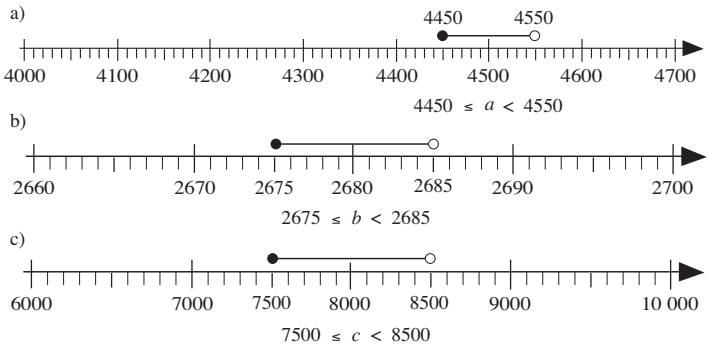
Ps suggest other numbers which belong in each set.

Notes: What kind of numbers are not divisible by 2? (Odd numbers)

26 min

Bk4

Lesson Plan 28

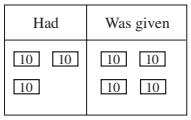
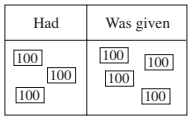
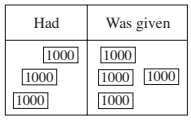
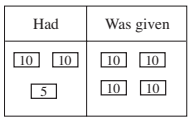
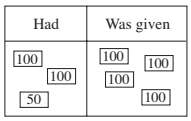
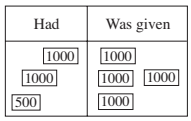
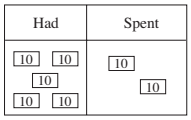
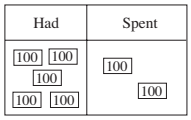
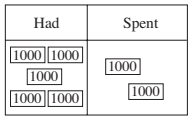
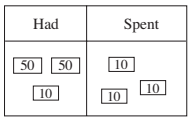
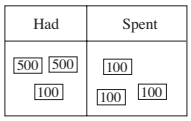
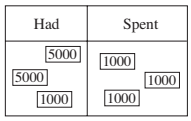
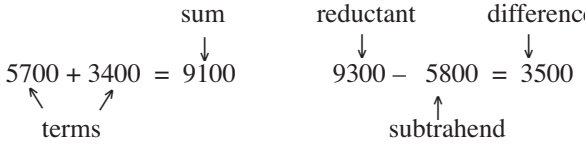
Activity		*Notes*
6	***Book 4, page 28*** Q.2 Read: *Round the numbers to the nearest ten, hundred and thousand.* Set a time limit. Review at BB with whole class. Ps come to BB or dictate to T. Class agrees/disagrees. Mistakes discussed and corrected. *Solution:* a) 2374 ≈ 2370 ≈ 2400 ≈ 2000 b) 8527 ≈ 8530 ≈ 8500 ≈ 9000 c) 6285 ≈ 6290 ≈ 6300 ≈ 6000 d) 3600 = 3600 = 3600 ≈ 4000 e) 9819 ≈ 9820 ≈ 9800 ≈ 10 000 f) 5499 ≈ 5500 = 5500 ≈ 5000 Note the case of 5499 which rounds up to 5500 as the nearest ten and hundred but rounds down to 5000 as the nearest thousand. Stress that a number cannot be rounded up twice! 5499 cannot be rounded up to 5500, then rounded up again to 6000 as the nearest thousand, because 5499 is nearer 5000 than 6000!	Individual work, monitored, helped Written on BB or use enlarged copy master or oHP Differentiation by time limit Reasoning, agreement, self-correction, praising Elicit the rounding 'rules': 5 (50, 500) rounds up to next ten (hundred, thousand) Whole class discussion Consolidate with another example if necessary.
	32 min	
7	***Book 4, page 28*** Q.3 Read: *Mark on the number lines those numbers which round to:* *a) 4500, to the nearest hundred* *b) 2680, to the nearest ten* *c) 8000, to the nearest thousand.* Deal with one part at a time. Less able Ps need only mark the whole numbers with dots but more able Ps should try to use the notation to show all numbers. Ps come to BB to show solutions. Class agrees/disagrees. Mistakes discussed and corrected.	Individual work, monitored, helped Drawn on BB or use enlarged copy master or OHP Reasoning, agreement, self-correction, praising Extra praise if Ps used new notation correctly
Extension	Who can write an inequality about it? Ps can use letters or shapes or symbols to signify the possible numbers. Tell me a number which would make the inequality true. *Solution:*  	With T's help T asks several Ps for possible numbers. Ps suggest a number, then come to number line to show its approximate position. e.g. a) 4473 ≈ 4500 4450 ≤ 4473 < 4550 ✔
	39 min	

Bk4		*Lesson Plan 28*
Activity		***Notes***
8	**Rounding** Which digits can be put instead of the letter to make the statement true? Ps come to BB to explain reasoning and to write the possible digits. Class agrees/disagrees. Let's check with the smallest and greatest values. BB: a) It rounds to 5430 as the nearest 10: 5 4 3 *a* 5 4 *b* 5 5 *c* 3 4 *d* 4 2 8 5 4 *e* 4 *a*: 0, 1, 2, 3, 4 *b* = 2 *c* = 4 *d* = 5 *e* = 3 b) It rounds to 7800 as the nearest 100: 7 8 5 *f* 78 *g* 9 7 *h* 5 2 *i* 7 8 9 7 7 *j* 0 *f*: – *g*: 0, 1, 2, 3, 4 *h* = 7 *i* = 7 *j*: 5, 6, 7, 8, 9 c) It rounds to 9000 as the nearest 1000: 9 3 7 *k* 8 5 *l* 0 9 *m* 9 9 *k*: 0, 1, 2, 3, 4 5, 6, 7, 8, 9 *l*: 0, 1, 2, 3, 4 5, 6, 7, 8, 9 *m*: 0, 1, 2, 3, 4 *n* 5 5 5 *p* 4 9 9 *n* = 8 *p* = 9 *45 min*	Whole class activity T has BB or SB or OHT already prepared, or use enlarged copy master or OHP (Ps can have copy on desks if they prefer to try it individually) At a good pace Reasoning, agreement, checking, praising Elicit that *f* is impossible! If problems, show on relevant segment of number line drawn on BB. Feedback for T

Bk4

R: Mental calculation
C: Addition and subtraction: up to 10 000
E: Over 10 000

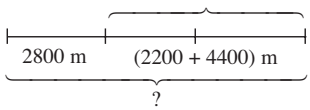
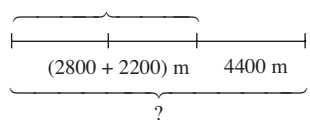
Lesson Plan 29

Activity		*Notes*
1	**Model money** Let's write an operation about each diagram. Ps come to BB to write and say additions and subtractions. Class points out errors. BB: a) i)  30 + 40 = 70 ii)  300 + 400 = 700 iii)  3000 + 4000 = 7000 b) i)  25 + 40 = 65 ii)  250 + 400 = 650 iii)  2500 + 4000 = 6500 c) i)  50 – 20 = 30 ii)  500 – 200 = 300 iii)  5000 – 2000 = 3000 d) i)  110 – 30 = 80 ii)  1100 – 300 = 800 iii)  11 000 – 3000 = 8000 *6 min*	Whole class activity Drawn on BB, or model money stuck on tables drawn on BB, or use enlarged copy master or OHP At a good pace Reasoning, agreement, praising What do you notice? Ps point out the similarities among the 3 diagrams in each row. Feedback for T
2	**Vocabulary** T writes an addition and a subtraction on BB. Ps come to BB to write results, explaining reasoning. Class agrees/disagrees. What names do we give to the different parts of the operations? Ps come to BB to say and write. Class agrees/disagrees on correct spelling. T helps if necessary. BB: e.g.  Elicit that: • in addition, the terms can be interchanged, • in subtraction, the reductant and subtrahend <u>cannot</u> be interchanged. *9 min*	Whole class activity Reasoning, agreement, praising T covers up names and Ps suggest another addition and subtraction. T points to a component and class shouts out its name (sum, difference, term, subtrahend, reductant) e.g. 3 + 2 = 2 + 3 e.g. 3 – 2 ≠ 2 – 3
3	**Problems** Listen carefully to the problem. Are there any missing or unnecessary data? T reads problem aloud twice. Ps suggest the data which are missing or not needed. Class agrees/disagrees. T reads problem again. Ps note the data, make a plan, do the calculation and write the answer as a sentence in their *Ex. Bks*. Ps could show numerical part of answer on scrap paper or slates on command. P who responded correctly explains to those who did not. Mistakes discussed and corrected.	Whole class discussion on the data. Agreement, praising Individual work in *Ex. Bks*, then whole class review and discussion on solution (Or all done as a whole class activity, with Ps helping each other to solve the problems at the BB and T intervening only when necessary)

Bk4		*Lesson Plan 29*
Activity		***Notes***
3	(Continued) a) *There are 240 children at a holiday camp. How many children will there be altogether if another 130 children and 14 adults arrive?* *Unnecessary data:* Number of adults arriving *Plan:* 240 + 130 = 370 *Answer:* There will be 370 children altogether. b) *The 24 pupils in Class 3 collected 140 kg of chestnuts. The 22 pupils in Class 4 collected 150 kg of chestnuts. How many kg of chestnuts did the two classes collect altogether?* *Unnecessary data:* Number of pupils and the class numbers. *Plan:* 140 kg + 150 kg = 290 kg *Answer:* The two classes collected 290 kg of chestnuts. c) *If Bob was given £240, he would have £600. How much money does Bob have at the moment?* *Unnecessary or missing data:* none *Plan:* £600 – £240 = £360 (or $\boxed{360}$ + 240 = 600) *Answer:* Bob has £360 at the moment. d) *Kate is 170 cm tall and is 24 years old. She is 15 years older then Henry. How old and how tall is Henry?* *Missing data:* Difference between their heights *Plan:* 24 – 15 = 9 (years) *Answer:* Henry is 9 years old. We cannot say how tall he is. e) *120 pupils from a primary school went to the circus on Monday but only 80 pupils from the pimary school went to the cinema on Tuesday. How many pupils are in the primary school?* *Missing data:* Number of pupils from the primary school who did not go the circus (or to the cinema) We can only write an inequality for the number of Ps. If the 80 Ps who went to the cinema also went to the circus, there must be at least 120 Ps in the school. If the 80 Ps who went to the cinema did not go the circus, then the school would have at least 120 + 80 = 200 pupils – but there could be Ps who did not attend either event. BB: Let P be the least number of Ps possible: $120 \leq P \leq 200$ *Answer:* We cannot say exactly from the data given. *20 min*	Deal with one at a time (T could have questions written on SB or OHT) Discussion, reasoning, agreement, self-correcting, praising T helps Ps to express their reasoning clearly. Extra praise if Ps think of writing the inequality without help from T.

Bk4		*Lesson Plan 29*
Activity		***Notes***
4	***Book 4, page 29*** Q.1 Read: *Practise addition*. Let's see how many of these you can do in 3 minutes! Start . . . now! Review orally with whole class. Ps change to coloured pencils and mark/correct own work. Who had all 16 correct? Who made 1 (2, 3, more than 3) mistakes? What kind of mistakes? Who did the same? etc. What did you notice? Ps point out connections. *Solution:* a) $5+2=\underline{7}$ $50+20=\underline{70}$ $500+200=\underline{700}$ $5000+2000=\underline{7000}$ b) $3+6=\underline{9}$ $30+60=\underline{90}$ $300+600=\underline{900}$ $3000+6000=\underline{9000}$ c) $8+2=\underline{10}$ $80+20=\underline{100}$ $800+200=\underline{1000}$ $8000+2000=\underline{10\,000}$ d) $3+4=\underline{7}$ $32+45=\underline{77}$ $320+450=\underline{770}$ $3200+4500=\underline{7700}$ *25 min*	Individual work, monitored (helped) Differentiation by time limit Agreement, self-correction, evaluation, praising If problems, write calculations vertically on BB. Elicit that, e.g. $5\overset{7}{+}2=2\overset{7}{+}5$ In addition, the order of terms does not matter; they are inter-changeable Feedback for T
5	***Book 4, page 29*** Q.2 Read: *Practise subtraction*. Let's see how many of these you can do in 3 minutes! Start . . . now! Review orally with whole class. Ps change to coloured pencils and mark/correct own work. Who had all 16 correct? Who made 1 (2, 3, more than 3) mistakes? What kind of mistakes? Who did the same? etc. What did you notice? Ps point out connections. *Solution:* a) $8-5=\underline{3}$ $80-50=\underline{30}$ $800-500=\underline{300}$ $8000-5000=\underline{3000}$ b) $90-40=\underline{50}$ $900-400=\underline{500}$ $9000-4000=\underline{5000}$ $19\,000-4000=\underline{15\,000}$ c) $10-3=\underline{7}$ $100-30=\underline{70}$ $1000-300=\underline{700}$ $10\,000-3000=\underline{7\,000}$ d) $7-6=\underline{1}$ $78-64=\underline{14}$ $740-680=\underline{60}$ $7800-6400=\underline{1400}$ *30 min*	Individual work, monitored (helped) Differentiation by time limit Agreement, self-correction, evaluation, praising If problems, write calculation vertically, or with place values. Elicit that, e.g. $8\overset{3}{-}5\neq 5\overset{-3}{-}8$ In subtraction, the order matters; the reductant and subtrahend are <u>not</u> inter-changeable Feedback for T
6	***Book 4, page 29*** Q.3 Read: *Fill in the missing numbers*. How many additions and subtractions are there? ($6\times 3=18$) Let's see how many you can do in 4 minutes! Start . . . now! Review orally with whole class. Ps change to coloured pencils and mark/correct own work. Who had all 18 correct? Who made 1 (2, 3, 4, 5, more than 5) mistakes? What kind of mistakes? Who did the same? etc. What did you notice? Ps point out connections. *Solution:* a) $30+\underline{40}=70$, $300+\underline{400}=700$, $3000+\underline{4000}=7000$ b) $80-\underline{60}=20$, $800-\underline{600}=200$, $8000-\underline{6000}=2000$ c) $\underline{30}+40=70$, $\underline{300}+400=700$. $\underline{3000}+4000=7000$ d) $\underline{80}-60=20$, $\underline{800}-600=200$, $\underline{8000}-6000=2000$ e) $8+\underline{5}=13$, $800+\underline{500}=1300$, $8000+\underline{5000}=13\,000$ f) $\underline{120}-90=30$, $\underline{1200}-300=900$, $\underline{12\,000}-9000=3000$ *38 min*	Individual work, monitored, helped Written on BB or use enlarged copy master or OHP Differentiation by time limit Agreement, self-correction, evaluation, praising If problems, write calculation vertically on BB, or with place values, e.g. 12 Th − 9 Th = 3 Th Extra praise for correct answers to RH column in e) and f) Feedback for T

Bk4		*Lesson Plan 29*
Activity		***Notes***
7	***Book 4, page 29, Q.4*** Read: *Write operations and calculate the results*. T (P) reads one question at a time. Ps do calculation in *Pbs* and show result on scrap paper or slates on command. P who answered correctly explains in detail to those who did not. Who agrees? Who did it another way? Mistakes discussed and corrected. *Solutions:* a) *What is the sum of 4300 and 2800?* BB: 4300 + 2800 = 6300 + 800 = 6300 + 700 + 100 = 7100 b) *What is the difference beween 4300 and 2800?* BB: 4300 – 2800 = 2300 – 800 = 2300 – 300 – 500 = 1500 c) *One term in an addition is 1800. The sum is 5300. What is the other term?* BB: 1800 + 3500 = 5300 or 5300 – 1800 = 4300 – 800 = 4300 – 300 – 500 = 3500 d) *What is the subtrahend if the reductant is 5300 and the difference is 1800?* BB: 5300 – 3500 = 1800 or 5300 – 1800 = 3500 (from c))	Whole class activity but individual calculation (or individual work if Ps prefer, under a set time limit and reviewed at BB with whole class) Responses shown in in unison. Reasoning, agreement, self-correcting, praising Extra parise if Ps noticed similarity between a) and b), c) and d). (Revise vocabulary if necessary: reductant is the number being reduced subtrahend is the number being subtracted)
Extension	e) *What is the reductant if the subtrahend is 3800 and the difference is 3300?* BB: 7100 – 3800 = 3300 or 3300 + 3800 = 6300 + 800 = 6300 + 700 + 100 = 7100	
	45 min	

Bk4	R: Mental calculation **C: Addition and subtraction up to 10 000** *E: Over 10 000*	*Lesson Plan* *30*
Activity		***Notes***
1	**Sequences** T says the first 3 terms of a sequence. Ps continue it and give the rule. a) 7000, 7600, 8200, (8800, 9400, 10 000, 10 600, . . .) [+ 600] b) 4000, 3200, 2400, (1600, 800, 0, – 800, – 1600, . . .) [– 800] c) 5070, 5670, 6270, (6870, 7470, 8070, 8670, 9270, 9870, . . .) [+ 600] d) 3999, 3599, 3199, (2799, 2399, 1999, 1599, 1199, 799, 399, – 1, – 401, . . .) [– 400] *6 min*	Whole class activity At speed in order round class If a P makes a mistake the next P corrects it. T writes terms on BB Continue to negative numbers if Ps are able. Agreement, praising
2	**Chain calculations** Listen carefully to each step. Do the calculation in your head and show me the final result (on scrap paper or slates) when I say. a) *Start with 6800, subtract 500, . . . subtract 400, . . . subtract 2900, . . . and add 4000.* Show me the result . . . now! (7000) P who made a mistake goes through the calculations again with help of class: 6800 – 500 = 6300, 6300 – 400 = 5900, 5900 – 2900 = 3000, 3000 + 4000 = 7000 b) *Start with 5200, add 800, . . . subtract 1300, . . . add 800, . . . and subtract 1300.* Show me the result . . . now! (4200) P who made a mistake goes through the calculations again with help of class: 5200 + 800 = 6000, 6000 – 1300 = 4700, 4700 + 800 = 5500, 5500 – 1300 = 4200 Repeat with another similar calculation if there is time. *12 min*	Whole class activity Ps nod heads when they are ready for next step. (Less able Ps may write results of each step in *Ex. Bks*) In unison Reasoning, agreement, praising In unison Reasoning, agreement, praising Ps could think of it!
3	**Problems** Study the plan. Think of a problem about it. T allows some time for thought, then asks several Ps for their suggestions. Class chooses the one they like best. Do the calculation in your *Ex. Bks*. Review at BB with whole class. Ps dicate to T or come to BB, explaining reasoning. Class agrees/disagrees. Mistakes discussed and corrected. a)  6600 2800 + (2200 + 4400) = 9400 (m) e.g. Charlie cycled 2800 m in the morning. After lunch he cycled 2200 m and then another 4400 m. How far did Charlie cycle altogether? *Answer:* Charlie cycled 9400 m altogether. b)  5000 (2800 + 2200) + 4400 = 9400 (m) e.g. Helen cycled 2800 m, then another 2200 m in the morning. After lunch she cycled 4400 m. How far did she cycle altogether? *Answer:* Helen cycled 9400 m altogether. *20 min*	Whole class activity T has BB or SB or OHP already prepared. Praise all contributions. Class decides whether they match the diagram. Discussion, reasoning, agreement, self-correction, praising Discuss similarity between a) and b). Agree that in a 3-term (or any) addition, it does not matter which 2 terms are added first, as the result will be the same: BB: $a + (b + c) = (a + b) + c = a + b + c = c + b + a, \ldots$ Brackets are not really needed.

Bk4

Lesson Plan 30

Activity		*Notes*
4	**Addition** *Daffy Duck* has done her additions like this. Can you suggest an easier way to do them? Ps come to BB or dictate to T. Class agrees/disagrees. BB: a)  Ps: e.g. 1700 + 830 + 2300 + 170 = 2530 + 2300 + 170 = 4830 + 170 = <u>5000</u> 1700 + 830 + 2300 + 170 = (1700 + 2300) + (830 + 170) = 4000 + 1000 = <u>5000</u> b)  Ps: e.g. 4200 + 380 + 2800 + 620 = (4200 + 380) + (2800 + 620) = 4580 + 3420 = <u>8000</u> 4200 + 380 + 2800 + 620 = (4200 + 2800) + (380 + 620) = 7000 + 1000 = <u>8000</u>	Whole class activity Written on BB with *Daffy Duck* cut out and coloured from enlarged copy master (or use any well-known cartoon character cut out of a magazine) Give several Ps the chance to make a suggestion. Agreement, praising Feedback for T
	25 min	
5	***Book 4, page 30*** Q.1 Read: *Do the calculations. Colour the equal results in the same colour.* Review at BB with whole class. Ps come to BB or dictate to T. Class agrees/disagrees. Mistakes discussed and corrected. *Solution:* a) 4600 + 3900 = <u>8500</u> b) 4600 + 4000 – 100 = <u>8500</u> c) 3900 + 4000 + 600 = <u>8500</u> d) 3900 + 4000 – 600 = 7300 e) 9700 – 1200 = <u>8500</u> f) 9700 – 1000 + 200 = 8900 g) 9700 – 2000 + 800 = <u>8500</u> h) 10 000 – 1200 – 300 = <u>8500</u> Ps compare the equal operations and try to explain why the results are the same.	Individual work, monitored, helped Written on BB or use enlarged copy master or OHP Discussion, reasoning, agreement, self-correction, praising Extra praise if Ps offer some explanations, e.g. 4000 – 100 = 3900 4000 + 600 = 4600 9700 = 10 000 – 300 etc.
	30 min	
6	***Book 4, page 30*** Q.2 Read: *Calculate the sums as simply as you can. Show your calculations in detail.* Set a time limit. Ps can try out calculations in *Ex. Bks* or on scrap paper first. Review at BB with whole class. Ps come to BB to show their calculations. Who did the same? Who thinks another way is easier? Class agrees on easiest one. *Solution:* a) 360 + 4900 + 4100 + 40 = (360 + 40) + (4900 + 4100) = 400 + 9000 = <u>9400</u> b) 2840 + 650 + 3050 + 160 = (2840 + 160) + (650 + 3050) = 3000 + 3700 = <u>6700</u> c) 410 + 5330 + 2390 + 70 = (410 + 2390) + (5330 + 70) = 2800 + 5400 = <u>8200</u>	Individual work, monitored (or whole class activity) Written on BB or OHT Discussion, reasoning, agreement, self-correcting (only if result is incorrect), praising Feedback for T
	35 min	

Bk4

Lesson Plan 30

Activity		*Notes*
7	***Book 4, page 30*** Q.3 Read: *Do part a) in your exercise book. Use the result to help answer parts b) and c).* Set a time limit. Review at BB with whole class. Ps come to BB to explain their solutions and point out relationships which make calculation easier (including changing the pence to £s!) Class agrees/disagrees. Mistakes discussed and corrected. *Solution:* *Ann had 7500 p. How much more did she have than:* a) *Peter, if Peter had 2300 p?* 7500 – 2300 =5200 Ann had 5200 p (= £52) more than Peter. b) *John, if John had 2200 p?* (7500 – 2200 = 5300) or John had 100 p less than Peter so Ann would have 5400 p (= £54) more than John. c) *Diane, if Diane had 1300 p?* (7500 – 1300 = 6200) or Diane had 1000 p less than Peters o Ann would have 6200 p (= £62) more than Diane.	Individual work, monitored helped (or whole class activity) Reasoning, agreement, self-correcting, praising Extra praise if Ps reason b) and c) correctly from result of a) without doing the calculations. Otherwise T gives hints to make Ps think. Encourage Ps to use this kind of reasoning in Q.4
	38 min	
8	***Book 4, page 30*** Q.4 Read: *Do part a) in your exercise book. Use the result to help answer parts b) and c).* Set a time limit. Review at BB with whole class. Ps come to BB to explain their solutions. Class agrees/disagrees. Mistakes discussed and corrected. *Solution:* *Each pupil on a school trip spent 3500 p. How much money did:* a) *Finlay have left if he took 7000 p?* 7000 – 3500 =3500 Finlay had 3500 p (= £35) left. b) *Emma have left if she took 6800 p?* (6800 – 3500 =3300) Emma took 200 p less than Finlay, so would have 200 p less than Finlat left, i.e. 3300p (= £33) left. c) *Lee have left if he took 7300 p?* (7300 – 3500 =3800) Lee took 300 p more than Finlay, so would have 300 p more than Finlay left, i.e. 3800 p (= £38) left.	Individual work, monitored helped Reasoning, agreement, self-correcting, praising Extra praise if Ps use result of a) to reason b and c). Or Lee took 500 p more than Emma, so had left 500 p more than Emma.
	41 min	
9	***Book 4, page 30*** Q.5 Read: *Complete the magic squares. The sum of any row, column or diagonal is the same.* Set a time limit. Review at BB one at a time. Ps come to BB, explaining reasoning. Class checks all rows, columns and diagonals. Mistakes discussed and corrected. *Solution:* a) 9000 5000 2000 2000 **0** 3000 **6000** **4000** **4000** **1000** b) 9000 **3500** **3500** 2000 **1500** 3000 **4500** 4000 **2500** 2500	Individual work monitored, helped Drawn on BB or use enlarged copy master or OHP Reasoning, checking, agreement, self-correcting, praising Ps could finish off puzzles at home if they run out of time.
	45 min	

Bk4

R: Mental calculation

C: Addition and subtraction up to 10 000. Written calculations.

E: Over 10 000. Problems in context

Lesson Plan 31

Activity		*Notes*
1	**Sequences** Look at what the arrows mean. Let's fill in the missing terms. Ps come to BB or dictate to T. Class agrees/disagrees. Let's continue the sequence orally. Ps might notice that top and bottom terms are increasing by the same amount. Why? BB: a) → means + 4000 and ⟹ means – 3000 1000 2000 3000 4000 5000 etc. 5000 6000 7000 8000 9000 b) → means + 4500 and ⟹ means – 2500 1200 3200 5200 7200 9200 etc. 5700 7700 9700 11 700 13 700	Whole class activity Drawn on BB or use enlarged copy master or OHP At a good pace Agreement, praising For oral continuation, T chooses Ps at random Discussion, agreement that: a) + 4000 – 3000 = + 1000 b) + 4500 – 2500 = + 2000 Feedback for T
	5 min	
2	**Magic squares** Let's fill in these magic squares. What should we do first? (Work out the magic number.) Ps agree on total, then come to BB to fill in missing numbers, explaining reasoning. Class checks that all rows, columns and diagonals are equal. BB: a) 15 000: 7000 **2000** **6000**; 4000 5000 **6000**; 4000 **8000** **3000** b) 12 000: **2800** 4500 4700; **5900** 4000 **2100**; **3300** 3500 **5200**	Whole class activity Drawn on BB or use enlarged copy master or OHP Ps suggest what to do first and how to conntinue. Reasoning, agreement, checking, praising Feedback for T
	10 min	
3	**Problems** Help me to solve these problems. T reads problem twice and Ps repeat in own words. Ps suggest each step and come to BB to write data, make a plan, estimate the result, do the calculation, check the result and say the answer as a sentence. Class agrees/disagrees and writes each step in *Ex. Bks* too. a) T*he King of Dombleland has £6800 in his bank account and £1900 in a safe at his castle. How much money does he have altogether?* *Data:* Bank: £6800 Safe: £1900 *Plan:* £6800 + £1900 *Estimate:* £7000 + £2000 = £9000 *C:* 6800 + 1900 = 7800 + 200 + 700 = 8000 + 700 = <u>8700</u> *Answer:* He had £8700 altogether. or Th H T U 6 8 0 0 + 1 9 0 0 8 7 0 0 1	Whole class activity Involve as many Ps as possible Class (T) points out missed steps At a good pace Show the calculations horizontally and vertically. Check against estimates and with different calculations. *Check:* e.g. Th H T U 8 ^{10}7 0 0 – 1_1 9 0 0 6 8 0 0

Bk4

Lesson Plan 31

Activity		***Notes***
3	(Continued)	

b) *The King had a banquet and on the table were two jugs containing his favourite wine. One jug contained 3 litres 500 ml of white wine and the other contained 2700 ml of red wine. Which wine was there more of and how much more?*

Data: W: 3 litres 500 ml = 3500 ml R: 2700 ml

Plan: 3500 ml – 2700 ml *E:* 4000 – 3000 = 1000

C: 3500 – 2700 = 1500 – 500 – 200 or

= 1000 – 200

= <u>800</u>

Th	H	T	U
3	$^{10}5$	0	0
2_1	7	0	0
	8	0	0

(–)

Check:

Th	H	T	U
	8	0	0
2	7	0	0
3	5	0	0
1			

(+)

Answer: There were 800 ml more of white wine.

If another 1 and a half litres of wine was poured into each jug, which would hold more and how much more?

T asks several Ps what they think.

BB: 3500ml + 1500 ml > 2700 ml + 1500 ml

800 ml

Let's show it as an inequality.

Answer: The difference between the jugs would be the same.

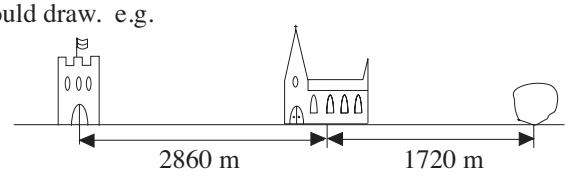
Agreement, praising

c) A *straight road leads from the castle to a church, 2860 m away. On the same road and 1720 m from the church is a large rock. How far is the rock from the castle?*

What could we do this time to help us? (Draw a diagram.) Ps dictate what T should draw. e.g.

Drawings need only be very rough.

i) BB:



Show distances from centre of each item so that their width need not be taken into account.

Plan: 2860 m + 1720 m *E:* 3000 m + 2000 m = 5000 m

C: 2860 + 1720 = 3860 + 700 + 20 or

= 4560 + 20

= <u>4580</u>

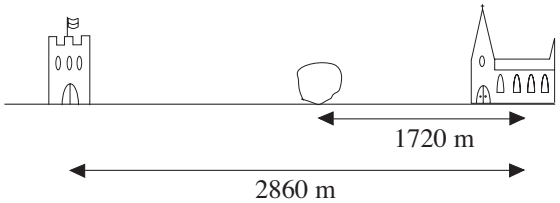
2	8	6	0	
1	7	2	0	(+)
4	5	8	0	(m)
1				

Check by comparing with estimate and with a subtraction.

Is this the only possible solution? Listen carefully. T reads problem again. (Elicit that the rock could be <u>before</u> the church.) Let's draw it.

Extra praise if a P thinks of the other possibility without a hint from T

ii) BB:



Ps dictate what T should draw (or a P draws the diagram).

Plan: 2860 m – 1720 m *E:* 3000 m – 2000 m = 1000 m

C: 2860 – 1720 = 1860 – 700 – 20 or

= 1160 – 20

= <u>1140</u>

2	8	6	0	
1	7	2	0	(–)
1	1	4	0	(m)

Check by comparing with estimate and with an addition or another subtraction.

Answer: The rock could be 4580 m (4 km 580 m) from the castle if it was after the church, or 1140 m (1 km 140 m) from the castle if it was between the castle and the church.

T helps with wording of final answer.

You have all been very clever!

20 min

Bk4

Lesson Plan 31

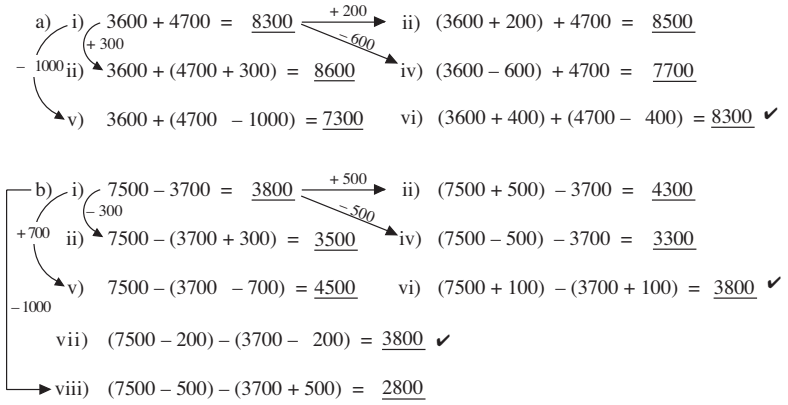
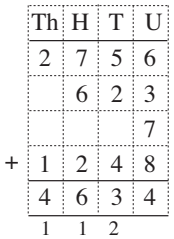
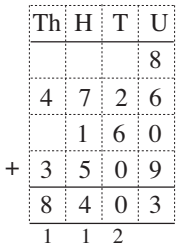
Activity		*Notes*
4	***Book 4, page 31*** Q.1 Read: *Estimate quickly, then calculate the sum.* Do part a) with whole class first as a model for Ps to follow. Review at BB with whole class. Ps come to BB or dictate to T, explaining reasoning. Class agrees/disagrees. Mistakes discussed and corrected. *Solution:* a) 2653 + 1746 *E:* 2700 + 1700 = 4400 *C:* 2653 + 1746 = 4399 (1) b) 1256 + 7902 *E:* 1300 + 7900 = 9200 *C:* 1256 + 7902 = 9158 (1) c) 5343 + 2145 *E:* 5300 + 2100 = 7400 *C:* 5343 + 2145 = 7488	Individual work, monitored, helped Written on BB or use enlarged copy master or OHP Reasoning with place value details, e.g. for a): 3U + 6U = 9U 5T + 4T = 9T 6H + 7H = 13 H = 1Th + 3H 2Th + 1Th + 1Th = 4Th Agreement, self-correction, praising Feedback for T
	26 min	
5	***Book 4, page 31, Q.2*** Read: *Complete the additions and then check them.* Ps come to BB to fill in a column, explaining reasoning in detail with place values, (e.g. 6U + 2U = 8U, or 8U – 6U = 2U). Class points out errors. Ps check by doing the completed addition again. *Solution:* a) 7856 + 1552 = 9408 (1 1) b) 4922 + 2537 = 7459 (1) c) 7376 + 4179 = 11555 (1 1 1) d) 4036 + 3787 = 7823 (1 1)	Whole class activity (or individual work if Ps wish) Written on BB or use enlarged copy master or OHP Discussion, reasoning, agreement, praising Reasoning details, e.g. d): 6U + 7U = 13U = 1T + 3U 3T + 8T + 1T = 12T = 1H + 2T 7H + 1H + 0H = 8H 4Th + 3Th = 7Th
	32 min	
6	***Book 4, page 31*** Q.3 Read: *Estimate first, then calculate the difference.* Deal with one part at a time. Do part b) with whole class if necessary, then Ps can do part c) in *Ex. Bks*. Review at BB with whole class. Ps come to BB or dictate to T, explaining reasoning in detail (with T's help). Class agrees/ disagrees. Mistakes discussed and corrected. Reasoning details: e.g. b): '7U – 2U = 5U I cannot take 7T away from 6T, so I add 10T to the tens column in the reductant and 1H to the hundreds column in the subtrahend; 10T + 6T = 16T, and 16T – 7T= 9T, 5H + 1H = 6H, but I cannot take 6H away from 5H, so I add 10H to the hundreds column in the reductant and 1Th to the thousands column in the subtrahend; 10H + 5H = 15H, and 15H – 6H = 9H, 1Th + 1Th = 2Th, and 4Th – 2Th = 2Th The difference is 2995.'	Individual work, monitored, helped Written on BB or use enlarged copy master or OHP Discussion, reasoning, agreement, self correction, praising (or if part b) is done as individual work, part c) can be an extension for quicker Ps)

Bk4		*Lesson Plan 31*
Activity		***Notes***
6	(Continued) *Solution:* a) 8587 – 5362 ≈ 8600 – 5400 = 3200 ✔ *C:* 8587 − 5362 = 3225 *Check:* 3225 + 5362 = 8587 ✔ b) 4567 – 1572 ≈ 4600 – 1600 = 3000 ✔ *C:* 4567 − 1572 = 2995 *Check:* 2995 + 1572 = 4567 ✔ c) 7438 – 5620 ≈ 7400 – 5600 = 1800 ✔ *C:* 7438 − 5620 = 1818 *Check:* 1818 + 5620 = 7438 ✔	Ps check with an addition and a subtraction and compare with estimate. Add 'Th, H, T, U' to calculations on BB if necessary. Extra praise if Ps had all 3 correct!
Extension		
	39 min	
7	***Book 4, page 31*** Q.4 Read *The sum of any two numbers is the number directly above them. Fill in the missing numbers.* Set a time limit. Ps can do necessary calculations on scrap paper or in *Ex. Bks*. Review at BB with whole class. Ps come to BB or dictate to T, explaining reasoning. Class agrees/disagrees. BB: a) 10 000 / 5400 4600 / 3600 1800 2800 b) 7800 / 4400 3400 / 1600 2800 600 c) 13 300 / 7400 5900 / 4900 2500 3400	Individual work, monitored Drawn on BB or use enlarged copy master or OHP Differentiation by time limit At a good pace Reasoning, agreement, self-correction, praising
Extension	Copy the diagram and make up your own puzzle using other 4-digit numbers for a neighbour to solve.	Could be finished at home.
	45 min	

Bk4

R: Mental calculation
C: Addition and subtraction to 10 000
E: Numbers over 10 000. Problems

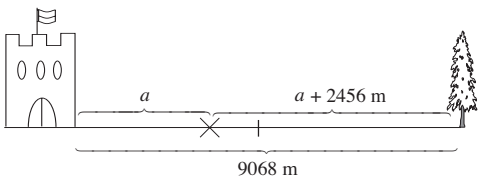
Lesson Plan 32

Activity		*Notes*
1	**Calculations** T has BB already prepared. Ps come to BB to do calculations, explaining reasoning. Class agrees/disagrees. Ps point out relationships which would make the calculations easier and identify equal operations. BB: e.g.  *8 min*	Whole class activity Written on BB or SB or OHT or use enlarged copy master At a good pace Involve several Ps. Reasoning, agreement, praising Extra praise for noticing relationships (indicated by the arrows). Equal operations ticked.
2	**Written exercise** Write these numbers one below the other in your E*x. Bks*. Make sure that the place values line up! Estimate their sum, then do the calculation. Show me the result when I say. Ps who responded correctly explain at BB to those who did not. Mistakes discussed and corrected. How could we check it? (Add in the opposite direction (e.g. ↓ then ↑), compare with estimate.) BB: a) 2756 + 623 + 7 + 1248 ≈ 2800 + 600 + 0 + 1200 = 4600 b) 8 + 4726 + 160 + 3509 ≈ 0 + 4700 + 200 + 3500 = 8400 Ps could dictate another calculation if time.   *13 min*	Individual work, monitored T dictates numbers while walking round class. Results shown on scrap paper or slates in unison. Reasoning, agreement, self-correction, praising Reasoning given with place value details. Feedback for T
3	**Problem** Listen carefully and solve this problem in your *Ex. Bks*. Do not miss any steps! Show me the answer when I say. *The highest mountian on earth is Mount Everest which is 8848 m above sea level. The highest mountain in Africa is Kilimandjaro which is 5895 m above sea level.* *How much higher is Mount Everest than Mount Kilimandjaro?* Show me . . . now! (2953 m) **A**, tell us how you worked out the answer. Who agrees? etc. Mistakes discussed and corrected.	Individual work, monitored, helped T could have problem written on SB or OHT. T reads problem, then two Ps read it also. Give Ps time to think and do calculation. Result shown on scrap paper or slates in unison on command.

Bk4		*Lesson Plan 32*
Activity		***Notes***
3	(Continued) *Solution:* *Data:* ME: 8848 m MK: 5895 m *Plan:* 8848 m – 5895 m *C:* *E*: 8800 – 5900 = 8900 – 6000 = 2900 (m) *Answer:* Mount Everest is 2953 m higher than Mount Kilimandjaro. *17 min*	Check with addition and compare with estimate. Reasoning, agreement, checking, self-correcting, praising T could have pictures of both mountains and show their positions on relevant map. T might tell some prepared interesting facts about each.
4	**Missing thousands** Which whole thousands make the statements true? Ps come to BB to fill in the numbers, explaining reasoning. Class agrees/disagrees or points out other thousands which would be possible. Show on relevant segments of number line roughly drawn on BB if there are problems. BB: a) 3758 + **4000** = 7758 3758 + ☐ < 7758 **3000, 2000, 1000, 0, (– 1000, . . .)** 3758 + ☐ > 7758 **5000, 6000, 7000, 8000, . . .** b) **7000** + 2568 = 9568 ☐ + 2568 < 9568 **6000, 5000, . . ., 1000, 0, (– 1000, . . .)** ☐ + 2568 ≤ 9568 **7000, 6000, . . ., 1000, 0, (– 1000, . . .)** c) 9534 – **3000** = 6534 9534 – ☐ < 6534 **4000, 5000, 6000, . . .** 9534 – ☐ ≥ 6534 **3000, 2000, 1000, 0, (– 1000, . . .)** d) **10 000** – 3108 = 6892 ☐ – 3108 > 6892 **11 000, 12 000, 13 000, . . .** ☐ – 3108≠ 6892 **Any thousand apart from 10 000** *23 min*	Whole class activity Written on BB or use enlarged copy master or OHP At a good pace Discussion, reasoning, agreement, checking, praising Include negative thousands only if Ps suggest them. T reminds Ps how to write long (or never-ending) lists of numbers in a short way, as oppposite, using ellipses (. . .) Elicit that: ≤ means the same as ≯ 'less than or equal to' is the same as 'not more than' and ≥ means the same as ≮ Feedback for T
5	***Book 4, page 32*** Q.1 Read: *Do the operations in the correct order.* Elicit that operations inside the brackets should be done first. Ps write interim results above operation signs. Calculations done at side of *Pbs* or in *Ex. Bks*. Review at BB with whole class. Ps come to BB or dictate to T, explaining reasoning. Mistakes discussed and corrected. Ps tell class what they noticed, e.g. • in each part, ii) is the same as i); the brackets are not needed; • in a), iii) is less because 1596 is subtracted instead of added; → (6020 – 2 × 1596 = 2828) • in b), iii) is greater because 1976 less is subtracted (or 1976 is added instead of subtracted). → (1886 + 2 × 1976 = 5838)	Individual work, monitored, helped Written on BB or SB or OHT Discussion, reasoning, agreement, self-correction, praising

Bk4

Lesson Plan 32

Activity		***Notes***
5	(Continued) *Solution:* a) i) $8152 - 3728 + 1596 = \underline{6020}$ ii) $(8152 - 3728) + 1596 = \underline{6020}$ iii) $8152 - (3728 + 1596) = \underline{2828}$ b) i) $7020 - 3158 - 1976 = \underline{1886}$ ii) $(7020 - 3158) - 1976 = \underline{1886}$ iii) $7020 - (3158 - 1976) = \underline{5838}$	i), ii) $8152 - 3728 + 1596 = 6020$; $4424 + 1596 = 6020$ iii) $3728 + 1596 = 5324$; $8152 - 5324 = 2828$ i), ii) $7020 - 3158 - 1976 = 3862$; $3862 - 1976 = 1886$ iii) $3158 - 1976 = 1182$; $7020 - 1182 = 5838$
	31 min	
6	***Book 4, page 32*** Q.2 Read: *Fill in the missing numbers.* Remember to check that all the equations, horizontally and vertically, are correct! Try to do the calculations mentally! Set a time limit. Review at BB with whole class. Ps come to BB or dictate to T. Class agrees/disagrees. Mistakes discussed and corrected. *Solution:* a) $3600 + 1800 = \mathbf{5400}$; $1900 + 2600 = \mathbf{4500}$; $\mathbf{5500} + \mathbf{4400} = \mathbf{9900}$ b) $12\,500 - 3500 = \mathbf{9000}$; $7200 - \mathbf{1800} = 5400$; $\mathbf{5300} - \mathbf{1700} = \mathbf{3600}$	Individual twork, monitored Written on BB or use enlarged copy master or OHP Reasoning agreement, checking, self-correction, praising Feedback for T
	35 min	
7	***Book 4, page 32, Q.3*** Read: *Solve the problem.* *The castle is 9 km 68 m from the forest. There is a waterfall between the castle and the forest. It is 2 km 456 m nearer to the castle than to the forest.* *How far away is the waterfall from the castle?* Allow Ps time to think about a plan and discuss it with their neighbour. **A**, what do you think we should do? Who agrees? Who thinks something else? etc. T gives hint if nobody knows. *Solution:* e.g. Let the distance from the castle to the waterfall be a, then the distance from the waterfall to the forest will be $a + 2456$ m. BB:  The total distance would be: $a + (a + 2456\text{ m}) = 9068\text{ m}$ i.e. $2 \times a = 9068\text{ m} - 2456\text{ m}$ So $a = (9068\text{ m} - 2456\text{ m}) \div 2 = 6612\text{ m} \div 2 = \underline{3306\text{ m}}$ *Answer:* The waterfall is 3 km 306 m from the castle.	Whole class activity (Or individual trial first if Ps wish) Diagram drawn on BB or use enlarged copy master or OHP Discussion on strategy for solution. Praise all positive contributions. Refer to diagram throughout. One method of solution is shown opposite but others are possible. (e.g. using a and b for the two distances: $a + b = 9068$, $b - a = 2456$ then adding both equations, or finding the mid-point first, then subtracting half of 2 km 456 m) Accept any method reasoned correctly by Ps.
	40 min	

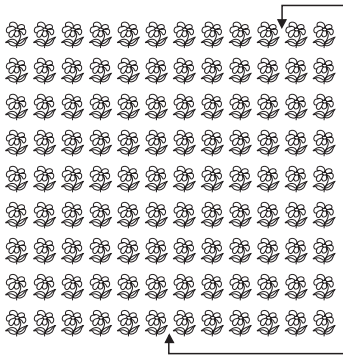
Bk4		*Lesson Plan 32*
Activity		***Notes***
8	***Book 4, page 32*** Q.4 Read: *Write a plan, do the calculation and write the answer in your exercise book.* Deal with one part at a time. Ps read the question themselves and solve it in *Ex. Bks*. Set a time limit for each question. Review with whole class. Ps come to BB to show their solution, explaining reasoning. Who agrees? Who thinks something else? Who did it a different way? Who made a mistake? What kind of mistake? etc. *Solutions:* a) *In Appletown, the number of inhabitants is 6548. The number of females is 3308. How many males live there?* BB: F: 3308 M + F: 6548 M: 6548 – 3308 6548 – 3308 =<u>3240</u> *Answer:* 3240 males live in Appletown. b) *In Banaville, there are 5476 females, 260 more than the number of males. How many males live there?* BB: F: 5476 M : 5476 – 260 =<u>5216</u> *Answer:* 5416 males live in Bananaville. c) *There are 9500 inhabitants in Dombleland, 2500 more adults than children. How many adults and how many children live there?* BB: e.g. A + C = 9500 C = A – 2500 so A + (A – 2500) = 9500 2A – 2500 = 9500 2A = 9500 + 2500 = 11 000 + 1000 = 12 000 A = 12 000 ÷ 2 = <u>6000</u> Then C = 6000 – 2500 = 4000 – 500 = <u>3500</u> *Answer:* There are 6000 adults and 3500 children living in Dombleland. *45 min*	Individual work, monitored, helped (or part c) could be done with the whole class) Responses could be shown on slates in unison on command. Reasoning, agreement, checking, self-correction, praising Show details of vertical addition/subtraction on BB. Other methods of solution possible, e.g. C + (C + 2500) = 9500 or C = (9500 – 2500)÷ 2 Accept any correct method. *Check:* 6000 + 3500 = 9500 ✔ 6000 – 3500 = 2500✔ Ps might notice its similarity to Q.3.

Bk4	R: Mental calculation. Multiplication and division tables **C: Multiplication and division, and their properties** *E: Numbers greater than 10 000*	*Lesson Plan* *33*
Activity		***Notes***
1	**Mental practice** T says an operation and Ps say result. (Give simple questions to the less able Ps and difficult questions to the more able.) e.g. a) $4+7,\ 6\times 8,\ 42\div 7,\ 23-9,\ 150+320,\ 1500-600,\ 5000\div 2$, etc. b) $56+77,\ 77-56,\ 35\div 5,\ 350\div 5,\ 3500\div 5,\ 7\times 400$, etc. c) $151+49,\ 628-428,\ 6000\div 3,\ 6000\div 30,\ 6000\div 300,$ $6000\div 3000,\ 140\times 2,\ 512\times 2,\ 200\times 40,\ 15\times 12,\ 432+430$, etc Write details of difficult calculations on BB if necessary, e.g. $56+77 = 126+7 = 133;\ 15\times 12 = 150+30 = 180.$	Whole class activity At speed in order round class (or T chooses Ps at random) If a P makes a mistake the next P corrects it. Class points out missed errors. In good humour! Praising Ps can think of operations too!
	15 min	
2	**Operations** a) Study the diagram. Who can think of additions or multipications about it? Ps come to BB or dictate to T. Class agrees/disagrees. BB: ○○○○○○○ ○○○○○○○ ○○○○○○○ ○○○○○○○ e.g. $7+7+7+7 = 4\times 7 = 28$ $4+4+4+4+4+4+4 = 7\times 4 = 28$ $4\times 7 = 7\times 4$ What is the connection between addition and multiplication? When equal numbers are added, the addition can be shortened to a multiplication. Let's see if you can remember the names of the components in a multiplication. Ps come to BB to point, say and write. Class agrees/disagrees.. BB: product $4\times 7 = 28$ multiplicant multiplier (4 added 7 times) or: multiplier multiplicant (4 times 7) or: factors What else can you tell me about multiplication? In multiplication, the factors are inter-changeable. b) Study this diagram. What multiplications could we write about it? Ps come to BB or dictate to T. Class agrees/disagrees. BB: (5) (5) (5) (5) (5) (5) e.g. $3\times(2\times 5) = 3\times 10 = 30$, or $2\times(3\times 5) = 2\times 15 = 30$ What do you notice about the brackets? If the operation contains only multiplications, then brackets do not change the product and can be deleted.	Whole class activity Diagrams drawn on BB (or items stuck to BB) Agreement, praising Ask several Ps what they think. T repeats Ps' reasoning in a clearer way if necessary. T could have 'rules' already prepared on SB or OHT or card. Ps say them in unison. Discuss the different ways of thinking of a multiplication, referring to the diagram. (4 rows of 7 or 7 columns of 4) T gives hint if nobody can think of anything. e.g. 3 columns of 2 (5)s or 2 rows of 3 (5)s T helps with wording if necessary.

Bk4

Lesson Plan 33

Activity		*Notes*
2	(Continued) c) Listen to the story and study the diagram. *Grandma planted 9 rows of flowers, with 12 plants in each row.* *Her 3 grandchildren were curious about how many plants there were altogether and worked it out in different ways like this.*	Diagram drawn (or flowers stuck) on BB, or use enlarged copy master or OHP T repeats story slowly one or two times. Give Ps time to think.



Alfie: $9 \times 12 = 9 \times (10 + 2)$
$= 9 \times 10 + 9 \times 2$
$= 90 + 18$
$= \underline{108}$

Bella: $9 \times 12 = 9 \times (6 + 6)$
$= 9 \times 6 + 9 \times 6$
$= 54 + 54$
$= \underline{108}$

Cilla: If there was an extra row, there would be 10 rows.
$9 \times 12 = (10 - 1) \times 12$
$= 10 \times 12 - 1 \times 12$
$= 120 - 12$
$= \underline{108}$

Who can explain their reasoning? Ps come to BB to work through the operations, referring to the diagram. Class points out errors.

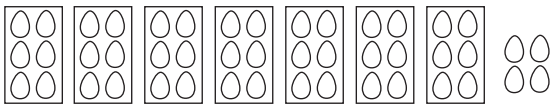
T intervenes only if necessary.
Encourage other Ps to help with reasoning.
Ps could suggest other such examples. e.g.
$6 \times 25 = 6 \times (20 + 5)$

> A difficult number can be multiplied by writing it as the sum or difference of simpler numbers, then multiplying each of the simpler numbers and adding or subtracting the products.

18 min

3	**Division** a) Each box holds 6 eggs. Who can write a division abut the diagram? Who agrees? Who can think of a different one? etc.	Whole class activity Drawn on BB or use enlarged copy master or OHP Ps suggest the divisions.

BB:



e.g. i) 46 eggs ÷ 7 = 6 eggs and 4 eggs remain, or
ii) 46 eggs ÷ 6 eggs = 7 (boxes) and 4 eggs remain

Discussion, reasoning, agreement, praising

Talk about the two kinds of division:

i) is sharing equally (1 egg in 1st box, then 1 egg in 2nd box, etc.)

ii) is dividing into equal groups (e.g. 6 in 1st box, then 6 in 2nd box) and could be shown as a subtraction:

BB: $46 - 6 - 6 - 6 - 6 - 6 - 6 - 6 = 4$, (i.e. 6 subtracted 7 times)

Ps explain to class (with T's help)

How can we check division? (with multiplication) P come to BB to write it. Class agrees/disagrees.

BB: $46 \div 7 = 6, \text{r } 4$ because $46 = 6 \times 7 + 4$

Agreement, praising

Let's see if you can remember the names of the components in a multiplication. Ps come to BB to point, say and write. Class agrees/disagrees.

BB:

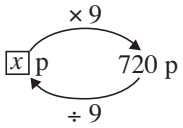
$$46 \overset{\text{dividend}}{\uparrow} \div 6 \overset{\text{divisor}}{\uparrow} = 7 \overset{\text{quotient}}{\downarrow}, \text{r } 4 \overset{\text{remainder}}{\uparrow}$$

Can the dividend and divisor be interchanged? (No, the order matters in division.) T confirms with simple example on BB.

$12 \overset{2}{\div} 6 \neq 6 \overset{\frac{1}{2}}{\div} 12$

Bk4

Lesson Plan 33

Activity		*Notes*
3	b) Listen carefully and think about how you would solve this problem. *Alice bought 9 kg of potatoes for £7.20. How much did 1 kg cost?* Ps come to BB or dictate to T. Class agrees/disagrees. e.g. BB: 9 kg → £7.20 = 720 p 1 kg → 720 p ÷ 9 = <u>80 p</u> *Check:* 80 p × 9 = 720 p = £7.20 ✔ *Answer:* 1 kg of potatoes cost 80 p. Agree that division is the <u>reverse</u> of multiplication (and subtraction is the reverse of addition).	Whole class activity Reasoning, agreement, checking, praising We could also show it in a diagram like this: BB: 
	23 min	
4	**Problems** Let's think of different ways in which we could solve these problems. a) *6 friends spent the day in London together. They each paid an equal share of the bills for their lunch and dinner. Their lunch bill was £42 and their dinner bill was £48.* *How much did each person pay altogether?* Ps come to BB or dictate to T, explaining reasoning. Class agrees/disagrees. Who can think of a different way to solve it? etc. BB: e.g. *Lunch* *Dinner* *Total* *Data:* 6 people £42 £48 ? 1 person ? ? ? i) Work out the total amount the 6 people paid, then divide by 6. (48 + 42) ÷ 6 = 90 ÷ 6 = 60 ÷ 6 + 30 ÷ 6 = 10 + 5 = <u>15</u> ii) Work out what each person paid for lunch and for dinner, then add the two amounts together. 48 ÷ 6 + 42 ÷ 6 = 8 + 7 = <u>15</u> *Answer:* Each person paid £15. b) *8 copies of a book should cost £88 altogether but the shopkeeper reduced the total price by £16.* *How much did the shopkeeper actually charge for each book?* Ps come to BB or dictate to T, explaining reasoning. Class agrees/disagrees. Who can think of a different way to solve it? etc. e.g. i) Work out the reduced price of 8 books then divide by 8. BB: (88 – 16) ÷ 8 = 72 ÷ 8 = <u>9</u> ii) Work out what each book should really cost, then subtract the reduction on each book. BB: 88 ÷ 8 – 16 ÷ 8 = 11 – 2 = <u>9</u> *Answer:* The shopkeeper charged £9 for each book.	Whole class activity T reads each problem slowly twice and Ps repeat in own words. Ps suggest plans (with T's help) Reasoning, agreement, praising Elicit that to divide 'difficult' numbers, write it as the sum (difference) of two simpler numbers, then divide each simpler number by the divisor and add (subtract) the two quotients.
	26 min	

Bk4		*Lesson Plan 33*
Activity		***Notes***
5	***Book 4, page 33*** Q.1 Read: *Write the products*. Elicit that there are $6 \times 4 = 24$ multiplications. Set a time limit. Review orally with whole class. Ps change pencils and mark/ correct own work. Who had all 24 correct? Who had 1 (2, 3, 4 more than 4) mistakes? What was your mistake? etc. Ps point out relationships they have noticed. *Solution:* a) $3 \times 6 = \underline{18}$, $30 \times 6 = \underline{180}$, $3 \times 60 = \underline{180}$, $30 \times 60 = \underline{1800}$ b) $8 \times 4 = \underline{32}$, $80 \times 4 = \underline{320}$, $800 \times 4 = \underline{3200}$, $80 \times 40 = \underline{3200}$ c) $9 \times 3 = \underline{27}$, $90 \times 3 = \underline{270}$, $9 \times 300 = \underline{2700}$, $90 \times 30 = \underline{2700}$ d) $8 \times 7 = \underline{56}$, $80 \times 7 = \underline{560}$, $8 \times 70 = \underline{560}$, $800 \times 7 = \underline{5600}$ e) $6 \times 7 = \underline{42}$, $60 \times 7 = \underline{420}$, $600 \times 7 = \underline{4200}$, $6 \times 700 = \underline{4200}$ f) $9 \times 9 = \underline{81}$, $90 \times 9 = \underline{810}$, $900 \times 9 = \underline{8100}$, $90 \times 90 = \underline{8100}$ *31 min*	Individual work, monitored (helped) Differentiation by time limit Agreement, self-correcting, evaluation, praising Write details of problem calculations on BB. Discuss connections, e.g. if the dividend (divisor) increases by 10 (100) times, the quotient also increases by 10 (100) times. Praise all contributions Feedback for T
6	***Book 4, page 33*** Q.2 Read: *Fill in the missing numbers*. Elicit that the missing factor can be calculated by dividing the product by the given factor and that there are $6 \times 3 = \underline{18}$ multiplications. Set a time limit. Review orally with whole class. Ps change pencils and mark/ correct own work. Who had all 18 correct? Who had 1 (2, 3, more than 3) mistakes? What was your mistake? etc. Ps point out relationships they have noticed. *Solution:* a) $8 \times \underline{3} = 24$, $8 \times \underline{60} = 240$, $8 \times \underline{300} = 2400$ b) $5 \times \underline{9} = 45$, $5 \times \underline{90} = 450$, $5 \times \underline{900} = 4500$ c) $6 \times \underline{5} = 30$, $6 \times \underline{50} = 300$, $6 \times \underline{500} = 3000$ d) $9 \times \underline{4} = 36$, $9 \times \underline{40} = 360$, $90 \times \underline{40} = 3600$ e) $4 \times \underline{7} = 28$, $4 \times \underline{70} = 280$, $40 \times \underline{70} = 2800$ f) $6 \times \underline{9} = 54$, $60 \times \underline{9} = 540$, $60 \times \underline{90} = 5400$ *35 min*	Individual work, monitored, helped Differentiation by time limit Agreement, self-correcting, evaluation, praising Write details of problem calculations on BB, e.g. $3600 \div 90 = 360 \div 9 = \underline{40}$ so $90 \times \underline{40} = 3600$ Discuss relationships. Praise all contributions. Feedback for T

Bk4

Lesson Plan 33

Activity		*Notes*
7	***Book 4, page 33*** Q.3 Read: *Write the products*. Remind Ps (or elicit) that difficult numbers can be written as the sum (or difference) of two simpler numbers before multiplying and to look for relationships to help them. Set a time limit. Review at BB with whole class. Ps come to BB or dictate to T, explaining reasoning. Class agree/disagrees. Mistakes discussed and corrected. *Solution:* a) $3 \times 4 = \underline{12}$ $30 \times 4 = \underline{120}$ $300 \times 4 = \underline{1200}$ $13 \times 4 = \underline{52}$ $130 \times 4 = \underline{520}$ $1300 \times 4 = \underline{5200}$ $43 \times 4 = \underline{172}$ $430 \times 4 = \underline{1720}$ $4300 \times 4 = \underline{17\,200}$ b) $9 \times 2 = \underline{18}$ $90 \times 2 = \underline{180}$ $900 \times 2 = \underline{1800}$ $19 \times 2 = \underline{38}$ $190 \times 2 = \underline{380}$ $1900 \times 2 = \underline{3800}$ $89 \times 2 = \underline{178}$ $890 \times 2 = \underline{1780}$ $8900 \times 2 = \underline{17\,800}$	Individual work, monitored, helped Written on BB or use enlarged copy master or OHP Differentiation by time limit Agreement, self-correcting, evaluation, praising Write details of problem calculations on BB, e.g. $43 \times 4 = (40 + 3) \times 4$ $= 160 + 12 = \underline{172}$ Deal with all mistakes and methods of calculation. Feedback for T
	40 min	
8	***Book 4, page 33*** Q.4 Read: *Fill in the missing numbers*. Elicit that there are $6 \times 4 = \underline{24}$ divisions. How can we work out the missing divisors? (Divide the dividend by the quotient.) Let"s have a competition! Let's see how many you can do correctly in 3 minutes! Start . . . now! . . . Stop! Review at BB with whole class. Ps dictate results to T, explaining reasoning where relevant. Ps change pencils and mark/correct own (or neighbour's) work. Discuss all mistakes. Stand up if you had all 24 correct! Let's give them '3 cheers'! *Solution:* a) $36 \div 6 = \underline{6}$, $360 \div 6 = \underline{60}$, $3600 \div 60 = \underline{60}$, $3600 \div 6 = \underline{600}$ b) $72 \div 8 = \underline{9}$, $720 \div 8 = \underline{90}$, $7200 \div 80 = \underline{90}$, $7200 \div 8 = \underline{900}$ c) $45 \div 5 = \underline{9}$, $450 \div 5 = \underline{90}$, $4500 \div 50 = \underline{90}$, $4500 \div 5 = \underline{900}$ d) $24 \div \underline{8} = 3$, $240 \div \underline{80} = 3$, $240 \div \underline{8} = 30$, $2400 \div \underline{80} = 30$ e) $35 \div \underline{7} = 5$, $350 \div \underline{70} = 5$, $350 \div \underline{7} = 50$, $3500 \div \underline{70} = 50$ f) $24 \div \underline{4} = 6$, $240 \div \underline{40} = 6$, $240 \div \underline{4} = 60$, $2400 \div \underline{40} = 60$	Individual work, monitored, helped (Or if short of time, do orally round class) Written on BB or use enlarged copy master or OHP Reasoning, agreement, self-correcting, evaluation, praising
Extension	T sets remainder for homework if Ps would like more practice. g) $\underline{28} \div 7 = 4$, $\underline{280} \div 7 = 40$, $\underline{280} \div 70 = 4$, $\underline{2800} \div 70 = 40$ h) $\underline{64} \div 8 = 8$, $\underline{640} \div 8 = 80$, $\underline{640} \div 80 = 8$, $\underline{6400} \div 80 = 80$ i) $\underline{54} \div 9 = 6$, $\underline{540} \div 9 = 60$, $\underline{540} \div 90 = 6$, $\underline{5400} \div 90 = 60$	Review at beginning of *Lesson 42*. (or extension for quicker Ps who finish early)
	45 min	

Bk4	R: Mental calculation **C: Multiplication and division up to 10 000. Written multiplication (1 digit)** *E: Numbers over 10 000. Problems*	*Lesson Plan* *34*

Activity		*Notes*
1	**Mental practice** T says an operation. Ps say result. a) Addition and subtraction: e.g. 67 + 7, 158 + 5, 2403 + 9, 67 + 24, 418 + 34, 5249 + 16, 4300 + 1800, etc. 72 – 8, 423 – 7, 6519 – 7, 72 – 28, 423 – 27, 6519 – 20, 5400 – 1600, etc. b) Multiplication and division tables: e.g. 4 × 5, 9 × 9, 5 × 0, 25 ÷ 5, 27 ÷ 3, 49 ÷ 7, 2 ÷ 1, 0 ÷ 10, etc. Ps can give them too! c) Multiplication and division: e.g. 17 × 2, 43 × 3, 154 × 2, 2320 × 3, 2500 × 4, 5000 × 2, etc. 48 ÷ 2, 630 ÷ 3, 420 ÷ 5, 8000 ÷ 4000, etc. Write difficult operations on BB. e.g. BB: 40 × 99 = 40 × 100 – 40 × 1 = 4000 – 40 = 3960 *8 min*	Whole class activity T chooses Ps at random (more difficult calculations to more able Ps) Class points out errors. At speed, in good humour! In order round class, at speed If a P answers incorrectly, next P corrects it. T chooses Ps at random (easier calculations to less able Ps) Praising, encouragement only
2	**Revision** a) *Vocabulary* T (or P) writes a multiplication and a division on the BB. Ps come out to BB to write result, explaining reasoning, and to point to and name each component. Class agrees/disagrees. e.g. BB: 30 × 40 = (1200) 750 ÷ 50 = (15) × : multiplicant and multiplier (or factors), product ÷ : dividend, divisor, quotient b) *Properties* Let's complete these open sentences. Ps come to BB or dictate to T. Class agrees/disagrees. e.g. i) The [terms] of an addition are inter-changeable. ii) The reductant and subtrahend of a [subtraction] are [not] inter-changeble. iii) The factors of a [multiplication] are inter-changeable. iv) The [dividend] and [divisor] of a division are [not inter-changeable.] *13 min*	Whole class activity (Names of components could be written on flash cards and stuck to side of BB. Ps point to a component and choose and read the appropriate name card.) Agreement, praising Written on BB or SB or use enlarged copy master or OHP Agreement, praising What else can you tell us about any of the operations? e.g. • subtraction (division) is the reverse of addition (multiplication) • addition of equal numbers can be replaced by ×, etc.
3	**Multiplication** Who can help me with these multiplications? Ps come to BB to write the products, explaining reasoning. Class points out errors. What do you notice? (The sum of the first 4 products equals the 5th product; the bottom multiplicant is the sum of the first 4 multiplicants.) BB: a) 3 × 4 = (12) 20 × 4 = (80) 400 × 4 = (1600) 2000 × 4 = (8000) 2423 × 4 = (9692) b) 5 × 3 = (15) 5 × 80 = (400) 5 × 400 = (2000) 5 × 1000 = (5000) 5 × 1483 = (7415) c) 5 × 7 = (35) 80 × 7 = (560) 700 × 7 = (4900) 785 × 7 = (5495) Elicit that the bottom multiplicant has been written as the sum of simpler numbers to make the multiplication easier.	Whole class activity Written on BB or use enlarged copy master or OHP At a good pace Agreement, praising Agreement, praising

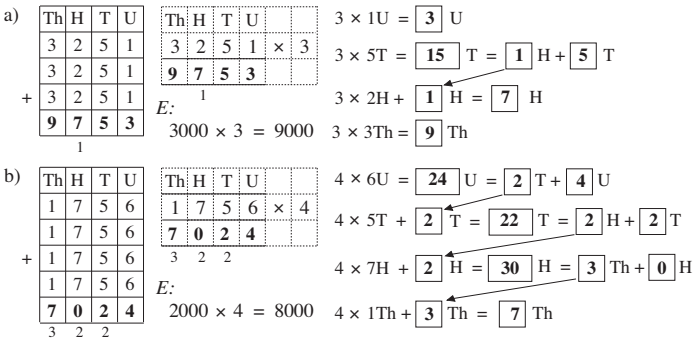
Bk4

Lesson Plan 34

Activity		*Notes*
3	(Continued) How could we calculate the last multiplication in each column in another way? Ps comes to BB to write it. Who agrees? Who can think of another way? etc. BB: e.g. a) $\begin{array}{r} 2423 \\ 2423 \\ 2423 \\ +\ 2423 \\ \hline 9692 \end{array}$ or $\begin{array}{r} 2423 \\ \times\ 4 \\ \hline 9692 \end{array}$ b) $\begin{array}{r} 1483 \\ 1483 \\ 1483 \\ 1483 \\ +\ 1483 \\ \hline 7415 \end{array}$ or $\begin{array}{r} 1483 \\ \times\ 5 \\ \hline 7415 \end{array}$ c) $\begin{array}{r} 785 \\ 785 \\ 785 \\ 785 \\ +\ 785 \\ 785 \\ 785 \\ \hline 5495 \end{array}$ or $\begin{array}{r} 785 \\ \times\ 7 \\ \hline 5495 \end{array}$ or $\begin{array}{r} 785 \times 7 \\ 35 \\ 560 \\ 4900 \\ \hline 5495 \end{array}$ *20 min*	T gives hints if necessary. Reasoning (with detail of place value), agreement, praising Feedback for T
4	**Division** Who can help me with these divisions? Ps come to BB to write the quotients, explaining reasoning. Class points out errors. What do you notice? Ps come to BB to point and reason (with T's help in b) to explain that the remainder in each row has been added to the next row, e.g. 90 + 100 = 190). BB: a) $600 \div 3 = (200)$ $90 \div 3 = (30)$ $7 \div 3 = (2, \text{r } 1)$ $697 \div 3 = (232, \text{r } 1)$ b) $4300 \div 6 = (700, \text{r } 100)$ $190 \div 6 = (30, \text{r } 10)$ $17 \div 6 = (2, \text{r } 5)$ $4397 \div 6 = (732, \text{r } 5)$ How could we calculate the bottom division in each column in another way? Ps comes to BB to write it. Who agrees? Who can think of another way? etc. BB: e.g. a) $\begin{array}{r\|l} & \text{HTU} \\ & 232 \\ 3 & 6\,9\,7 \\ - & 6\,\,\, \\ & 0\,9 \\ & -\ 9 \\ & 0\,7 \\ & -\ 6 \\ & \textcircled{1} \end{array}$ or $\begin{array}{r\|l} & \text{HTU} \\ & 232 \quad \text{r } 1 \\ 3 & 6\,9\,7 \\ & \quad\ 1 \end{array}$ b) $\begin{array}{r\|l} & \text{ThHTU} \\ & 732 \\ 6 & 4\,3\,9\,7 \\ - & 4\,2\,\,\, \\ & 1\,9 \\ & -\ 1\,8 \\ & 1\,7 \\ & -\ 1\,2 \\ & \textcircled{5} \end{array}$ or $\begin{array}{r\|l} & \text{ThHTU} \\ & 732 \quad \text{r } 5 \\ 6 & 4\,3\,9\,7 \\ & \quad 1\,1\,5 \end{array}$ or a) $697 \div 3 = (690 + 7) \div 3 = 230 + 2, \text{r } 1 = \underline{232, \text{r } 1}$ b) $4397 \div 6 = (4200 + 180 + 17) \div 6 = 700 + 30 + 2, \text{r } 5$ $= \underline{732, \text{r } 5}$ *25 min*	Whole class activity Written on BB or use enlarged copy master or OHP At a good pace Agreement, praising T gives hints if necessary. Reasoning (with detail of place value), agreement, praising Feedback for T

Bk4

Lesson Plan 34

Activity		*Notes*
5	***Book 4, page 34*** Q.1 Read: *Fill in the missing numbers*. Deal with one part at a time [or do part a) first with the whole class, then part b) as individual work]. Ps could estimate the results first by rounding to nearest 1000. Encourage Ps to think about what they are doing and to try to understand the steps. Review at BB with whole class. Ps come to BB or dictate to T, explaining reasoning in detail with place values. Mistakes discussed and corrected. Ps read completed steps while T points to the relevant parts of the calculation. *Solution:*  a) Th H T U: 3 2 5 1 + 3 2 5 1 = **9 7 5 3** (1) *E:* 3000 × 3 = 9000 3 × 1U = [3] U 3 × 5T = [15] T = [1] H + [5] T 3 × 2H + [1] H = [7] H 3 × 3Th = [9] Th b) Th H T U: 1 7 5 6 + 1 7 5 6 + 1 7 5 6 + 1 7 5 6 = **7 0 2 4** (3 2 2) *E:* 2000 × 4 = 8000 4 × 6U = [24] U = [2] T + [4] U 4 × 5T + [2] T = [22] T = [2] H + [2] T 4 × 7H + [2] H = [30] H = [3] Th + [0] H 4 × 1Th + [3] Th = [7] Th *30 min*	Individual work, monitored, helped Written on BB or SB or use enlarged copy master or OHP Discussion reasoning, checking against estimate, agreement, self-correction, praising In unison, or a different P for each step
6	***Book 4, page 34*** Q.2 Read: *Estimate first, then calculate with addition and with multiplication*. Ps can estimate by rounding to nearest 1000 or nearest 100. Agree that rounding to nearest 100 will be closer to real value. Review at BB with whole class. Ps come to BB or dictate to T, explaining reasoning with place value detail. Mistakes discussed and corrected. Which do you think is easier, addition or multiplication? (Ps most likely will agree that multiplication is easier if lots of the same number have to be added.) Encourage Ps to use the short form of multiplication but only if they understand what they are doing. *Solution:* a) *E:* 2600 × 4 = 10 400 or 3000 × 4 = 12 000 2 6 4 7 + 2 6 4 7 + 2 6 4 7 + 2 6 4 7 = **1 0 5 8 8** (2 1 2) 2 6 4 7 × [4] = **1 0 5 8 8** (2 1 2) b) *E:* 1700 × 6 = 10 200 or 2000 × 6 = 12 000 1 6 7 8 + 1 6 7 8 + 1 6 7 8 + 1 6 7 8 + 1 6 7 8 + 1 6 7 8 = **1 0 0 6 8** (4 4 4) 1 6 7 8 × [6] = **1 0 0 6 8** (4 4 4) *35 min*	Individual work, monitored helped Drawn on BB or use enlarged copy master or OHP Initial discussion about estimating Reasoning, checking against estimate, agreement, self-correction, praising Show as long multiplication if problems, e.g. 1 6 7 8 × 6 = 10 068 (1) Discuss advantages of multiplication over addition. (Quicker, easier if Ps know the × tables by heart, less writing if short form is used)

Bk4

Lesson Plan 34

Activity		*Notes*
7	***Book 4, page 34*** Q.3 Read: *Which is more? How many more? Write in the missing signs and differences.* Deal with one part at a time. How can we do it? (Work out the product for each side, then subtract the smaller from the greater product.) Ps can do the calculations in their *Ex. Bks*. Review at BB with whole class Ps come to BB or dictate to T, explaining reasoning. Mistakes discussed and corrected. *Solution:* a) 6 times 1480 (=) 3 times 2960 8880 8880 0 b) 9 times 875 (>) 5 times 1420 7875 7100 775 c) 4 times 3100 (<) 7 times 1800 12 400 12 600 200 d) 8 times 734 (>) 2 times 2931 5872 5862 10 Extra praise if Ps notice that 2960 is twice 1480 without doing calculations. *41 min*	Individual work, monitored, helped (or more complicated multiplications with the whole class) Written on BB or SB or OHT Discussion reasoning, agreement, self-correction, praising Calculations written on BB if problems, e.g. 8 7 5 × 9 = 7 8 7 5 (6 4) 1 4 2 0 × 5 = 7 1 0 0 (2 1) 7 8 7 5 − 7 1 0 0 = 7 7 5 Feedback for T
8	***Book 4, page 34, Q.4*** Read: *Write these digits in the boxes so that the product is less than 10 000 and it is:* *a) odd b) even c) a 4-digit number.* Deal with one part at a time. Let Ps think about it and try it themselves for a minute, or discuss with their neighbout. Then Ps come to BB to write a solution and explain their reasoning, with help of class. T gives hints if Ps have no idea what to do. (e.g in a) units digit and multiplier must both be odd, i.e. 3 or 5, but the multiplier cannot be 5, or the product would be > 10 000; choose the thousands digit by estimation) *Solution:* 2 3 4 5 6 a) odd 2645 × 3 = 7935 or 2465 × 3 = 7395 b) even 2456 × 3 = 7368 or 2654 × 3 = 7962 etc. c) 4-digit 4653 × 2 = 9306 or any of the numbers in parts a) and b), etc. *45 min*	Whole class activity (or individual trial first if Ps wish) Digits written or stuck on BB Discussion on strategy for solution. Ps suggest what to do first and how to continue. Encourage logical reasoning, rather than trial and error. Extra praise if Ps find a correct solution without help. If no time to complete during the lesson, the remaining parts could be done for homework.

Bk4	R: Mental calculation **C: Multiplication and division up to 10 000. Written division (1 digit)** *E: Numbers up to 20 000*	*Lesson Plan* *35*
Activity		***Notes***
1	**Mental practice** T says an operation. Ps say result. a) Addition and subtraction (Or relay: Ps answer, then give operation) b) Multiplication and division tables (Or relay as above) c) Multiplication: e.g. 4 × 6, 4 × 16, 4 × 36, 16 × 9, etc. d) Division: e.g. 12 ÷ 6, 120 ÷ 6, 120 ÷ 60, 1200 ÷ 60, 1200 ÷ 600, etc. *8 min*	Whole class activity a) and b) at speed in order round class. If a P answers incorrectly, next P corrects it. In c) and d) T chooses Ps at random. (Differentiation) Praising, encouragement only
2	**Secret numbers** I am thinking of a secret number. I will give you a clue and you must work out what it is. Show me the number when I say. (Ps can do calculations on scrap paper or in *Ex. Bks*.) Ps who responded correctly explain to those who did not. a) *If I multiply it by 3, the result is 2700*. Show me . . . now! (900) (BB: 2700 ÷ 3 = 900 or 900 × 3 = 2700) b) *If I multiply it by 40, the result is 3200*. Show me . . . now! (80) (BB: 3200 ÷ 40 = 320 ÷ 4 = 80 or 80 × 40 = 3200) c) *If I divide it by 7, the result is 80*. Show me . . . now! (560) (BB: 80 × 7 = 560 or 560 ÷ 7 = 80) d) *If I divide it by 60, the result is 50*. Show me . . . now! (3000) (BB: 50 × 60 = 500 × 6 = 3000 or 3000 ÷ 60 = 50) *12 min*	Whole class activity Responses given on scrap paper or slates in unison. Reasoning, agreement, praising If time, Ps can think of secret numbers and clues too.
3	**Time** I will ask a question about time. If you cannot do it mentally, write the calculations in your *Ex. Bks*. Show me the answer when I say. Ps who answer correctly explain reasoning to class. a) *How many hours are in a day?* Show me . . . now! (24) (BB: 1 day = 24 hours) b) *How many hours are in a week?* Show me . . . now! (168) (BB: 1 week = 7 days = 7 × 24 hours = 140 hours + 28hours = 168 hours) c) *How many hours are in 10 weeks?* Show me . . . now! (1680) (BB: 10 weeks = 168 hours × 10 = 1680 hours) d) *How many minutes are in an hour?* Show me . . . now! (60) (BB: 1 hour = 60 minutes) e) *How many minutes are in a day?* Show me . . . now! (1440) (BB: 1 day = 24 hours = 24 × 60 min. = 240 × 6 (min) = 1200 + 240 (min) = 1440 minutes) f) *How many minutes are in a week?* Show me . . . now! (10 080) (BB: 1 week = 7 days = 7 × 1440 min. = 10 080 minutes) *18 min*	Whole class activity (or individual work in *Ex. Bks*, reviewed with whole class) Give Ps enough time to do the calculations. Responses shown on scrap paper or slates in unison. Reasoning, agreement, praising f) BB:

	1	4	4	0
			×	7
1	0	0	8	0
	3	2		

Bk4

Lesson Plan 35

Activity		*Notes*
4	**Problems** Listen carefully and think about how you would solve these problems. T reads problem slowly twice and Ps note data in *Ex. Bks*. Ps come to BB to show each step of the solution while Ps work in *Ex. Bks*.	Whole class activity Ps decide what steps should be done, then come to BB to show them. Class points out missed steps or errors. Reasoning, agreement, checking, praising
	a) *7 metres of iron pipe weighs 3150 g. What would 1 metre weigh?* BB: e.g. *Plan:* 7 m → 3150 g 1 m → 3150 g ÷ 7 *E*: $2800\text{ g} \div 7 < w < 3500\text{ g} \div 7$ $400\text{ g} < w < 500\text{ g}$ *C*: $3150 \div 7 = 2800 \div 7 + 350 \div 7$ $= 400 + 50$ $= \underline{450}$ (g) *Check:* $450 \times 7 = 3150$ ✔ *Answer:* 1 metre of iron pipe would weigh 450 g.	Accept any correct form of estimation, calculation and check. Ps say answers in unison.
	b) *In a flower shop, the assistant is tying flowers in buches of 8. How many bunches can she make if she has 455 flowers?* BB: e.g. *Plan:* 8 flowers: → 1 bunch 455 flowers → 455 ÷ 8 (bunches) *E*: $480 \div 8 = 60$, or *C*: $455 \div 8 = 400 \div 8 + 55 \div 8$ or $= 50 + 6, \text{r } 7$ $= \underline{56, \text{r } 7}$ *Answer:* She can make 56 bunches and will have 7 flowers left over.	*E*: $400 \div 8 < b < 480 \div 8$ $50 < b < 60$ *Check:* $56 \times 8 + 7 = 400 + 48 + 7$ $= 448 + 7$ $= 455$ ✔
	25 min	
5	***Book 4, page 35*** Q.1 Read: *Fill in the missing numbers*. Elicit that there are $3 \times 3 \times 2 = 18$ operations. Encourage Ps to calculate mentally. Set a time limit. Review at BB with whole class. Ps dictate results to T, explaining reasoning. Ps change pencils and mark/correct own work. Who had all 18 correct? Who made 1 (2, 3, more than 3) mistakes? What was your mistake? etc. What did you notice? Ps point out relationships. *Solution:* a) $8 \times \underline{6} = 48$ $\quad 80 \times \underline{6} = 480$ $\quad 800 \times \underline{6} = 4800$ $4 \times \underline{12} = 48$ $\quad 40 \times \underline{12} = 480$ $\quad 400 \times \underline{12} = 4800$ $16 \times \underline{3} = 48$ $\quad 160 \times \underline{3} = 480$ $\quad 1600 \times \underline{3} = 4800$ b) $36 \div \underline{9} = 4$ $\quad 3600 \div \underline{900} = 4$ $\quad \underline{3600} \div 9 = 400$ $360 \div \underline{90} = 4$ $\quad 3600 \div \underline{90} = 40$ $\quad \underline{3600} \div 90 = 40$ $360 \div \underline{9} = 40$ $\quad 3600 \div \underline{9} = 400$ $\quad \underline{3600} \div 900 = 4$	Individual work, monitored, (helped) Written on BB or use enlarged copy master or OHP Discussion, reasoning, agreement, self-correction, evaluation, praising Extra praise if Ps notice connections by themselves. e,g, If the dividend increases by a certain number of times, the quotient also increases by that number of times; If the divisor increases by a certain number of times, the quotient decreases by that number of times.
	30 min	

Bk4

Lesson Plan 35

Activity 6

Book 4, page 35, Q.2

Read: *Divide 7640 into 3 equal parts. Fill in the missing items.*

Who can come and point to the division? Read it for us ('seven thousand six hundred and forty divided by 3') What should we do first? (Estimate the quotient) Where is it on the BB? P come to point. Why is it written like that? (Because 6000 and 9000 are the next smaller and greater thousands easily divisible by 3) Who can fill in the missing numbers? Who agrees? Let's read the inequality together. T points to each component. 'The quotient is more than 2000 and less than 3000.'

Now let's do the calculation. Ps come to BB to do each step, then fill in and say the relevant 'details'. Class agrees/disagrees. Ps complete steps in *Pbs* too. Continue until calculation is completed.

What should we do now? (Compare with the estimate.) Agree that 2546 is more than 2000 but less than 3000. How could we check it more accurately? (With a multiplication) Ps come to BB to show it.

Let's read all the steps again. T points to relevant parts of calculation.

Solution:

	Th	H	T	U
	2	**5**	**4**	**6**
3	7	6	4	0
−	6			
	1	6		
−	1	5		
		1	4	
	−	1	2	
			2	0
			1	8
				②

E: 6000 < 7640 < 9000

2000 < quotient < 3000

Details:

7 Th ÷ 3 = **2** Th, because
2 Th × 3 = **6** Th, and **1** Th remains.
1 Th + 6 H = 16H; 16H ÷ 3 = **5** H, because
5 H × 3 = **15** H, and **1** H remains.
1H + 4T = 14T; 14T ÷ 3 = **4** T, because
4 T × 3 = **12** T, and **2** T remains.
2T + 0U = 20 U, 20 U ÷ 3 = **6** U, because
6 U × 3 = **18** U,
and **2** U remains.

38 min

Activity 7

Book 4, page 35

Q.3 Read: *Do the divisions and check them with multiplication.*

Deal with one part at time. Set a time limit.

Review at BB with whole class. Ps dictate to T or come to BB, explaining reasoning in detail. Class agrees/disagrees. Mistakes discussed and corrected.

Solution:

a)

	Th	H	T	U	
	1	**2**	**3**	**1**	
5	6	1	5	7	
−	5				← 1 Th × 5
	1	1			
−	1	0			← **2** H × 5
		1	5		
	−	1	5		← **3** T × 5
			0	7	
		−		5	← **1** U × 5
				②	

Ch:

	1	2	3	1	×	5
	6	1	5	5		
				+	2	
6	1	5	7	✔		

b)

	Th	H	T	U	
		9	**1**	**8**	
8	7	3	4	8	
−	7	2			← **9** H × 8
		1	4		
	−		8		← **1** T × 8
			6	8	
		−	6	4	← **8** U × 8
				④	

Ch:

		9	1	8	×	8
	7	3	4	4		
				+	4	
7	3	4	8	✔		

45 min

Notes

Whole class activity

Written on BB or SB or use enlarged copy master or OHP

Discussion, reasoning, agreement, praising

In unison

Choose a different P for each step.

At a good pace

Reasoning, agreement, checking, praising

In unison

BB: *Check:*

2	5	4	6	×	3
7	6	3	8		
		+	2		
7	6	4	0	✔	

Individual work, monitored, helped

Written on BB or use enlarged copy master or OHP

Reasoning with place value detail, agreement, checking, self-correction, praising

Review the name of the components of division:

(dividend, divisor, quotient, remainder)

Extension

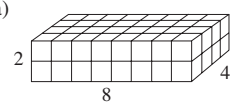
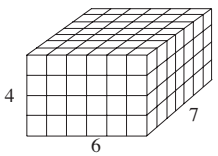
Who can show us one of the divisions in a different way?

(Horizontal or short division or subtraction of known multiples)

T gives hints /help if necessary.

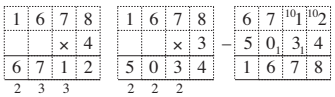
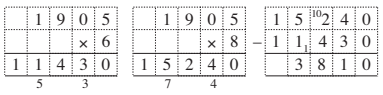
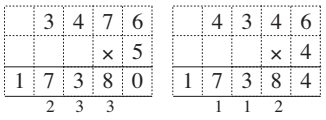
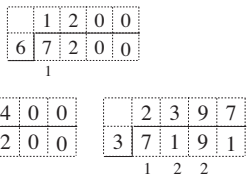
Which do you like best? Why?

Bk4	R: Mental calculation **C: Multiplication and division up to 10 000** *E: Numbers up to 20 000. Problems*	*Lesson Plan* *36*

Activity		*Notes*
1	**Multiplication** Let's calculate these products. Ps come to BB to do calculations or dictate to T. Who agrees? Who can think of a better way? Elicit that if an operation contains only multiplications, the order does not matter. You can do the calculations in the easiest order and obtain the same result. BB: a) $7 \times 4 \times 5 = 28 \times 5 = 100 + 40 = 140$ Or better: $7 \times (4 \times 5) = 7 \times 20 = 140$ b) $9 \times 5 \times 8 = 45 \times 8 = 320 + 40 = 360$ Or better: $45 \times 8 = 90 \times 4 = 360$ Or even better: $9 \times (5 \times 8) = 9 \times 40 = 360$ c) $2 \times 6 \times 10 = 12 \times 10 = 120$ Or : $2 \times (6 \times 10) = 2 \times 60 = 120$ d) $3 \times 5 \times 8 = 15 \times 8 = 80 + 40 = 120$ Or: $15 \times 8 = 30 \times 4 = 120$ Or even better: $3 \times (5 \times 8) = 3 \times 40 = 120$ e) $7 \times 5 \times 12 = 35 \times 12 = 350 + 70 = 420$ Or better: $35 \times 12 = 70 \times 6 = 420$ Or even better: $7 \times (5 \times 12) = 7 \times 60 = 420$ f) $8 \times 4 \times 15 = 32 \times 15 = 320 + 150 + 10 = 470 + 10 = 480$ Or better: $8 \times (4 \times 15) = 8 \times (2 \times 30) = 8 \times 60 = 480$ g) $9 \times 5 \times 20 = 45 \times 20 = 800 + 100 = 900$ Or: $45 \times 20 = 90 \times 10 = 900$ Or even better: $9 \times (5 \times 20) = 9 \times 100 = 900$ *5 min*	Whole class activity Initial operations written on BB or SB or OHT At a good pace Reasoning, agreement, praising Exra praise for 'clever' ways. T shows them if Ps do not. In c) Ps decide which is easier. (Show of hands)
2	***Book 4, page 36*** Q.1 Read: *How many unit cubes have been used to build the cuboids? Calculate the volume in 3 different ways.* Deal with one part at a time. Ps first count the unit cubes along each edge and write the number beside it. Then they write the multiplication with the factors in 3 different orders. Review at BB with whole class. Ps come to BB or dictate to T, explaining reasoning. Class agrees/disagrees. Mistakes discussed and corrected. *Solution:* e.g. a)  $V = 8 \times 4 \times 2 = 32 \times 2 = 64$ $V = 8 \times 2 \times 4 = 16 \times 4 = 64$ $V = 4 \times 2 \times 8 = 8 \times 8 = 64$ etc. b)  $V = 6 \times 7 \times 4 = 42 \times 4 = 168$ $V = 6 \times 4 \times 7 = 24 \times 7 = 168$ $V = 7 \times 4 \times 6 = 28 \times 6 = 168$ etc. *12 min*	Individual work, monitored, helped Drawn on BB or use enlarged copy master or OHP Discussion, reasoning, agreement, self-correcting, praising Agree that as all operations are multiplications, the order of factors does not matter – the result is the same. **Extension** What is the **area** of each face? T points to a face and class shouts out its area in unit squares.

Bk4

Lesson Plan 36

Activity		*Notes*
3	**Missing numbers** Let's fill in the missing numbers. You can do the calculations in your *Ex. Bks.* first if you wish. Ps come to BB to write numbers, explaining reasoning. Class agrees/disagrees. Extra praise if Ps notice a 'clever' way. BB: a) $1678 \times 4 = 1678 \times 3 +$ 1678 (6712 / 5034) But no calculation is necessary, as $4 \times n = 3 \times n + n$)  b) $1905 \times 6 = 1905 \times 8 -$ 3810 (11 430 / 15 240) But only one calculation is necessary: $1905 \times 2 = 3810$ as $6 \times n = 8 \times n - 2 \times n$)  *18 min*	Whole class aactivity Written on BB or SB or OHT Reasoning, agreement, praising Necessary calculations done at side of BB. If no P notices easy methods, T gives hints. Class applauds P who notices this!
4	**Inequalities** Which numbers could be written instead of the square to make the inequality true? What should we do first? (Work out the value of each side.) Ps work out values in *Ex. Bks.* then come to BB to write results as another inequality. Class agrees/disagrees. What numbers would make it true? Class dictates and T writes on BB. BB: a) $3476 \times 5 < \square < 4346 \times 4$ $17380 < \square < 17384$ $\square$: 17381, 17382, 17383  b) $1075 \times 7 > \square \geq 1503 \times 5$ $7525 > \square \geq 7515$ $\square$: 7524, 7523, . . ., 7516, 7515 (10 numbers) *23 min*	Whole class activity Written on BB or SB or OHT Ps suggest how to solve them, with help of class Reasoning, agreement, checking, praising Check with smallest and greatest values from list. Feedback for T
5	**Equal values** What do you notice about these operations? (They contain the same numbers and the same two operations.) Which of them do you think are the same? T marks the equations that Ps think have equal results. Let's do the calculations and see whether you are correct. Ps do calculations in *Ex. Bks* first before coming to BB or dictating to T. Class agrees/disagrees. Mistakes in *Ex. Bks* corrected. Did you choose the correct equal values? Why did you choose them? BB: $7200 \div 9 - 3 = 800 - 3 =$ 797 $7200 \div (9 - 3) = 7200 \div 6 =$ 1200 $7200 \div 3 - 9 = 2400 - 9 =$ 2391 $(7200 - 9) \div 3 = 7191 \div 3 =$ 2397 ✔ $7200 - 9 \div 3 = 7200 - 3 =$ 7197 $7200 \div 3 - 9 \div 3 = 2400 - 3 =$ 2397 ✔ *28 min*	Whole class activity Initial discussion and deciding Reasoning, agreement, self-correcting, praising Extra praise if correct. Ps explain reason for choice (with T's help if necessary). *C:* 

Bk4

Lesson Plan 36

Activity		*Notes*
6	*Book 4, page 36* Q.2 Read: *Fill in the missing numbers.* Let's see how quickly you can solve these! Stand up when you have finished. P who finished first explains reasoning to class. Class agrees/ disagrees. Who did the same? Who did it a different way? *Solution:* a) $1256 \times 6 = 1256 \times 5 +$ **1256** (No calculation is necessary, as $6 \times n = 5 \times n + n$) b) $2432 \times 3 = 2433 \times 3 -$ **3** (No calculation is necessary as $2432 \times n = 2433 \times n - n$) Check for Ps who did the calculations: a) $\begin{array}{cccc} 1 & 2 & 5 & 6 \\ & & \times & 6 \\ \hline 7 & 5 & 3 & 6 \\ 1 & 3 & 3 & \end{array}$ $\begin{array}{cccc} 1 & 2 & 5 & 6 \\ & & \times & 5 \\ \hline 6 & 2 & 8 & 0 \\ 1 & 2 & 3 & \end{array}$ $-$ $\begin{array}{cccc} 7 & 5 & {}^{10}3 & 6 \\ 6 & 2_{1} & 8 & 0 \\ \hline 1 & 2 & 5 & 6 \end{array}$ b) $\begin{array}{cccc} 2 & 4 & 3 & 2 \\ & & \times & 3 \\ \hline 7 & 2 & 9 & 6 \\ 1 & & & \end{array}$ $\begin{array}{cccc} 2 & 4 & 3 & 3 \\ & & \times & 3 \\ \hline 7 & 2 & 9 & 9 \\ 1 & & & \end{array}$ $7299 - 7296 = \underline{3}$	Individual work, monitored T notes which Ps finish quickly. If P reasoned correctly, class gives 3 cheers! If several Ps did the calculations, let Ps go through them on the BB in case mistakes were made. Reasoning, agreement, self-correction, praising
	32 min	
7	***Book 4, page 36*** Q.3 a) Read: *How many squares can you count in this diagram?* Show me the answer . . . now! (5) P who answered correctly comes to BB to point and count. Mistakes corrected. b) Read: *How many squares could you count in:* *i) 675 of these diagrams* (3375 squares) *ii) 1060 of these diagrams?* (5300 squares) Ps can do calculations in *Ex. Bks* or on scrap paper. Results could be shown on scrap paper or slates on command. Ps who responded incorrectly come to BB to do calculations with help of class. Mistakes discussed/corrected. BB: i) $\begin{array}{cccc} & 6 & 7 & 5 \\ & & \times & 5 \\ \hline 3 & 3 & 7 & 5 \\ & 3 & 2 & \end{array}$ ii) $\begin{array}{cccc} 1 & 0 & 6 & 0 \\ & & \times & 5 \\ \hline 5 & 3 & 0 & 0 \\ & 3 & & \end{array}$	Individual work, monitored Diagram drawn on BB:  Agreement, self-correction, praising Give Ps enough time to do calculations. In unison Reasoning, agreement, self-correcting, praising
Extension	If the question had asked for the number of rectangles, what would the answers be? Ps come to BB or dictate to T. a) 9 rectangles (including the 5 squares) b) i) $\begin{array}{cccc} & 6 & 7 & 5 \\ & & \times & 9 \\ \hline 6 & 0 & 7 & 5 \\ & 6 & 4 & \end{array}$ ii) $\begin{array}{cccc} 1 & 0 & 6 & 0 \\ & & \times & 9 \\ \hline 9 & 5 & 4 & 0 \\ & 5 & & \end{array}$	Whole class activity Reasoning, agreement, praising
	37 min	

Bk4

Lesson Plan 36

Activity		*Notes*
8	***Book 4, page 36***	
	Q.4 Read: *Solve the problems in your exercise book.*	Individual work, monitored, helped
	Ps read problems themselves, write a plan, do the calculations, check them and write the answer as a sentence. T warns them to picture the story in their head before writing the answer.	
	Review at BB with whole class. Ps come to BB to write solutions and explain reasoning. Mistakes discussed and corrected.	Reasoning, agreement, self-correcting praising
	Solution:	Extra praise if Ps realise that number of rows must be 161 and not 160!
	a) *964 soldiers are on parade. They are marching in rows of 6.*	
	i) How many rows are there?	
	BB: $964 \div 6 = (600 + 300 + 60 + 4) \div 6$ $= 100 + 50 + 10 + 0, \text{r } 4$ $= \underline{160, \text{r } 4}$	or 1 6 0 r 4 6 9 6 4 3 ④
	Answer: There are 161 rows. (160 rows of 6 and 1 row of 4)	
	ii) Does the last row contain fewer soldiers than the other rows?	Discussion, agreement
	Answer: One of the 161 rows contains 2 fewer soldiers but it might not be the last row.	
	b) *What would your answers be if the soldiers were marching in rows of 8?*	
	BB: $964 \div 8 = (800 + 160 + 4) \div 8$ $= 100 + 20 + 0, \text{r } 4$ $= \underline{120, \text{r } 4}$	or 1 2 0 r 4 8 9 6 4 1 ④
	Answer: There would be 121 rows. (120 rows of 8 and 1 row of 4)	
	41 min	
9	***Book 4, page 36, Q.5***	
	Read: *Fill in the missing numbers.*	Whole class activity (or individually if Ps wish)
	Ps come to BB or dictate to T, explaining reasoning. Calculations done in *Ex. Bks* or at side of BB. Class points out errors.	Written on BB or use enlarged copy master or OHP
	Solution:	At a good pace
	a) 9360 $\xrightarrow{\div 2}$ 4680 $\xrightarrow{\div 3}$ 1560 $\xrightarrow{\div 4}$ 390 $\xrightarrow{\div 5}$ 78 $\xrightarrow{\div 6}$ **13**	Reasoning, agreement, praising
	b) 9360 $\xrightarrow{\div 4}$ 2340 $\xrightarrow{\div 5}$ 468 $\xrightarrow{\div 2}$ 234 $\xrightarrow{\div 6}$ 39 $\xrightarrow{\div 3}$ **13**	
	c) 9360 $\xrightarrow{\div 3}$ 3120 $\xrightarrow{\div 6}$ 520 $\xrightarrow{\div 5}$ 104 $\xrightarrow{\div 4}$ 26 $\xrightarrow{\div 2}$ **13**	
	What do you notice? (dividends and quotients are the same; divisors are the same but in different orders) Elicit that if an operation contains only divisions, then the order does not matter.	Discussion, agreement Extra praise if Ps notice this without hints from T.
	45 min	

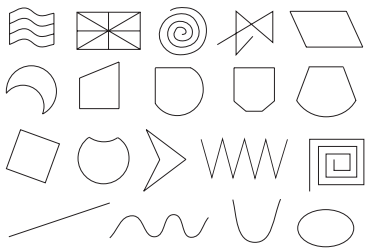
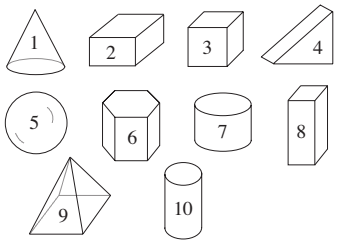
Bk4

R: Calculations

C: Geometry: 1–D, 2–D, 3–D shapes. Angles. Parallel and perpendicular lines

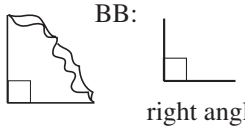
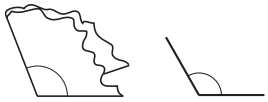
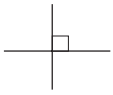
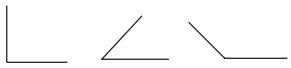
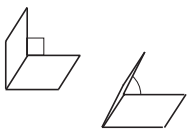
E: Problems

Lesson Plan *37*

Activity		*Notes*
1	**Geometric shapes 1** Let's remind ourselves about the different kinds of shapes. What can you tell me about these? Ps say what they know. Class agrees/disagrees or suggests other properties or descriptions. T has: • real objects: e.g. rectangular boxes, large dice, ball, pencil, hexagonal and cylindrical tins, briefcase, candle, globe, etc. • pictures: e.g. church, house, pyramid, igloo, tree, wheelbarrow, etc. • line drawings, e.g. BB:  Ps might mention, e.g.: • 3-D shapes: size, colour, material, uses, solid, box, sphere, cylinder, cuboid, cube, pyramid, prism, cylinder, curved or plane faces, straight or curved edges, number of vertices, etc. • 2–D (or plane shapes): names of shapes, polygons, straight or curved sides or mixture of the two, number of sides, perimeter, vertices, regular or irregular, closed or open, parallel or perpendicular sides, right angles, etc. • 1–D: lines, straight or curved, horizontal, vertical, slanting, crosses itself or not, etc. *10 min*	Whole class activity (Or objects could be on a theme, e.g. Christmas) T holds up or points to each in turn and Ps say something about them. Encourage Ps to speak in sentences. Gradually elicit the geometric features. Drawn on BB or use enlarged copy master or OHP Involve the majority of Ps. Praise all contributions. Extra praise for 'clever' features, such as symmetry N.B. Objects, pictures, drawings and features can be limited according to ability of Ps. There is no need to cover everything!
2	**Geometric shapes 2** T has various models to show and also drawings of them on BB, e.g.  a) What are the geometric names of these solids? T points to each in turn and Ps shout out its name if they know it. T writes it on BB. How many faces (edges, vertices) does it have? [*Names:* 1: cone; 2: cuboid; 3: cube; 4: prism (triangular-based); 5: sphere; 6: prism (hexagonal-based) ; 7: cylinder; 8: cuboid; 9: pyramid (square-based); 10: cylinder] b) Which of the solids has: i) at least one plane (flat) face (1, 2, 3, 4, 6, 7, 8, 9, 10) ii) at least one face which is a triangle (4, 9) iii) at least one face which is a circle (1, 7, 10) iv) all its faces plane (flat) (2, 3, 4, 6, 8, 9) v) at least one face which is a rectangle (2, 3, 4, 6, 8, 9) vi) all its faces rectangles (2, 3, 8) viii) at least one face which is a square (3, 9) viii) all its faces square? (3) *20 min*	Whole class activity T has set of solids to match those drawn on BB or on enlarged copy master . (If possible, Ps also have a set of solids and/or copies of sheet on desks.) Or T could have names on flash cards stuck to side of BB and Ps come to BB to choose and say the correct name. Discussion on properties. Ps come to BB or dictate to T Class agrees/disagrees In v), elicit that a square is also a rectangle. Praising, encouragement only Feedback for T

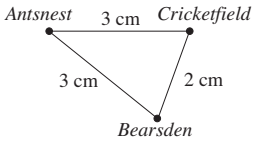
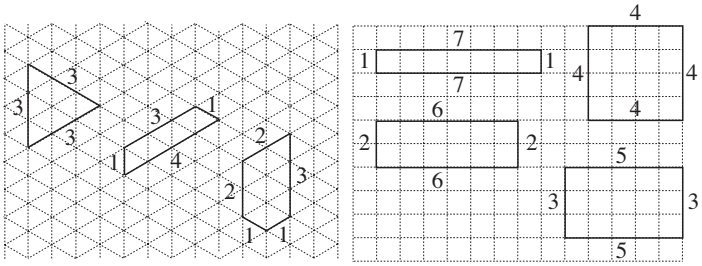
Bk4

Lesson Plan 37

Activity		*Notes*
3	**Angles** Ps have 3 roughly torn pieces of paper and 2 straws on desks. T has large sheets for demonstration. a) i) Take one piece of paper and fold it to make a <u>right angle</u>. Show it to me . . . now! P who responded correctly demonstrates to those who did not (or T demonstrates). Corrections made. T draws angle on BB. (Ps can draw and label angle in *Ex. Bks.)* ii) Take another piece of paper and fold it to make an angle <u>smaller</u> than a right angle. Show it to me . . . now! P who responded correctly demonstrates to those who did not (or T demonstrates). Corrections made. An angle smaller than a right angle is called an <u>acute angle</u>. T draws angle on BB. (Ps can draw and label angle in *Ex. Bks.)* iii) Take the 3rd piece of paper and fold it to make an angle <u>larger</u> than a right angle. Show it to me . . . now! P who responded correctly demonstrates to those who did not (or T demonstrates). Corrections made. An angle larger than a right angle is called an <u>obtuse angle</u>. T draws angle on BB. (Ps draw and label angle in *Ex. Bks.)* b) Everyone stand up! Hold your 2 straws so that they are: i) parallel to each other . . . . now! T corrects Ps who are wrong. Who can explain what parallel means? (Lines stay the same distance apart, however far they are extended) ii) crossing each other . . . . now! iii) crossing each other but are also perpendicular . . . now! T corrects Ps who are wrong. Who can explain what perpendicular means? (The lines are at right angles to one another (or form an angle of 90°). c) With your 2 straws, make a right (acute, obtuse) angle . . . now! Look at your neighbour's straws and correct them if they are wrong. d) Open your *Pb* (*Ex Bk*) so that the two sides: i) are perpendicular . . . now! What angle do they make? (right) ii) make an angle less than a right angle . . . now! What is this kind of angle called? (acute) iii) make an angle greater than a right angle . . . now! What is this kind of angle called? (obtuse)	Whole class activity but folding done individually Angles shown in unison BB:  right angle  acute angle  obtuse angle  parallel lines Ps find examples of such lines in the classroom. BB:  perpendicular lines lines    Correcting, praising
	26 min	
4	***Book 4, page 37*** Q.1 Read: *a) How many rectangles are in this diagram?* *b) How many rectangles would be in 874 such diagrams?* *c) What is the area of the diagram?* *d) What is the perimeter of the diagram?* Deal with one part at a time. Ps could show results on scrap paper or slates on command. Mistakes discussed and corrected. *Solution:* a) 9 b) 7623 c) A = <u>4</u> square units d) P = <u>8</u> units	Individual work, monitored (helped) Diagram drawn on BB:  Calculation done on scrap paper or in *Ex. Bks*. Reasoning, agreement, self-correction, praising BB: 8 4 7 × 9 7 6 2 3 4 6 T checks with a calculator.
	30 min	

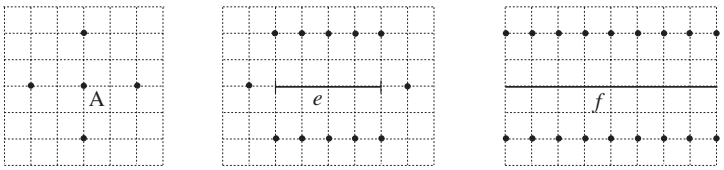
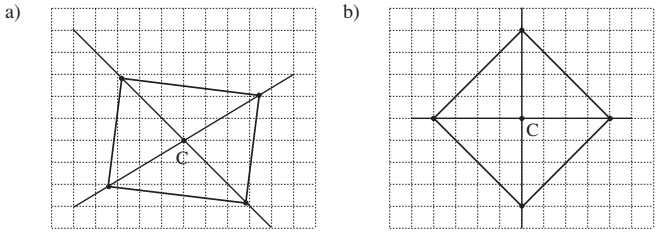
Bk4

Lesson Plan 37

Activity		*Notes*
5	***Book 4, page 37*** Q.2 Read: *Scale: 1 cm on the diagram means 875 cm in real life.* *a) How far away in real life is* *i) Bearsden from Antsnest?* *ii) Cricketfield from Antsnest?* *b) What distance in real life is the round trip?* Ps measure the lines and write lengths on diagram. Review with whole class. Mistakes corrected. Ps work through rest of questions by themselves. Calculations done in *Ex. Bks*, only results written in *Pbs*. Set a time limit. Review at BB with whole class. Ps dictate to T or come to BB to write actual distances on diagram. Calculations written on BB if problems. Mistakes discussed and corrected. Elicit that the round trip is the perimeter of the triangle.	Individual work, monitored, helped Diagram drawn on BB. Reasoning, agreement, self-correcting, praising BB: 1 cm → 875 cm  a) AB = AC = 3 × 875 m = 2625 m = 2 km 625 m b) P = 8 × 875 m = 7000 m = 7 km
Extension	How far is *Bearsden* from *Cricketfield*? (2 × 875 m = 1750 m)	
	35 min	
6	***Book 4, page 37*** Q.3 Read: *a) Draw 9-unit perimeters which enclose a triangle, a quadrilateral and a pentagon.* *b) Draw 16-unit perimeters which enclose different rectangles.* Deal with one part at a time. Advise Ps to think about it before starting to draw! Ps can discuss it with their neighbour. Review at BB with whole class. Ps come to BB to draw shapes (or T has possible solution already prepared on SB or OHT). *Solution:* 	Individual (or paired) work, monitored, helped Drawn on BB or use enlarged copy master or OHP (or use squared board or pin-board) Discussion, reasoning, agreement, self-correction, praising **Extension** • Mark the parallel lines by drawing over them in the same colour (or by drawing arrows). • Mark the perpendicular sides by colouring a square in the corner.
	40 min	

Bk4

Lesson Plan 37

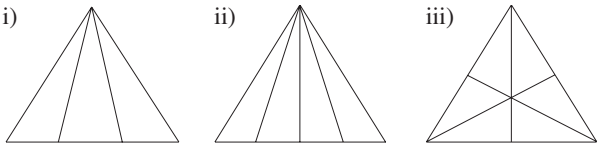
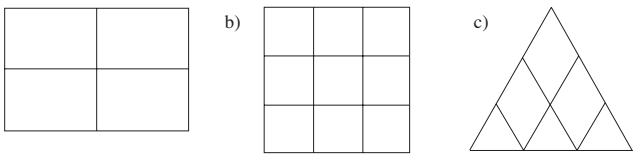
Activity		*Notes*
7	***Book 4, page 37*** a) Ps have copies of copy master on desks. Mark the grid points which are 1 cm away from i) point A ii) line segment *e* iii) line *f*. Review at BB with whole class. Ps agree on number of points. Point out that in iii), only 18 points can be shown on this grid but if you imagine the line going on and on in both directions, there will be a never-ending (infinite) number of points. T shows (or elicits if some Ps remember it) the symbol for infinity (a point which can never be reached): ∞ *Solution:* i) point A ii) line segment *e* iii) line *f*  4 12 18 here, but really ∞	Individual (or paired) work, monitored, helped Use enlarged copy master or OHP for demonstration only. Ps come to BB to show possible points. Class agrees/ disagrees. Mistakes corrected and omissions added. Whole class discussion about the concept in maths of a line never ending (going on and on to infinity). BB: ∞ infinity
	b) Q.4 Read: *Measure 2 cm from point C on the lines. Join up the points. What shape have you made?* I will give you a minute, then you must write only one word on your slates which describes both shapes and show me it when I say. Show me . . . now! (rectangle) What other shape could you have written for b)? (Square) T confirms by showing already prepared solution. *Solution:* a) b)  	Individual work, monitored Ps use rulers to measure in a) as points are not on grid inter-sections. In unison Class shouts out in unison. Drawn on SB or OHT or use enlarged copy master for demonstration only! Agreement, self-correcting, praising

45 min

Bk4

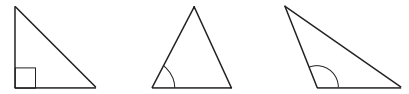
R: Parallel, perpendicular lines. Calculations
C: Shapes (1-D, 2-D). Right angles
E: Problems

Lesson Plan *38*

Activity		*Notes*
1	**Multiplication practice** a) How many triangles can you count in these shapes? BB: i) ii) iii)  (6) (10) (16) Ps come to BB to BB to show the triangles. (T helps them to draw each one on BB if necessary.) Class agrees on final number.	Whole class activity but individual calculation Drawn on BB or use enlarged copy master or OHP Ps might remember iii) from *Lesson 45*. Discussion, reasoning, agreement, praising
	b) How many triangles could we count in 412 such shapes? Ps do calculations in *Ex. Bks* then show results, one part at a time, on command. Ps who responded incorrectly come to BB to work through calculation with help of class. Corrections made. BB: $412 \times 10 = 4120$ $412 \times 16 = 412 \times (10 + 6)$ $= 4120 + 2472$ $= \underline{6592}$	Individual work, monitored Responses shown on scrap paper or slates in unison. or *C*:
Extension	c) On how many such shapes could we count 9600 triangles? Elicit that the operation needed is division. Ps do calculations in *Ex. Bks*. Review as in b) whole class. BB: $9600 \div 10 = 960$	Individual work, monitored Reasoning, agreement, praising [N.B. $9600 \div 16 \neq 9600 \div 10 + 9600 \div 6 = 960 + 1600 = 2560$!]
	10 min	
2	**Parallel and perpendicular lines** Let's mark the parallel and perpendicular lines on these diagrams. BB: a) b) c)  Ps come to BB to colour over in different colours (or mark with arrowheads) the sets of parallel lines, then to draw squares at all the right angles. Class points out errors or omissions.	Whole class activity Drawn on BB or use enlarged copy master or OHP At a good pace Agreement, praising
	Who can think of other questions to ask about the diagrams? e.g. In each diagram: i) What shapes can you see? ii) How many rectangles (squares, triangles) can you see? iii) How many <u>pairs</u> of parallel (perpendicular) lines can you count? etc. Class (T) decides which ones to solve (some with T's help).	Extra praise for 'clever' questions. e.g.in a): i) rectangles ii) 9 rectangles iii) 6 pairs of parallel lines 9 pairs of perpendicular lines
	20 min	

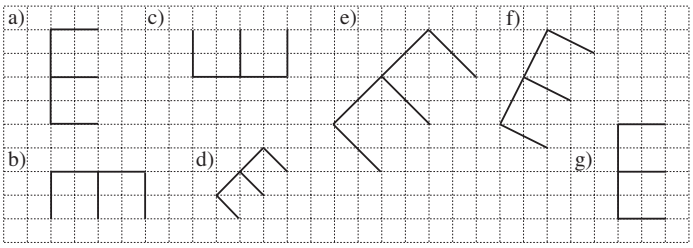
Bk4

Lesson Plan 38

Activity		*Notes*
3	**Folding paper** Ps have 4 pieces of triangular or circular shaped paper on desks. Fold a piece of paper so that: a) it has 2 parallel sides Show me . . . now! Ps can check by measuring how far apart the sides are at each end. (T demonstrates how rulers should be perpendicular to the sides!) b) it has a pair of perpendicular lines. Show me . . . now! (Elicit that they form a right angle. Ps mark it with a square.) c) it has an angle smaller than a right angle. Show me . . . now! (Elicit/tell that this is called an acute angle.) d) it has an angle greater than a right angle. Show me . . . now! (Elicit /tell that this is called an obtuse angle.)	Whole class activity but individual folding. (or a roughly torn sheet of paper which has no parallel or perpendicular sides to start with) Paper shown in unison. Ps check neighbour's lines. Mistakes corrected. Agreement, praising
	T draws 3 triangles on BB (without labels or markings). Let's compare these triangles with our 3 folded angles.  right angled triangle — acute angled triangle — obtuse angled triangle	(Or already drawn on SB or OHT)
	Which triangle has a right angle? Ps come to BB to point and check with their own angle. T (P) marks the right angle with a square. We call this kind of triangle a right-angled triangle. T writes (sticks) the label beneath it. Elicit that its other 2 angles are acute. Repeat for the obtuse-angled triangle. Elicit that only one angle is obtuse and the other 2 angles are acute. Elicit that the 3rd triangle has all its 3 angles acute, so it is called an acute-angled triangle.	Discussion, agreement, praising Ps could draw the 3 triangles in *Ex. Bks* (using rulers) and label them.
	25 min	
4	***Book 4, page 38*** Q.1 Read: *In your exercise book, make a plan, estimate, calculate, check and write the answer as a sentence.* Deal with one part at a time. Ps read the question themselves and solve it in *Ex. Bks*. Set a time limit for each question. Review with whole class. Ps come to BB to show their solution, explaining reasoning. Who agrees? Who thinks something else? Who did it a different way? Who made a mistake? What kind of mistake? etc. *Solutions:* a) *The highest mountain in Europe is Mont Blanc which is 4810 m high. It is 4032 m lower than Mount Everest.* *How high is Mount Everest?* *Plan:* MB: 4810 m ME: 4810 + 4032 m *E:* 5000 + 4000 = 9000 *C:* $\begin{array}{r} 4\,8\,1\,0 \\ +\ 4\,0\,3\,2 \\ \hline 8\,8\,4\,2 \end{array}$ *Answer: Mount Everest* is 8842 m high.	Individual work, monitored, helped (T could have relevant maps on hand to show where each place is, and some interesting facts about each in mind, although give Ps the chance to tell class what they know first.) Reasoning, agreement, checking, self- correction, praising Check against estimate, then with a subtraction (or with a calculator). Feedback for T

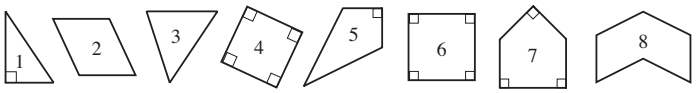
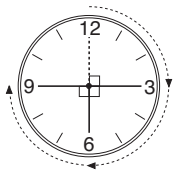
Bk4

Lesson Plan 38

Activity		*Notes*
4	(Continued) b) *The River Danube is 2840 km long and the River Nile is 6670 km long. How much longer is the River Nile than the River Danube?* *Data:* RD: 2840 km RN : 6670 km *Plan:* 6670km – 2840 km *E:* 7000 – 3000 = 4000 (km) *Answer:* The *River Nile* is 3820 km longer than the *River Danube*. c) *The deepest point in the Pacific Ocean is near Japan and is 10 680 m below sea level. The highest point in Japan is 3776 m above sea level. What is the difference between these two points?* *Data:* DP: 10 680 m below sea level HP: 3776 m above sea level *Plan:* 10 680 m + 3776 m *C*: + 1 0 6 8 0 / 3 7 7 6 / 1 4 4 5 6 (1 1) 14 456 m = 14 km 456 m *Answer:* The difference between the two points is 14 km 456 m.	*C:* – 6 10 6 7 0 / 2 1 8 5 0 / 3 8 2 0 Draw a diagram on BB to aid understanding. BB: Highest Point, 3776 m, Sea Level, 10 680 m, Deepest Point
	31 min	
5	***Book 4, page 38*** Q.2 Read: *Mark the parallel and perpendicular lines on this capital E.* Ps mark the parallel lines with arrowheads (or colour over in the same colour) and draw (or colour) squares to show the perpendicular lines (right angles). Review at BB with whole class. Ps come to BB. Class agrees/disagrees. Mistakes corrected. Read: *We started to draw the letter E on this grid in different positions and sizes. Complete the drawings.* Set a time limit. Ps who finish first come to BB or OHP to complete the drawings. Review with whole class. Class agrees/disagrees with solutions. Mistakes discussed/corrected. *Solution:* e.g. Accept any correct completion.  	Individual work, monitored, helped Drawn on BB or use enlarged copy master or OHP Agreement, self-correcting, praising Agreement, self-correction, praising Which shapes are <u>similar</u>? (All of them) Which shapes are <u>congruent</u>? [a), b), c) and g) on solution opposite but Ps might have different ones] Revise what similar and congruent mean if Ps cannot remember.
	36 min	

Bk4

Lesson Plan 38

Activity		*Notes*
6	***Book 4, page 38*** Q.3 Read: *List the polygons for which each statement is true.* What is a polygon? (A plane shape with straight sides.) Let's see if you can do them all in 3 minutes! . . . Stop! Review at BB with whole class. P reads question, then T points to each diagram in turn. Class indictes whether it should be included (e.g. thumbs up or down). T writes lists on BB. Mistakes discussed and corrected. *Solution:*  a) *It has a right angle.* (1, 4, 5, 6, 7) b) *Every angle is a right angle.* (4, 6) c) *It has no right angles.* (2, 3, 8) d) *It has an angle which is not a right angle.* (1, 2, 3, 5, 7, 8) e) *Every angle is a right angle but it is not a rectangle.* (–)	Individual work, monitored, helped Diagrams drawn on BB or use enlarged copy master or OHP Ps can use edge of rulers or folded right angle to check angles which theyare unsure about. (Or use other pre-agreed signals, or Ps show Yes or No on scrap paper or slates.) At a good pace Agreement, self-correcting, praising (Impossible!)
Extension	Which shapes have parallel lines? Ps come to BB to mark them.	Whole class activity
	31 min	
7	***Book 4, page 38, Q.4*** T has large real or model clock. The minute hand is pointing to 12. Tell me what kind of angle it has turned after: a) 4 minutes (angle smaller than a right angle, or acute angle) b) 11 minutes (angle smaller than a right angle, or acute angle) c) 15 minutes (right angle) Elicit that it is a quarter of a turn. d) 21 minutes (angle larger than a right angle, or obtuse angle) e) 30 minutes (angle larger than a right angle, or obtuse angle) Elicit that it is also half a turn, or 2 right angles)	Whole class activity T demonstrates on clock and also draws diagram on BB. Ps shout out in unison or write <, =, > (or A, R, O) on scrap paper or slates and show in unison on command, or T asks several Ps what they think.
	Q.4 Read: *The minute hand on the clock is pointing to 12 o'clock. Through how many right angles will it turn after:* *a) 15 minutes b) 30 minutes c) 45 minutes?* Ps draw the hand at the 3 different positions and mark the right angles, then fill in the missing numbers. Review with whole class. Ps explain reasoning, demonstrating on model clock and on diagram on BB. Class agrees/disagrees. *Solution:* a) 15 min. = $\underline{1}$ right angle b) 30 min. = $\underline{2}$ right angles b) 45 min. = $\underline{3}$ right angles.	Individual work, monitored Ps use folded right angles to check if they are unsure. Agreement, self-correction, praising BB: 
Extension	What unit do we use to measure angles? (degrees) How many degrees are in 1 complete turn? (360) How many degrees are in a right angle (i.e. 1 quarter of a turn)? (90) T shows notation on BB. Class reads equations aloud in unison.	Whole class activity BB: 1 complete turn = 360° 1 right angle = $360^\circ \div 4 = 90^\circ$
	45 min	

Bk4

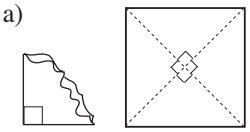
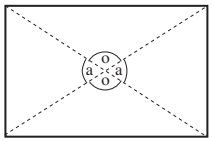
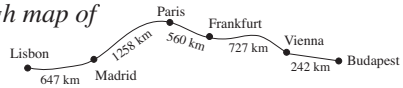
R: Calculations
C: Shapes. Polygons. Angles
E: Problems. Diagonals

Lesson Plan 39

Activity		*Notes*
1	**Calculation practice** a) How many congruent (equal) squares are needed to make a cube like this? (T holds up a large cubic box) Show me . . .now! (6) b) How many <u>congruent</u> (equal) squares would be needed to make 1223 such cubes? Show me . . . now! (7338) P who responded incorrectly works through the calculation on BB with help of class. c) How many such cubes could be made from 2394 congruent (equal) squares? Show me . . . now! (399) d) How many such cubes could be made from 2397 congruent (equal) squares? (399, r 3) Same as c), but 3 extra squares. *5 min*	Whole class activity Ps do necessary calculations in *Ex. Bks.* first. Responses shown on scrap paper or slates in unison. Reasoning, agreement, praising BB: b) c)
2	**Pentagons** T has BB or OHT already prepared. What kind of shapes are these? (pentagons, because they have 5 straight sides) Who can draw a line through the pentagon to make: a) a triangle and a quadrilateral or b) a triangle and a pentagon e.g. or c) a triangle and a hexagon e.g. or d) two quadrilaterals? e.g. or *10 min*	Whole class activity Drawn on BB or SB or OHT Ps can try it out in *Ex. Bks* first if they wish. Ps come to BB to draw lines. Class checks that they are correct. Who has found another way to do it? etc. Discussion, agreement, praising
3	**Diagonals 1** a) A castle has 5 towers. (T points to circles on LH diagram.) Each tower is joined to the towers next to it by a wall. (T points to sides of pentagon.) Each tower is joined to the towers which are not next to it by straight paths. (T points to diagonals.) Let's think of it mathematically. Here is a simpler diagram of the castle. What shape is it? (pentagon) Let's draw a dot at each corner to represent the 5 castles. What is its mathematical name? (<u>vertex</u>) What do we call the lines around the outside? (<u>sides</u>) Let's join up each vertex to all the vertices which are not next to it. Ps come to BB to draw straight lines with BB ruler. Class points out any they have missed. These lines are called <u>diagonals</u>. b) Draw a triangle, a quadrilateral, a pentagon and a hexagon in your *Ex. Bks*. They need not be <u>regular</u> polygons (i.e. the sides do not have to be the same length). Now draw their diagonals, keep count as you draw them and write the number below your diagram. Review at BB with whole class. T has polygons drawn on BB. Ps come to BB to draw the diagonals. Class agrees/disagrees. Ps add any they missed to diagrams in *Ex. Bks*. BB: – (2) (5) (9) *15 min*	Whole class activity Diagrams drawn on BB or use enlarged copy master or OHP BB: <u>Castle</u> T writes labels on diagram as each is dealt with,. BB: <u>Pentagon</u> Vertex, Side, Diagonal Individual work, monitored, helped Agreement, self-correcting, praising Elicit that <u>polygons</u> are <u>plane</u> shapes with straight sides.

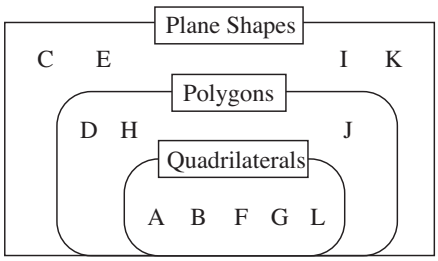
Bk4

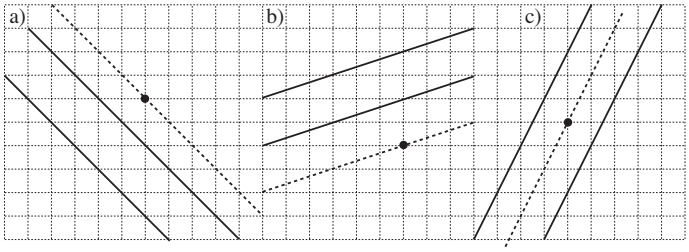
Lesson Plan 39

Activity		*Notes*
4	**Diagonals 2** Ps each have a square and rectangular sheet of paper on desks. a) Fold your square along its diagonals. Open it out. How many diagonals can you see? (2) How many angles have you made at its centre? (4) Measure them with your folded right angle. What kind of angles are they? (right angles) What can you say about the 2 diagonals of a square? (They are perpendicular.) b) Now fold your square along its diagonals. Open it out. How many diagonals can you see? (2) How many angles have you made at its centre? (4) Measure them with your folded right angle. What kind of angles are they? (2 acute angles and 2 obtuse angles) Ps write initial letters in each angle. Elicit that these diagonals are <u>not</u> perpendicular. *20 min*	Whole class activity but individual folding. T demonstrates and Ps copy. Agreement, praising a)  b) 
5	***Book 4, page 39*** Q.1 Read: *In your exercise book, make a plan, estimate, calculate, check and write the answer as a sentence.* Deal with one part at a time. Ps read the question themselves and solve it in *Ex. Bks*. Set a time limit for each question. Review with whole class. Ps come to BB to show their solution, explaining reasoning. Class agrees/disagrees. Mistakes discussed and corrected. *Solutions:* a) *The distance between Budapest and London (UK) is 1450 km. It is 5950 km less than the distance between Washington and Budapest. How far is Washington from Budapest?* *Plan:* B → L: 1450 km B → W: 1450 km + 5950 km *E:* 1000 + 6000 = 7000 *C:* 1 4 5 0 + 5 9 5 0 7 4 0 0 1 *Answer:* Washington is 7400 km from Budapest. b) *A trourist drew this rough map of where he had travelled.*  *i) How far did he travel from Lisbon to Budapest?* *Plan:* LM + MP + PF + FV + VB *E:* 600 + 1300 + 600 + 700 + 200 = 3400 (km) *Answer:* He travelled 3434 km. *ii) Which part of his route was longer, Lisbon to Paris or Paris to Budapest?* *Plan:* LP = 647km + 1258 km = 1905 km PB = 560 km + 727 km + 242 km = 1529 km *Answer:* Lisbon to Paris was longer. **Extension** 1. How much longer? (1905 km – 1529 km = <u>376 km</u>) 2. Which was longer, L → P or M → F? (LP > MF) (N.B. M → P is common to both) 87 km *28 min*	Individual work, monitored, helped T could have large map of to show the countries and cities. Reasoning, agreement, self-correcting, praising Ps could draw a diagram for part a) if it will help them: e.g. B L W 1450 km 5950 km Check with another operation, or with a calculator, especially in b) i) below. Diagram drawn on BB or use enlarged copy maser or OHP *C:* 6 4 7 1 2 5 8 5 6 0 7 2 7 + 2 4 2 L to B: 3 4 3 4 2 2 2 *C:* L to P: 6 4 7 + 1 2 5 8 1 9 0 5 1 1 P to B: 5 6 0 7 2 7 + 2 4 2 1 5 2 9 1 *C:* 1. 1 9 10 0 10 5 – 1 5 1 2 1 9 3 7 6 2. 6 10 4 7 – 5 1 6 0 8 7

Bk4

Lesson Plan 39

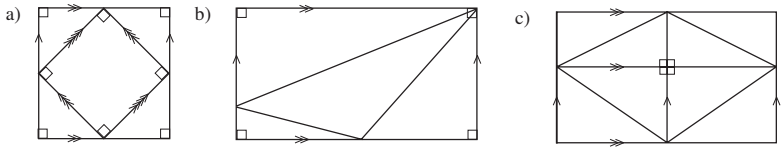
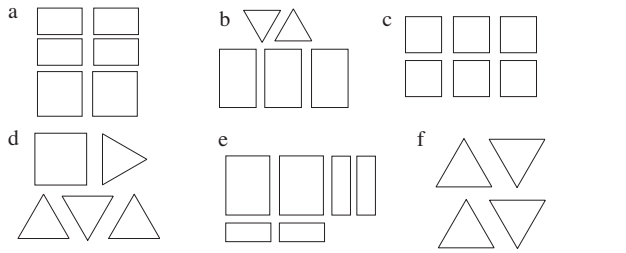
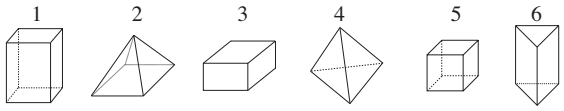
Activity		*Notes*
6	***Book 4, page 39*** Q.2 Read: *In a dress pattern, there are these different shapes of pocket to choose from.* BB:  *List the shapes for which each statement is true.* Set a time limit. Review with whole class. P reads each statement and Ps dictate letters to T. Class agrees/disagrees or adds ommissions. Mistakes discussed and corrected *Solution:* a) *It has only straight sides.* (A, B, D, F, G, H, J, L) What do we call plane shapes with straight sides? (Polygons) b) *It has at least one straight side.* (A, B, C, D, E, F, G, H, J, K, L) c) *It has only curved lines.* (I) d) *It is a pentagon.* (D, J) e) *It has parallel sides.* (A, B, D, F, H, J, L) f) *It has perpendicular sides.* (B, D, E, F H, J, L) g) *It is a quadrilateral.* (A, B, F, G, L) h) *It is a hexagon.* (H) i) *It is a rectangle.* (F, L) j) *It is a square.* (L)	Individual work, monitored, helped Shapes drawn on BB or use enlarged copy master or OHP Discussion, reasoning, agreement, self-correction, praising Feedback for T Elicit that: pentagon: a plane shape with 5 straight sides quadrilateral: a plane shape with 4 straight sides hexagon: a plane shape with 6 straight sides square: a regular rectangle
Extension	Let's put the shapes into sets. How could we do it? Ps suggest ways and T chooses one. T draws diagrams on BB and Ps suggest labels. Ps come to BB to write letters in appropriate set. BB: e.g.  	Whole class activity Praise all positive contributions. Discussion, agreement, praising
	35 min	
7	**Compass points** T has a large N stuck to the wall of the classroom which faces North (or if no wall faces north, use the BB wall). Everyone stand up and face North. T gives instructions on how Ps should turn. Through how many right angles have you turned? Class shouts out in unison or T chooses Ps at random. e.g. a) Turn to the right: i) from N to face E (1 right angle) ii) from E to face W (2 right angles) iii) from W to face NW (half a right angle) b) Turn to the left: i) from N to face SW ($1\frac{1}{2}$ right angles) ii) from SW to face SE (1 right angle) iii) from S to face W (3 right angles) etc. Ps can give instructions too!	Whole class activity Revise compass points first if necessary. At a good pace Agreement, praising In good humour! Ps could also say whether the angle is acute or obtuse where relevant.
	40 min	

Bk4		*Lesson Plan 39*
Activity		***Notes***
8	***Book 4, page 39*** Q.3 Read: *Draw a line through the point given so that it is parallel to the other two lines* Review at BB with whole class. Ps finished first come to BB to draw their solutions. Who agrees? Who drew a different line? etc. Deal with all cases. Mistakes corrected. *Solution:*  Where in the classroom can you see sets of parallel lines? *45 min*	Individual work, monitored, helped Drawn on BB or use enlarged copy master or OHP Ps should use rulers to draw the lines and check distances at either end by mesuring or counting the grid units. Agreement, self-correcting, praising Elicit that parallel lines need not be equal in length but must be at the same angle, and that they will never meet, however far they are extended.

Bk4

R: Calculations
C: Shapes, polygons. Angles. Parallel and perpendicular lines
E: Problems. Constructions

Lesson Plan 40

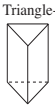
Activity		*Notes*
1	**Quadrilaterals** T has BB already prepared. How many quadrilaterals and triangles can you count on each diagram? Ps come to BB to point and count and name the shapes if they know them (e.g. square, rectangle, right-angled triangle). Class agrees/disagrees. If problems, T helps by drawing each of the sub-shapes separately. BB:  Q: 2 (both squares) T: 4 Q: 4 (1 rectangle) T: 4 Q: 14 (5 rectangles) T: 12 Find the parallel and perpendicular lines. Ps come to BB to mark them. Class points out any they have missed. T helps with notation. *5 min*	Whole class activity Drawn on BB or use enlarged copy master or OHP At a good pace Ps can use edges of ruler or folded right angle to check any they are unsure about. Agreement, praising Who can find a pentagon (hexagon) in the diagrams?
2	**Compass points and angles** Everyone stand up! Let's suppose the BB is North. Everyone face North. a) Follow my instructions then tell me which compass point you are facing. (Ps could write on slates and show on command.) e.g. Turn to the right through 1 right angle. In which direction are you facing? (E) Turn to the right through 2 right angles. (W) Turn to the left through half a right angle. (SW) etc. b) Everyone face North again! Turn to the right to face South. Through how many right angles did you turn? (2) Face N again. Turn to the left to face SW. Through how many right angles did you turn? (1 and a half) etc. *10 min*	Whole class activity At a good pace In good humour! Praising, encouragement only Ps can give the instructions too!
3	**Solids and shapes** a) Which solid could be made from which set of plane shapes? Ps come to BB to join up or write the matching pairs, explaining reasoning. Class agrees/disagrees. BB:   BB: 1–e, 2–d, 3–a, 4–f, 5–c, 6–b Who remembers the names of these solids? [1: cuboid, 2: square-based pyramid, 3: cuboid, 4: triangle-based pyramid, 5: cube (regular cuboid), 6: triangle-based prism]	Whole class activity T could have actual solids to show to class. (If possible, Ps have small-sized set of shapes and solids on desks too,) Drawn on BB or use enlarged copy master or OHP Discussion, reasoning, agreement, praising At a good pace Extra praise for Ps who remember the names of 2, 4 and 6

Bk4

Lesson Plan 40

Activity		***Notes***
3	(Continued) b) Let's count the edges, faces and vertices of each solid and show the information in this table. Ps come to BB or dictate to T. Class agrees/disagrees. Do you notice a connection between the rows?	Whole class activity Table drawn on BB or use enlarged copy master or OHP At a good pace Agreement, praising

BB:

	1	2	3	4	5	6
	Cuboid 	Square-based pyramid 	Cuboid 	Triangle-based pyramid 	Cube 	Triangle-based prism 
Edges	12	8	12	6	12	9
Faces	6	5	6	4	6	5
Vertices	8	5	8	4	8	6

Elicit that:
BB: $e + 2 = f + v$

- Which of the solids are made from congruent shapes? (4, 5)
- Which of them have 6 faces which are rectangles? (1, 3 and 5)
- How many of a cuboid's faces can be square? (0 as in cuboid 1, or 2 as in cuboid 3, or 6 as in the cube)
- Who can think of other things to say about the shapes? (e.g. Ps might point out parallel edges or faces, perpendicular edges or faces, congruent faces, number of edges meeting at each vertex, etc.)

Discussion involving as many Ps as possible.
Encourage Ps to speak in sentences and to try to use the correct vocabulary.
Praise all positive contributions
T repeats more clearly when necessary.

Extension

T tells class that a solid with many plane faces is called a polyhedron. (Compare with a polygon, which is a plane shape with many straight sides.)

This solid (T holds up the triangle-based pyramid) is also called a tetrahedron, because it has 4 plane faces (tetra means 4), but because all its 4 plane faces are congruent (triangles with equal sides and angles), it is called a regular tetrahedron.

This solid (T holds up a cuboid) is also called a hexahedron, because it has 6 plane faces (hexa- means 6), but this solid (T holds up a cube) is a hexahedron with all its 6 plane faces congruent (equal squares), so it is called a regular hexahedron.

Whole class discussion on geometric names of solids.
BB: poly- means 'many'
-hedron means 'a solid with plane faces'
tetra- means '4'
hexa- means '6'
polyhedron, tetrahedron, hexahedron

24 min

4	***Book 4, page 40*** Q.1 Read: *Do the calculation for b) and c) in your exercise book.* a) How many unit cubes does this cube contain? *b) How many unit cubes would 1176 of these cubes contain?* *c) How many of these large cubes could be built from 9648 unit cubes?* Deal with one part at a time. Ps could show results on scrap paper or slates on command. Mistakes discussed/corrected. *Solution:* a) 8 b) 9408 c) 1206	Individual work, monitored helped Diagram drawn on BB and/or Ps have such cubes on desks.  Calculations done in *Ex. Bks.* Reasoning, agreement, self-correction, praising BB:
Extension	How many such large cubes would contain 9501 unit cubes? Ps come to BB or dictate to T, explaining reasoning	

BB:

	1	1	8	7	r 5
8	9	5	0	1	
	1	7	6	⑤	

Check:
$9501 = 8 \times 1187 + 5$
$= 9496 + 5 = 9501$

1	1	8	7
		×	8
9	4	9	6
1	6	5	

Answer: 1187 large cubes would contain 9496 unit cubes and 5 unit cubes would be left over.

b)

1	1	7	6
		×	8
9	4	0	8
1	6	4	

c)

	1	2	0	6
8	9	6	4	8
	1		4	

Whole class activity
Discussion, reasoning, agreement, praising

29 min

Bk4

Lesson Plan 40

Activity 5

Book 4, page 40

Q.1 a) Read: *In each diagram, mark*

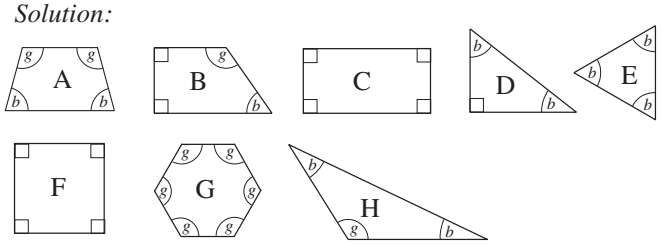
- *the right angles in red like this,*
- *angles smaller than a right angle in blue like this,*
- *angles larger than a right angle in green like this.*

T could do Shape B with the whole class first if necessary.

Ps colour remaining shapes. Set a time limit. Review at BB with whole class. Ps come to BB or T points to each angle in turn and Ps say which colour (or what kind of angle) it is. Mistakes corrected.

Elicit that the *blue* angles are acute and the *green* angles are obtuse angles.

Solution:



b) Read: L*ist the letters of the shapes for which each statement is true.*

Set a time limit. Review with whole class. P reads each statement and Ps dictate letters to T. Class agrees/disagrees or adds ommissions. Mistakes discussed and corrected

Solution:

i)	*It is a square.*	(F)
ii)	*It is a rectangle.*	(C, F)
iii)	*It is a quadrilateral.*	(A, B, C, F)
iv)	*It is a triangle.*	(D, E, H)
v)	*It has at least 1 right angle.*	(B, C, D, F)
vi)	*Every angle is a right angle.*	(C, F)
vii)	*It has at least one angle smaller than a right angle.*	(A, B, D, E, H)
viii)	*All its angles are smaller than a right angle.*	(E)
ix)	*It has at least one angle larger than a right angle.*	(A, B, G, H)
x)	*All its angles are larger than a right angle.*	(G)

36 min

Notes

Individual work, monitored, helped

Drawn on BB or use enlarged copy master or OHP

Ps check angles they are unsure about with corner of ruler or folded right angles.

Agreement, self-correcting, praising.

What are the names of the polygons?

A and B: quadrilaterals

C: rectangle

D: right-angled triangle

E: acute-angled triangle

F: square

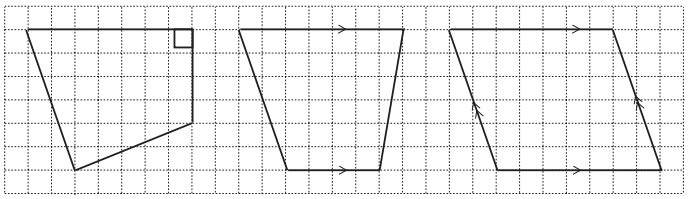
G: (regular) hexagon

H: obtuse-angled triangle

Individual work, monitored, helped (or whole class activity if time is short)

Drawn on BB or use enlarged copy master or OHP

Agreement, self-correcting, praising

Bk4		*Lesson Plan 40*
Activity		***Notes***
6	***Book 4, page 40*** Q.3 Read: *Two sides of a quadrilateral have been drawn.* *Complete the shape so that:* *a) it has at least one right angle* *b) 2 of its sides are parallel* *c) it has 2 pairs of parallel sides.* Set a time limit. Review at BB with whole class. Ps come to BB to draw lines and mark the features. Who agrees? Who drew a different shape? etc. Mistakes discussed and corrected. *Solution:* e.g.  *40 min*	Individual work, monitored, helped Drawn on BB or use enlarged coy master or OHP Reasoning, agreement, self-correcting, praising Other solutions are possible. **Extension** T tells class that a quadrilateral in which both pairs of opposite sides are parallel (as in RH diagram) is called a BB: <u>parallelogram</u>
7	**Secret shapes** a) Draw a shape in your *Ex. Bks*. T chooses Ps to stand up and describe their shape. Rest of class must work out what it is. b) I am thinking of a shape. Ask me questions to find out what it is. I can answer only 'yes' or 'no'. (e.g. <u>square</u>: Is it a plane shape? (yes) Is it a polygon? (yes) Does it have more than 4 sides? (no) Does it have a right angle? (yes) Are all its angles right angles? (yes) Are all its sides equal? (yes) It is a square! (yes) Repeat for other shapes if there is time. Ps can think of a shape and answer the questions too (with T's help). *45 min*	Whole class activity Encourage Ps to speak in sentences and to try to use mathematical terms. T helps with descriptions if necessary. In good humour! Encourage logical questioning. Ps can keep note of clues on scrap paper. Praising, encouragement only