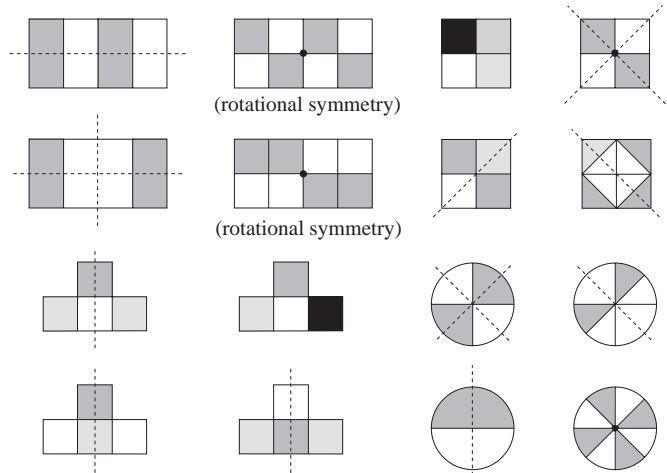
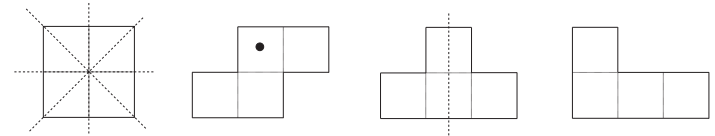
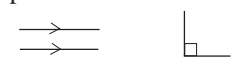


<h1>Y3</h1>	<p>R: (Mental) calculation C: Reflection. Symmetry E: Motion in space. Rotation around an axis by 180°</p>	<h2>Lesson Plan</h2> <h1>111</h1>												
<p>Activity</p> <p>1</p>	<p>Addition practice</p> <p>T dictates simple additions of 3-digit numbers. Ps write the answers (if done mentally) or the whole addition in their <i>Ex. Bks</i>. e.g. $111 + 222$, $301 + 215$, $834 + 121$, etc. Ps can suggest additions too. (T keeps a note of them.) Review with whole class. Write problem calculations on BB.</p> <p style="text-align: right;">4 min</p>	<p>Notes</p> <p>Individual work, monitored Ps nod heads when ready for next one. At a good pace Agreement, self-correction, praising</p>												
<p>2</p>	<p>Missing numbers</p> <p>Listen carefully and think what values you would put in this table. <i>Nigel had £12.45. After buying a book, Nigel had more than £6.45 but less than £6.50 left. How much could the book have cost?</i></p> <p>What should we do first? (Change the values to pence as the values in the table are in pence.) What is the smallest amount of money Nigel could have left? ($£6.46 = 646$ p.) Ps suggest where to write it in the table. How could we work out how much he spent if he had this amount left? ($£12.45 = 1245$ p, 1245 p – 646 p = <u>599</u> p)</p> <p>P come out to BB to do calculation and write result in table. Class agrees/disagrees. Ps come to BB to fill in next 3 columns explaining reasoning (without calculation). Class agrees/disagrees. Are there any more possible values? No, because the largest amount that Nigel could have left is $£6.49 = 649$ p)</p> <table border="1" style="margin-left: 20px;"> <tr> <td>BB: Spent (p)</td> <td>599</td> <td>598</td> <td>597</td> <td>596</td> <td></td> </tr> <tr> <td>Had left (p)</td> <td>646</td> <td>647</td> <td>648</td> <td>649</td> <td></td> </tr> </table> <p><i>Answer:</i> The book could have cost $£5.96$, $£5.97$, $£5.98$ or $£5.99$.</p> <p>Who can write a rule for the table? Who agrees? Who can think of a different one? etc. (T might need to help with this.)</p> <p style="text-align: right;">8 min</p>	BB: Spent (p)	599	598	597	596		Had left (p)	646	647	648	649		<p>Whole class activity Table drawn on BB or use enlarged copy master or OHP</p> <p>Discussion on method of solution. Ps suggest what to do at each stage BB: $1245 - 646$ or $\begin{array}{r} 1245 \\ - 646 \\ \hline 599 \end{array}$ $= 1245 - 645 - 1 = 599$</p> <p>Reasoning, agreement, praising</p> <p><i>Rule:</i> $H + S = 1245$, or $S = 1245 - R$, or $R = 1245 - S$, and $645 < R < 650$</p>
BB: Spent (p)	599	598	597	596										
Had left (p)	646	647	648	649										
<p>3</p>	<p>Sums and differences</p> <p>Listen carefully and think how you would solve it.</p> <p>a) <i>What is the <u>sum</u> of the sum and the difference of 876 and 528?</i> Ps suggest what to do first and how to continue. Calculations done at side of BB. Class agrees/disagrees.</p> <p>BB: $\begin{array}{r} 876 \\ + 528 \\ \hline 1404 \end{array}$ $\begin{array}{r} 876 \\ - 528 \\ \hline 348 \end{array}$ $S + D: \begin{array}{r} 1404 \\ + 348 \\ \hline 1752 \end{array}$</p> <p>or $(876 + 528) + (876 - 528) = 876 + 876 = 2 \times 876 = 1600 + 140 + 12 = 1752$</p> <p>b) <i>What is the <u>difference</u> between the sum and difference of 876 and 528?</i> Again, Ps suggest how to solve it. (Sum and difference already known from part a)).</p> <p>BB: $(876 + 528) - (876 - 528) = 1404 - 348 = 1056$ or $(876 + 528) - (876 - 528) = 528 + 528 = 1056$</p> <p style="text-align: right;">13 min</p>	<p>Whole class activity (or individually in <i>Ex. Bks</i> if Ps wish)</p> <p>Do not intervene unless Ps are struggling. Discussion, reasoning, agreement, praising</p> <p>Extra praise if P thinks of this 'clever' method of solution.</p> <p>Discussion, reasoning, agreement, praising</p> <p>BB: $\begin{array}{r} 1404 \\ - 348 \\ \hline 1056 \end{array}$ or $\begin{array}{r} 528 \\ + 528 \\ \hline 1056 \end{array}$ S – D: $\begin{array}{r} 1404 \\ - 348 \\ \hline 1056 \end{array}$</p> <p>or $2 \times 528 = 1000 + 40 + 16$</p>												

<p>Y3</p>		<p><i>Lesson Plan 111</i></p>
<p>Activity</p> <p>4</p> <p>See Y2 LP 116–119</p>	<p>Symmetry 1</p> <p>T has various items, pictures, shapes, etc. stuck to (or drawn on) BB, some symmetrical, some not. Which of these are <u>symmetrical</u>?</p> <p>Ps come to BB to point and explain. Revise symmetry, mirror image, mirror line, line of symmetry, reflection. Allow Ps to explain where they can. T mentions the criteria missed.</p> <p>(Do not mention rotational symmetry at this stage unless a P notices it or asks about it. Stress that 'mirror line' is equivalent to 'line of symmetry'.)</p> <p style="text-align: right;">17 min</p>	<p>Notes</p> <p>Whole class discussion/revision (e.g. pictures from Y1b and Y2b or cut out of magazines or drawn on BB: butterfly, leaf, flower, domino, clown, random shapes, etc.)</p> <p>BB: <u>symmetry</u>, <u>symmetrical</u>, <u>line of symmetry</u> or <u>mirror line</u></p>
<p>5</p> <p>Extension</p>	<p>Symmetry 2</p> <p>These shapes have been coloured in different ways. Which of them are symmetrical? Ps come to BB to draw in the mirror lines (lines of symmetry). Class agrees/disagrees. If problems, check with a mirror.</p> <p>BB:</p>  <p style="text-align: right;">(rotational symmetry)</p> <p style="text-align: right;">(rotational symmetry)</p> <p style="text-align: right;">(rotational symmetry)</p> <p>Discuss the shapes which have <u>rotational symmetry</u>. Demonstrate what it means. Ps might notice that some shapes have both line and rotational symmetry.</p> <p style="text-align: right;">22 min</p>	<p>Whole class activity</p> <p>Drawn on BB or use enlarged copy master or OHP</p> <p>At a good pace</p> <p>Reasoning, agreement, praising</p> <p>Feedback for T</p> <p>Ps could have mirrors and copies of shapes on desks too.</p> <p>BB: <u>Rotational symmetry</u></p> <p>T could copy these shapes onto OHTs, stick a drawing pin through the centre and rotate on top of original shapes.</p>
<p>6</p>	<p>Symmetry 3</p> <p>What do these shapes have in common? (All have area 4 square units)</p> <p>Which of them are symmetrical? Ps come out to point and draw in the mirror lines (lines of symmetry).</p> <p>BB:</p>  <ul style="list-style-type: none"> • Ps come out to point to lines which are <u>parallel</u>. • Ps come out to show the <u>perpendicular</u> lines and <u>right angles</u>. • Which has the shortest perimeter? (The square has a perimeter of 8 units. All the others have perimeters of 10 units.) <p style="text-align: right;">25 min</p>	<p>Whole class activity</p> <p>Drawn on BB or use enlarged copy master or OHP</p> <p>At a good pace</p> <p>Ps might notice that the shape 2nd from left has rotational symmetry around centre point.</p> <p>Extra praise if Ps remember how to show parallel and perpendicular lines.</p>  <p style="text-align: center;">parallel perpendicular</p>

Y3

Lesson Plan 111

Activity

7

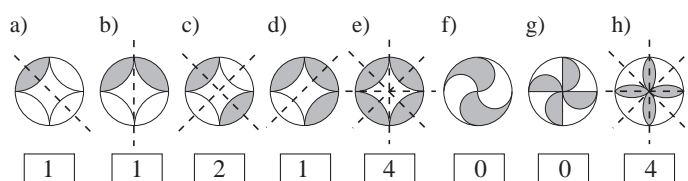
PbY3b, page 111

Q.1 Read: Write below each pattern the number of mirror lines it has.

Ps may use mirrors as a check. Ps draw the lines using pencils and rulers and write the appropriate numbers in the boxes.

Review at BB with whole class. Ps come to BB to show their solutions. Class agrees/disagrees. Mistakes discussed and corrected.

Solution:



Extension

Which of the shapes have rotational symmetry? (c, e, f, g, h)

30 min

Notes

Individual work, monitored, helped

Drawn on BB or use enlarged copy master or OHP

Ps should draw lightly at first so that errors can be erased easily.

Discussion, agreement, self-correction, praising

Feedback for T

Extra praise if Ps find them all

(T could have copies of these 5 shapes on OHTs as a check.)

8

PbY3b, page 111

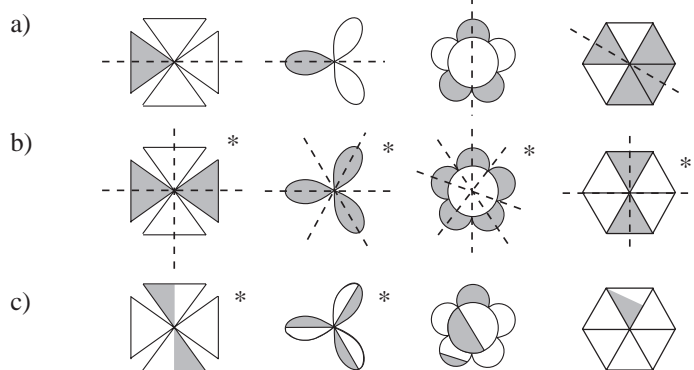
Q.2 Read: Colour each shape so that it has:

- a) exactly one mirror line
- b) more than one mirror line
- c) no mirror lines.

Deal with one part at a time. Review after each part. Ps who finish first colour the shapes on the BB or OHP. Ps show alternative solutions. Class decide whether they are valid.

Mistakes discussed and corrected

Solution: e.g.



35 min

Individual work, monitored, helped, corrected

(Or whole class activity if T prefers)

Drawn on BB or use enlarged copy master or OHP

Discussion, agreement, self-correction, praising

Extra praise for creative, correct solutions.

Feedback for T

Extension

Ps can point out the shapes which have rotational symmetry. (*)

Y3

Lesson Plan 111

Activity

9

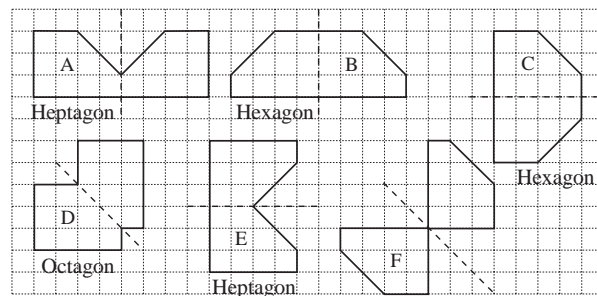
PbY3b, page 111

Q.3 Read: *Reflect the shape in different ways. The broken lines are the mirror lines.*

Ps could each have a cut-out copy of the pentagon to try out the reflections (and/or check with a mirror). T could have a large model for demonstration.

Review at BB with whole class. Ps show solutions on BB. T checks using large model. Mistakes discussed and corrected.

Solution:

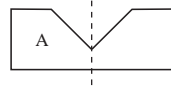


Extension

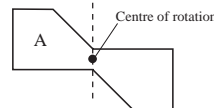
- Discuss the names of the combined shapes. (Ps should already know hexagon (6 sided polygon). T helps with heptagon (7-sided polygon) and octagon (8-sided polygon).
- Compare reflections with rotations of 180° (half a turn). Agree that they do not give the same result here.

e.g.

Reflection



Rotation



41 min

Notes

Individual work, monitored, helped, corrected

Draw on BB or use enlarged copymaster or OHP

Discussion, agreement, self-correction, praising

Ps will probably not see F as a combined shape.

Whole class activity

BB: Hexagon: 6 sides
Heptagon: 7 sides
Octagon: 8 sides

T demonstrates on BB and Ps try out on desks too.

Discussion, agreement

10

PbY3b, page 111

Q.4 Read: *Draw the mirror image of each shape.*

Elicit that this is the same as reflecting the shape.

Ps can again check their drawing with mirrors.

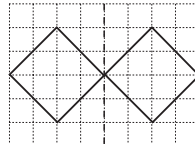
Review at BB with whole class. Mistakes corrected.

Solution:

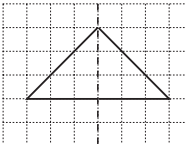
a)



b)



c)



What can you tell me about the different diagrams? e.g.

- the shape and the mirror image are separate. Here the two rectangles are in a symmetrical position (i.e. the same distance away from the mirror line)
- the shape and the mirror image touch at only one point.
- the shape coincides with the mirror image to form a symmetrical triangle.

45 min

Individual work, monitored, helped, corrected

Draw on BB or use enlarged copy master or OHP

Discussion, agreement, self-correction, praising

T could have large models to demonstrate the reflections.

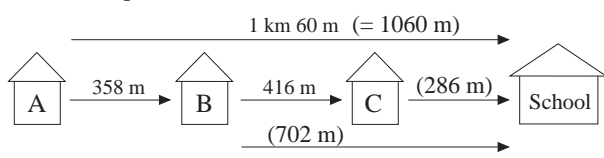
T could show rotations of 180° (half a turn) too.

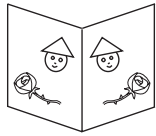
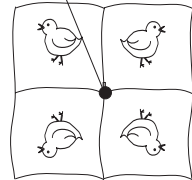
Agree that in b) reflection and rotation by a half turn give the same result.

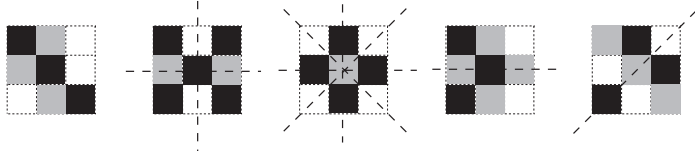
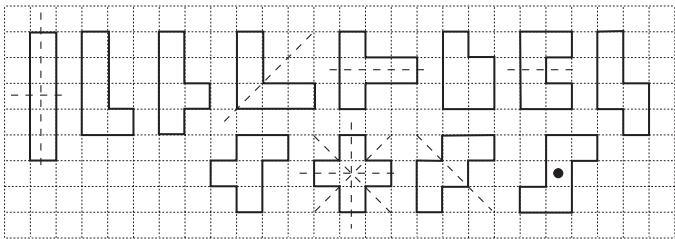
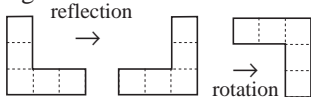
Whole class discussion

Ps express themselves in own words. T repeats in mathematical language.

Praising only

<h1>Y3</h1>	<p>R: Calculations C: Line symmetry E: Reflection. (Rotational symmetry)</p>	<h2>Lesson Plan 112</h2>																					
<p>Activity</p> <p>1</p>	<p>Missing numbers</p> <p>Johnny, Charlie and Leslie are collecting 1 p coins. Johnny has 126 more than Charlie but 126 less than Leslie. How many coins could they each have?</p> <p>Let's show it in a table. Ps come to BB to choose a column and fill in the missing numbers. Calculations done mentally or at side of BB or in Ex. Bks. Praise if Ps notice that some calculations have already been done in previous columns. Class points out errors.</p> <p>BB:</p> <table border="1" style="margin-left: 20px;"> <tr> <td>C</td> <td>541</td> <td>415</td> <td>289</td> <td>1014</td> <td>888</td> <td>762</td> </tr> <tr> <td>J</td> <td>667</td> <td>541</td> <td>415</td> <td>1140</td> <td>1014</td> <td>888</td> </tr> <tr> <td>L</td> <td>793</td> <td>667</td> <td>541</td> <td>1266</td> <td>1140</td> <td>1014</td> </tr> </table> <p>How many operations did we need to do? (8, not 12)</p> <p style="text-align: right;">6 min</p>	C	541	415	289	1014	888	762	J	667	541	415	1140	1014	888	L	793	667	541	1266	1140	1014	<p>Notes</p> <p>Whole class activity</p> <p>Table drawn on BB or use enlarged copy master or OHP</p> <p>Use names of Ps in class if possible.</p> <p>At a good pace</p> <p>Reasoning, agreement, praising</p> <p>Feedback for T</p> <p>Ps might notice pattern of positions of both 541 and 1014 in the table.</p>
C	541	415	289	1014	888	762																	
J	667	541	415	1140	1014	888																	
L	793	667	541	1266	1140	1014																	
<p>2</p>	<p>Problem</p> <p>Listen carefully and study the diagram. Think how you would work out the answers to the questions.</p> <p>BB:</p>  <p>Anne's house is 1 km 60 m from her school.</p> <p>a) How far is Bob's house from the school? b) How far is Carol's house from the school?</p> <p>What should we do first? (Change 1 km 60 m to metres.)</p> <p>BB: 1 km 60 m = 1000 m + 60 m = 1060 m</p> <p>What should we do next? Ps come to BB to explain reasoning (or dictate to T what to write on the BB). Class agrees/disagrees or suggests alternative method.</p> <p><i>Solution:</i></p> <p>a) Distance of B's house from School = 1060 m – 358 m</p> $\begin{array}{r} 1060 \\ - 358 \\ \hline 702 \end{array}$ <p>= <u>702m</u></p> <p>b) Distance of C's house from School = 702m – 416 m</p> $\begin{array}{r} 702 \\ - 416 \\ \hline 286 \end{array}$ <p>= <u>286 m</u></p> <p>or 1060 m – (358 m + 416 m)</p> $\begin{array}{r} 1060 \\ - 774 \\ \hline 286 \end{array}$ <p style="text-align: right;">12 min</p>	<p>Whole class activity</p> <p>(or individual work in Ex. Bks if Ps wish)</p> <p>Diagram drawn on BB or use enlarged copy master or OHP (or 'houses' stuck to BB)</p> <p>T repeats while referring to diagram.</p> <p>Use names of Ps in class.</p> <p>Ps suggest how to start and how to continue.</p> <p>Ps do calculations in Ex. Bks and dictate results to T.</p> <p>Reasoning, agreement, praising</p> <p>Accept either method.</p> <p>Feedback for T</p>																					

Y3		Lesson Plan 112
<p>Activity</p> <p>3</p>	<p>Symmetry 1</p> <p>Ps each have 2 rectangular sheets of <u>thin</u> paper and 4 pieces of carbon paper (1 piece half the size of the rectangle and the other 3 pieces a quarter of the size).</p> <p>a) <u>Line symmetry</u></p> <p>Fold one sheet in half and put the large piece of carbon paper inside like this. (T demonstrates with large pieces to show which side of the carbon paper should be face down.)</p> <p>Now draw 2 simple pictures on the paper. (e.g. face and flower)</p> <p>Make sure that Ps press hard while drawing.</p> <p>Now take out the carbon paper, unfold your sheet and hold it up to the window. What can you see? (One half is a reflection or mirror image of the other half.)</p> <p>T shows an example to class and pierces key points (e.g. the left eye) on the sheet to confirm the reflection. Agree that holes on both sides are in the eye nearest the fold.</p> <p>Elicit that the fold is the <u>mirror line</u> or <u>line of symmetry</u> and that the shapes are in <u>symmetrical positions</u> on either side of the line.</p> <p>Agree that the sheet (i.e. the whole pattern) has <u>line symmetry</u>.</p> <p>b) <u>Rotational symmetry</u></p> <p>Fold the other sheet of paper in four and put the small pieces of carbon paper inside the layers face down like this.</p> <p>Now draw a simple picture on the paper (e.g. chick, triangle, boat).</p> <p>Make sure that Ps press very hard while drawing.</p> <p>Now take out the pieces of carbon paper, unfold your sheet and hold it up to the window. What can you see? (4 pictures, each a reflection of the other.) Elicit that there are 2 lines of symmetry (the fold lines) crossing at the centre of the sheet (<u>centre point</u>).</p> <p>T shows an example to class. Discuss the positions of each picture relative to the others. Elicit that LH pair are mirror images of RH pair (top pair are mirror images of bottom pair).</p> <p>T has copy of example on an OHT. T pins both to BB through centre points and rotates the OHT by half a turn. Ps agree that the shapes line up exactly. The sheet (pattern) has <u>rotational symmetry</u>.</p> <p style="text-align: right;">18 min</p>	<p>Notes</p> <p>Whole class discussion but individual preparation</p> <p>All paper prepared before lesson and put on Ps' desks.</p> <p>T gives instructions and demonstrates at the same time.</p> <p>Check position of carbon paper before drawing begins.</p> <p>T chooses Ps to show their drawings to class.</p> <p>e.g. </p> <p>Discussion, agreement</p> <p>BB: <u>Line symmetry</u></p> <p>T instructs and demonstrates.</p> <p>Check position of carbon paper before drawing begins.</p> <p>T chooses Ps to show their drawings to class.</p> <p>Discussion, agreement, praising</p> <p>BB: <u>Centre point</u></p> <p>e.g. </p> <p>BB: <u>Rotational symmetry</u></p>
<p>4</p>	<p>Symmetry 2</p> <p>a) Ps point out symmetrical things in the classroom, indicating where the lines of symmetry (mirror lines) are (or T points to things and Ps say whether they are symmetrical or not). Ps also show the mirror line or centre point where relevant.</p> <p>b) T places one or more pairs of <u>congruent</u> plane (2-D) shapes on BB, some in symmetrical positions and some not. Elicit meaning of congruent (exactly the same).</p> <p>Ps say whether the patterns have line symmetry (and draw the line of symmetry) or rotational symmetry (and draw the centre point) or that the shapes are <u>not</u> in symmetrical positions.</p> <p style="text-align: right;">24 min</p>	<p>Whole class activity</p> <p>Involve several Ps</p> <p>Agreement, praising</p> <p>BB: <u>congruent</u></p> <p>Discussion, agreement, praising</p> <p>Or Ps could stick the shapes on the BB to show symmetry relative to mirror lines drawn by T.</p>

<p>Y3</p>		<p><i>Lesson Plan 112</i></p>
<p>Activity</p> <p>5</p>	<p><i>PbY3b, page 112</i></p> <p>Q.1 Read <i>Colour the unit squares using only 3 colours. Do not use the same colour for adjoining unit squares. Make every large square different.</i></p> <p>Let Ps try without help first. Review at BB with the whole class. T could have a possible solution already prepared for discussion. Some Ps could show their solutions too. e.g.</p>  <p>Read: <i>If a pattern is symmetrical draw in the mirror line(s).</i></p> <p>Ps come to BB to draw the mirror lines in the solution on the BB. Rest of Ps do so on their own solutions in <i>Pbs</i>.</p> <p style="text-align: right;"><i>30 min</i></p>	<p>Notes</p> <p>Individual work, monitored, helped Ps decide on the 3 colours T has a possible solution coloured on BB or use enlarged copy master or OHP</p> <p>Agreement, praising</p> <p>Discussion, agreement, praising. Ps point out the shapes which also have rotational symmetry. (2nd and 3rd from left)</p>
<p>6</p>	<p><i>PbY3b, page 112</i></p> <p>Q.2 Read: <i>Draw a line around 5 unit squares in different ways. If a shape is symmetrical, draw in any mirror lines.</i></p> <p>T could show one example on BB if necessary. Elicit that <u>area</u> of each shape will always be 5 unit squares but the perimeter may vary. T sets a time limit. (e.g. 4 minutes)</p> <p>Ps come to BB to draw a shape each. Class agrees whether the shape is valid, whether it is a repeat (e.g. by rotation or reflection of congruent shapes) and whether it is symmetrical.</p> <p>N.B. There should be 12 different shapes but T need not show all cases if Ps have missed some – leave the problem open.</p> <p><i>Solution</i></p>  <p style="text-align: right;"><i>37 min</i></p>	<p>Individual work, monitored, helped, corrected Grid drawn on BB or use enlarged copy master or OHP</p> <p>(Ps will most likely find only 3–5 shapes and may repeat some in another position)</p> <p>e.g.</p>  <p>Discussion, agreement, praising only</p> <p>Extra praise if Ps find all 12 cases!</p> <p>Ps could try to find missing cases in <i>Lesson 115</i>, or at home if they wish.</p>

Y3

Lesson Plan 112

Activity

7

PbY3b, page 112

Q.3 Read: *Reflect the shape in one axis first. Then reflect the shape and its mirror image in the other axis.*

Draw the mirror lines of the whole shape.

T explains task. Elicit that the vertical and horizontal solid lines are the axes and are perpendicular to each other. Remind Ps about the axes in a graph – the x-axis is horizontal, and the y-axis is vertical. Imagine that these lines are mirrors.

Do part a) on BB with whole class first if necessary, so that Ps understand what to do.

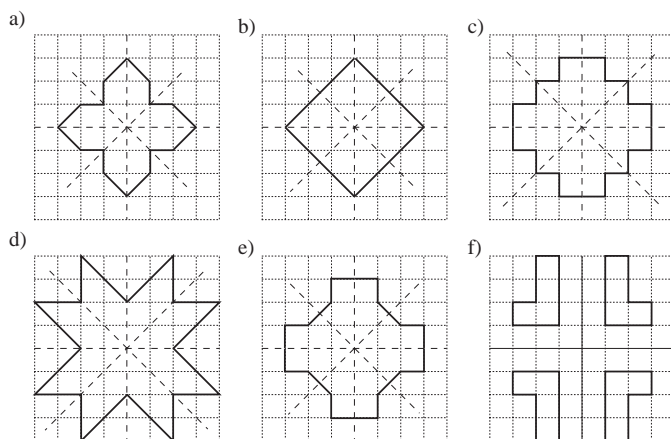
Deal with one part at a time. Review at BB with whole class. Ps come out to draw solution. Class agrees/disagrees.

Mistakes discussed and corrected.

Agree that shapes a) to e) have both line and rotational symmetry.

Which is the odd one out? (part f), as the shapes in the 4 sections do not touch to make a 'whole' shape.) Ps might see the 4 shapes as congruent and in symmetrical positions.

Solution:



45 min

Notes

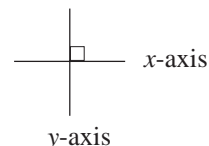
Individual work, monitored, helped, corrected

(or whole class activity if T prefers)

Drawn on BB or use enlarged copy master or OHP

Whole class discussion to start



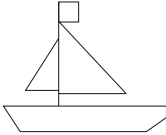
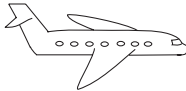
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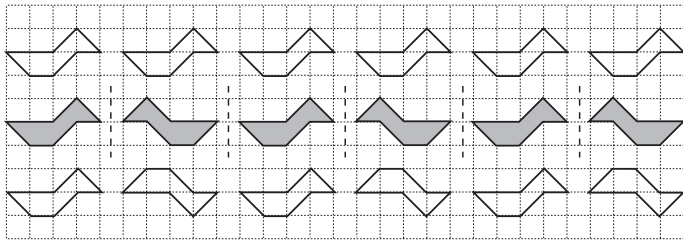
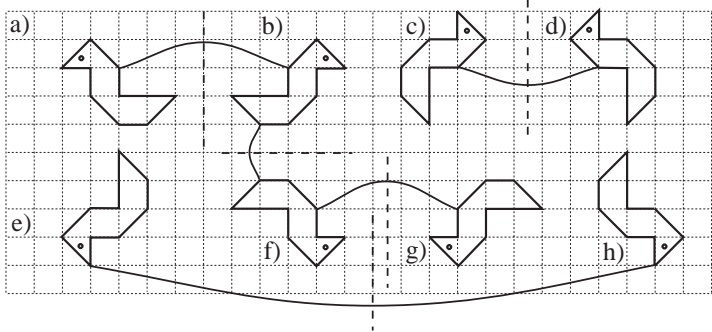


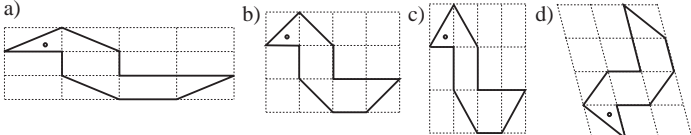
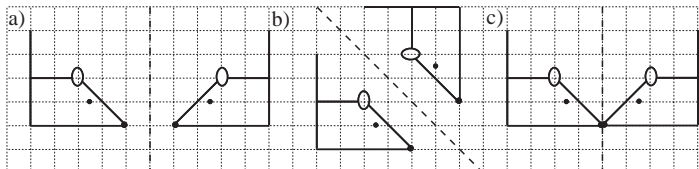
Agreement, self-correction, praising

Whole class discussion

Agree that in part f), each pair of shapes (top, bottom, left, right) are mirror images of the other pair and that the pattern has rotational symmetry around the centre point..

Y3	R: Calculation C: Shapes in symmetrical positions E: Challenges	Lesson Plan 113
Activity 1	<p>Problem</p> <p>Paul has saved up £4.32. How much extra money will he need to save if he wants to buy one of these?</p> <p>BB:</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  £6.75 </div> <div style="text-align: center;">  £3.32 </div> <div style="text-align: center;">  £8.54 </div> <div style="text-align: center;">  £4.99 </div> </div> <p>Ps come out to BB to choose a picture and say how much more Paul would have to save. Ps can change the money to pence and do vertical additions, or keep as £s and do the calculations horizontally. Ps give answer in a sentence. Class points out errors.</p> <p>e.g. <i>Car</i>: Paul has £4.32 = 432 p</p> $\begin{array}{r} 675 \\ - 432 \\ \hline 243 \end{array}$ <p>Car costs £6.75 = 675 p Paul needs to save 243 p = <u>£2.43</u></p> <p><i>Ball</i>: Paul has enough money already to buy the ball and will have £4.32 – £3.32 = £1 left.</p> $\begin{array}{r} 432 \\ - 332 \\ \hline 100 \end{array}$ <p>or</p> <p><i>Boat</i>: Boat costs £8.54 = 854 p</p> $\begin{array}{r} 854 \\ - 432 \\ \hline 422 \end{array}$ <p>Paul needs to save 422 p = <u>£4.22</u>.</p> <p><i>Plane</i>: Plane costs £4.99 = 499 p.</p> $\begin{array}{r} 499 \\ - 432 \\ \hline 67 \end{array}$ <p style="text-align: right;">5 min</p>	<p style="text-align: center;">Notes</p> <p>Whole class activity</p> <p>Drawn on BB or use enlarged copy master or OHP or use pictures cut out of magazines, or real toys, with price labels.</p> <p>At a good pace</p> <p>Ps may do calculations in <i>Ex. Bks</i> first if they wish.</p> <p>Reasoning, agreement, praising</p> <p>Ps decide what method to use and dictate to T or write on BB.</p> <p>Feedback for T</p>
2	<p>Sequence</p> <p>I am thinking of a sequence. Its 1st term is 1×195, its 2nd term is 2×195, its 3rd term is 3×195, etc. Let's write the first 5 terms.</p> <p>Ps come to BB to write the terms or dictate to T, explaining reasoning. Class agrees/disagrees. Calculations can be done at side of BB.</p> <p>BB: 195, 390, 585, 780, 975, ...</p> <p>What is the rule? (Increasing by 195)</p> <p>[Preparation for multiplication of 3-digit numbers by a 1-digit number]</p> <p style="text-align: right;">10 min</p>	<p>Whole class activity</p> <p>(Or individually in <i>Ex. Bks</i> if Ps wish)</p> <p>BB: e.g.</p> $\begin{array}{r} 195 \\ + 195 \\ \hline 390 \end{array}$ $\begin{array}{r} 390 \\ + 195 \\ \hline 585 \end{array}$ $\begin{array}{r} 585 \\ + 195 \\ \hline 780 \end{array}$ $\begin{array}{r} 780 \\ + 195 \\ \hline 975 \end{array}$ <p>Discussion, praising</p>
3	<p>Written exercises</p> <p>Revise order of operations (operations inside the brackets first, multiplication or division before addition or subtraction, otherwise work from left to right.)</p> <p>T dictates operations. Ps write them in <i>Ex Bks.</i> and solve them. Review at BB with whole class. Mistakes discussed and corrected.</p> <p>a) $480 - 400 \div 8 = (430)$ b) $480 \div 8 - 2 = (58)$ $(480 - 400) \div 8 = (10)$ $480 \div (8 - 2) = (80)$</p> <p>c) $1200 \div 40 + 20 = (50)$ d) $180 - 40 \div 10 = (176)$ $1200 \div (40 + 20) = (20)$ $(180 - 40) \div 10 = (14)$</p> <p style="text-align: right;">15 min</p>	<p>Individual work, monitored</p> <p>T walks round class while reading operations.</p> <p>Reasoning, agreement, self-correction, praising</p> <p>Ps explain how they did the calculations, e.g.</p> <p>$1200 \div 40 = 120 \div 4 = 30$</p> <p>Feedback for T</p>

<h1>Y3</h1>		<p><i>Lesson Plan 113</i></p>
<p>Activity</p> <p>4</p>	<p>Making symmetrical shapes</p> <p>Ps have coloured sheets of paper on desks. T shows Ps how to make symmetrical patterns by folding sheets in two (four) , tearing a random pattern along unfolded edges, then opening out again.</p> <p>T chooses Ps to show their shapes. Elicit that the fold lines are the lines of symmetry, that shapes made by folding sheet in 2 have <u>line symmetry</u> (symmetry across a line) and those made by folding in 4 have <u>rotational symmetry</u> (symmetry around the centre point)</p> <p style="text-align: right;">20 min</p>	<p>Notes</p> <p>Whole class demonstration first, then individual work, monitored</p> <p>Praising only</p> <p>T (or class) chooses the most original shapes</p> <p>Elicit that the <u>centre point</u> is where the fold lines cross.</p>
<p>5</p>	<p>PbY3b, page 113</p> <p>Q.1 Read: <i>Colour the row in which the ducks are mirror images of each other.</i></p> <p>T also asks Ps to draw the mirror lines. Review at BB with whole class. P comes out to point and explain. Class agrees/disagrees.</p> <p>How have the other rows been made? Ask several Ps what they think. T repeats their reasoning using mathematical terms.</p> <p><i>Solution:</i></p>  <p style="text-align: right;">25 min</p>	<p>Individual work, monitored, helped</p> <p>Drawn on BB or use enlarged copy master or OHP</p> <p>Discussion, agreement, self-correction. praising</p> <p>T could have cut-out ducks to show the transformations.</p> <p><i>Row 1: Translation</i> (moved 5 units to the right each time)</p> <p><i>Row 2: Reflection</i></p> <p><i>Row 3: Rotation</i> by half a turn then <u>reflection</u> (extra praise if Ps realise this by themselves)</p>
<p>6</p> <p>Extension</p>	<p>PbY3b, page 113, Q.2</p> <p>Read: <i>Complete the drawings so that each duck is exactly the same as the first duck.</i></p> <p>T tells Ps that the ducks must be the same shape (congruent) but can face in different directions. (Elicit that the position of the eye indicates where the duck is facing.)</p> <p>Ps come to BB to complete shapes. Class agrees/disagrees or helps P at front if necessary.</p> <p>Read: <i>Join up the pairs which are mirror images of each other.</i></p> <p>Ps come to BB to draw joining lines. Class agrees/disagrees. Check by drawing the mirror lines . (a–b, b–f, c–d, f–g, e–h)</p> <p><i>Solution:</i></p>  <p style="text-align: right;">35 min</p>	<p>Whole class activity</p> <p>Draw on BB or use enlarged copy master or OHP</p> <p>T (and Ps) could have ducks cut out of card for ease of manipulation.</p> <p>Ps can draw ducks in Pbs too if they wish.</p> <p>Discussion, agreement, praising only</p> <p>(If Ps are struggling, let them manipulate a cut-out duck. Once the correct position has been agreed, Ps draw round the duck.)</p> <p>Discuss other transformations. e.g a) to c): rotation by a quarter turn to the right, etc.</p> <p>Ps explain in own words and T repeats using mathematical terms. Praising only</p>

<h1>Y3</h1>		<p><i>Lesson Plan 113</i></p>
<p>Activity</p> <p>7</p>	<p><i>PbY3b, page 113</i></p> <p>Q.3 Read: <i>Draw the duck on these grids.</i></p> <p>Review at BB with whole class. Mistakes corrected.</p> <p><i>Solution:</i></p>  <ul style="list-style-type: none"> • Which duck is <u>similar</u> to the ducks in Q.2? (b), as it is the same shape but a bigger size.) • What has happened to the other ducks? (a) has been <u>stretched</u> horizontally, c) has been stretched vertically and d) has been stretched diagonally) <p style="text-align: right;"><i>41 min</i></p>	<p>Notes</p> <p>Individual work, monitored, helped, corrected</p> <p>Drawn on BB or use enlarged copy master or OHP</p> <p>Discussion, agreement, self-correction. praising</p> <p>BB: <u>similar</u></p> <p>Discussion, agreement, praising</p> <p>T could show <u>stretching</u> with a piece of elasticated material.</p>
<p>8</p> <p>Extension</p>	<p><i>PbY3b, page 113</i></p> <p>Q.4 Read: <i>Draw the mirror image of the mouse.</i></p> <p>Deal with one part at a time. Elicit that the dashed lines are the mirror lines.</p> <p>Review at BB with whole class. How could we check it? (With a mirror or by choosing any point on the mouse, e.g. the nose or the ear, and counting the units from each point to the mirror line. Elicit that if they are true reflections, the distances should be equal.)</p> <p><i>Solution:</i></p>  <p>T could have a cut-out card mouse stuck to BB and give Ps instructions such as:</p> <ul style="list-style-type: none"> • rotate it by half a turn to the left (1 right angle to the right, etc.) • reflect it in the <i>y</i>-axis (i.e. vertical axis) • reflect it in the <i>x</i>-axis (i.e. horizontal axis) • rotate it so that its nose points NE (SW, etc.) <p style="text-align: right;"><i>45 min</i></p>	<p>Individual work, monitored, helped, corrected</p> <p>Drawn on BB or use enlarged copy master or OHP</p> <p>Discussion, agreement, self-correction. praising</p> <p>Whole class activity (or Ps each have a cut-out mouse on desks)</p> <p>Ps come out to transform mouse. Class agree/disagrees.</p> <p>At a good pace</p> <p>Ps can give instructions too!</p>

<h1>Y3</h1>	R: Calculation C: Similarity. Parallel and perpendicular lines E: Estimation	<h2>Lesson Plan 114</h2>
Activity 1	Operations Let's do the calculations and compare the results. BB: $965 - 123 - 542 = (300) \quad (=) \quad 965 - (123 + 542) = (300)$ $965 + 542 - 123 = (1384) \quad (=) \quad 965 + (542 - 123) = (1384)$ $(965 + 542) - 123 = (1384) \quad (>) \quad 965 - (542 - 123) = (546)$ Ps come to BB to do calculations, writing difficult ones at side of BB. Class points out errors. Ps then come out to compare the results, writing the correct sign between each pair. Ps might be able to explain the equalities but do not worry if they cannot. Ps might also point out the sets of brackets which are not really needed. (LH bottom, RH middle) <i>5 min</i>	Notes Whole class activity Already prepared on BB or SB or OHT. At a good pace Ps can do calculations in <i>Ex. Bks</i> if they wish. Reasoning, agreement, praising BB: e.g. $\begin{array}{r} 1507 \\ - 123 \\ \hline 1384 \end{array} \quad \begin{array}{r} 542 \\ - 123 \\ \hline 419 \end{array} \quad \begin{array}{r} 965 \\ + 419 \\ \hline 1384 \end{array} \quad \begin{array}{r} 965 \\ - 419 \\ \hline 546 \end{array}$ Discussion, agreement, praising
2	Inequalities Which numbers could we write instead of the rectangles? BB: a) $478 + 312 - 105 < 312 + 478 - \square$ $(685 < 790 - \square)$, so $\square < 790 - 685 = 105$ or Ps might notice that 790 is the same on both sides, so the numbers subtracted on RHS must be less than 105. \square : 104, 103, ... BB: b) $149 < 200 \times \square - 850 < 151$ (Add 850 to all parts: $999 < 200 \times \square < 1001$, but $999 < 1000 < 1001$ so $200 \times \square = 1000$, $\square = 5$) <i>10 min</i>	Whole class activity Already written on BB or SB or OHT Ps suggest method of solution and what calculations to do. Reasoning, agreement, checking, praising Extra praise for clever explanations. or $149 < 150 < 151$, so $200 \times \square - 850 = 150$ $200 \times \square = 1000$ $\square = 5$ T gives hints if necessary
3	Find the mistake <i>Daffy Duck</i> had to write the same number in 6 different ways but he has made one mistake in each part. Can you find it? BB: a) $3H + 6T + 5U \quad 300 + 60 + 5 \quad 3 \times 100 + 6 \times 10 + 5 \times 1$ $36T + 5U \quad 3H + 65U \quad CCCXLV \text{ (CCCLXV)}$ b) $9H + 8U \quad 98U \text{ (908U)} \quad 9 \times 100 + 0 \times 10 + 8 \times 1$ $CMVIII \quad 900 + 8 \quad \text{The next whole number less than 909.}$ Deal with one part at a time. First elicit what the numbers should be. (365 and 908) Ps come to BB to underline the mistake and write it correctly. Class agrees/disagrees. <i>16 min</i>	Whole class activity T has BB or SB or OHT already prepared Give Ps time to work out descriptions mentally Reasoning, agreement, correcting, praising Feedback for T

Y3

Lesson Plan 114

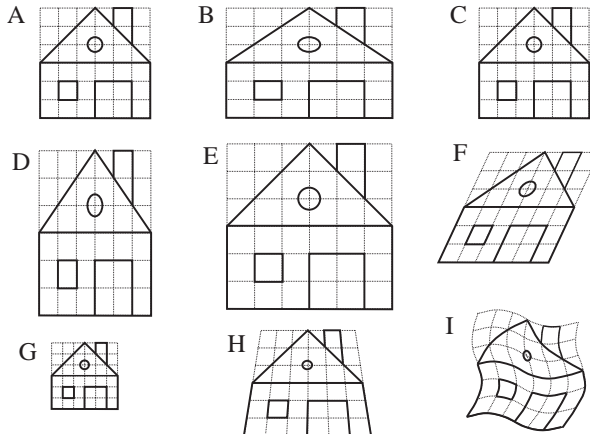
Activity

4

Shapes and lines

Look carefully at the houses on the different grids. Which parts of the drawings are missing? Ps come out to BB to draw them in. Class points out errors.

BB:



- Who can show us lines which are parallel (perpendicular)? Ps come out to point. Class agrees/disagrees or suggests others.
- Which houses are congruent (exactly the same)? (A 'is congruent to' C) We could write it mathematically like this. T shows the sign.
- Which houses are similar? (i.e. the same shape but different size) (A (or C) 'is similar to' E and G) We could write it like this.
- What have we done to House A to make the other houses? Elicit that: A (or C) was enlarged (made bigger) to make E, A (or C) was reduced (made smaller) to make G, A (or C) was stretched horizontally to make B, A (or C) was stretched vertically to make D.

Discuss the cases of F, H and I. T could liken *House I* to the reflection we sometimes see in the ripples of a pond or lake.

25 min

Notes

Whole class activity

Drawn on BB or use enlarged copy master or OHP

Discussion, agreement, praising

At a good pace

Involve majority of Ps

Ps could have sheets of copy master on desks too.

T reminds Ps of notation to show parallel (perpendicular) lines.

BB: Congruent $A \cong C$

BB: Similar $A \sim E \sim G$
or $C \sim E \sim G$

Ps explain in own words.

T repeats using mathematical terms where appropriate.

T could introduce the terms skewed to the right (F) and distorted (out of shape) for H and I.

5

PbY3b, page 114

Q.1 Read: *Colour in the same colour shapes which are similar to:*

i) rectangle 1, ii) rectangle 2, iii) rectangle 3.

Use a different colour for each set of shapes.

Elicit that similar rectangles are the same shape but can be different sizes. Class can agree on a colour for each set.

Deal with one set at a time. Review at BB with whole class.

Discuss how to check whether shapes are similar. Elicit that, e.g.

Rectangle 1: longer sides are twice the length of shorter sides (or are in the ratio 1 to 2, or 1:2)

Rectangle 2: longer sides are 1 and a half times as long as the shorter sides (or are in the ratio 2 to 3, or 2:3)

Rectangle 3: All sides are equal so it is a square (or in ratio 1:1).

- Which is the odd one out? (13) Why? (Longer sides are 3 times length of shorter sides, or are in the ratio 1:3)
- Which rectangles are congruent? Ps show and write on BB.

32 min

Whole class activity

Drawn on BB or use enlarged copy master or OHP

Discussion, reasoning, agreement, self-correction, praising

Solution:

i) 1 ~ 4 ~ 5 ~ 10 ~ 12 ~ 15

ii) 2 ~ 6 ~ 11

iii) 3 ~ 8 ~ 9 ~ 14 ~ 16 ~ 17

Ps explain in own words.

T tells it as a ratio.

Agreement, praising

Ps might notice that '7' is missing. Let's draw it ~13.

BB: $1 \cong 12 \cong 15$; $2 \cong 6$

Y3		<i>Lesson Plan</i> 115
<i>Activity</i>	Tables and calculation practice, activities, consolidation <i>PbY3b, page 115</i>	<i>Notes</i>

<h1>Y3</h1>	<p>R: Calculation C: Similarity. Enlargements and reductions E: <i>Complex shapes</i></p>	<h2>Lesson Plan 116</h2>
<h3>Activity</h3>	<h3>Problems 1</h3> <p>Listen carefully and think about how you would solve these problems. Tell me what operation or equation you would write.</p> <p>a) <i>Pete had £715 in his bank account. After buying a computer he had £319 left in his account. How much was the computer?</i> A, come and write the equation or operation you think is needed. Who agrees? Who would do it another way? etc.</p> <p>BB: e.g. $£715 - \square = £319$ or $\begin{array}{r} 715 \\ - 319 \\ \hline \end{array}$</p> <p><i>Answer:</i> The computer cost £396. £ <u>(396)</u></p> <p>b) <i>Rob has £715 left in his bank account after spending £319 while on holiday. How much money did Rob have in his account <u>before</u> he went on holiday?</i> B, come and write the equation or operation you think is needed. Who agrees? Who would do it another way? etc.</p> <p>BB: e.g. $\square - £319 = £715$ or $\begin{array}{r} 715 \\ + 319 \\ \hline \end{array}$ £ (1034)</p> <p><i>Answer:</i> Rob had £1034 in his account before his holiday.</p> <p>c) <i>Sarah had £319 in her bank account. Her grandparents gave her some money and she now has £715. How much money did Sarah's grandparents give her?</i> C, come and write the equation or operation you think is needed. Who agrees? Who would do it another way? etc.</p> <p>BB: e.g. $£319 + \square = £715$ or $\begin{array}{r} 715 \\ - 319 \\ \hline \end{array}$ £ (396)</p> <p><i>Answer:</i> Sarah's grandparents gave her £396.</p> <p style="text-align: right;"><i>6 min</i></p>	<h3>Notes</h3> <p>Whole class activity Ps only need to write the equations or operations at first.</p> <p>Once the class has agreed it is correct, Ps come to BB to do the calculation or T writes what Ps dictate.</p> <p>At a good pace</p> <p>Reasoning, agreement, praising</p> <p>Ps say answer as a sentence in unison.</p> <p>T uses the words reductant, subtrahend, difference.</p> <p>If problems, show details of calculations in a place-value table.</p> <p>Feedback for T</p>
<h3>2</h3>	<h3>Problems 2</h3> <p>Listen carefully and think about how you would solve these problems. Show me the operation when I say. (On scrap paper or 'slates') Write the answer too if you have time.</p> <p>Ps who respond correctly explain to those who do not. Ps dictate calculation to T (or come to BB). Class says answer as a sentence.</p> <p>a) <i>If you have only 50 p coins in your purse, how many would you need to pay £4 50 p?</i> Show me . . . now! ($450 \div 50 = \square$) (or $\square \times 50 = 450$) BB: $£4\ 50\ p = 450\ p$, $450\ p \div 50\ p = 45\ p \div 5\ p = 9$ (times) <i>Answer:</i> I would need nine 50 p coins to pay £4.50.</p> <p>b) <i>Tim had £4.20. He spent 60 p per day. For how many days did his money last?</i> Show me . . . now! ($420 \div 60 = \square$) (or $\square \times 60 = 420$) <i>Answer:</i> Tim's money would last for 7 days.</p> <p>c) <i>Vicky has £4.80. Her money must last for 6 days. If she spends the same amount each day, what is the most that she can spend daily?</i> Show me . . . now! ($480 \div 6 \geq \square$) or ($\square \times 6 \leq 480$) <i>Answer:</i> She can spend at most 80 p each day.</p> <p style="text-align: right;"><i>15 min</i></p>	<p>Individual work in writing but reviewed with whole class T reads questions while walking round the class. Responses given in unison Reasoning, agreement, self-correcting, praising (Or done in <i>Ex. Bks</i> and mistakes corrected after review.)</p> <p>BB: $£4.20 = 420\ p$ $420\ p \div 60\ p = 42\ p \div 6\ p = 7$ (times)</p> <p>BB: $£4.80 = 480\ p$ $480\ p \div 6 = 80\ p$</p>

Y3

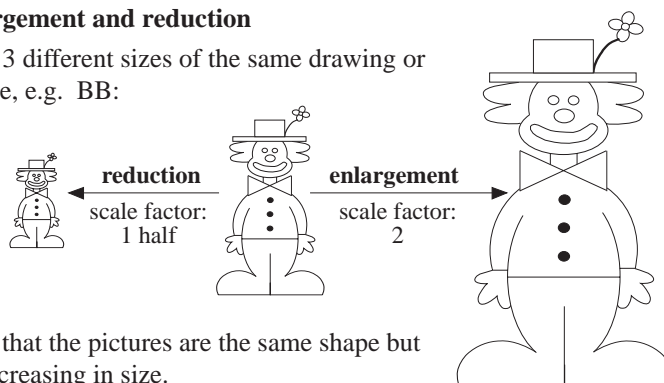
Lesson Plan 116

Activity

3

Enlargement and reduction

T has 3 different sizes of the same drawing or picture, e.g. BB:



Elicit that the pictures are the same shape but are increasing in size.

Which picture is biggest? (RH) We say that the RH picture is an enlargement of the middle picture (or the middle picture has been enlarged to make the RH picture).

Which picture is the smallest? (LH) We say that the LH picture is a reduction of the middle picture (or the middle picture has been reduced to make the LH picture).

How can we find out by how much they have been enlarged or reduced? (Measure them.) Discuss the parts of the pictures which could be measured. (e.g. distance from bottom of feet to top of hat, or width of bow, or length of one foot, or height of hat, etc.)

Ps choose what to measure. T (or P) measures using appropriate unit.

T explains that :

- if length is twice as much, then the picture has been enlarged by 2 times (or scale factor 2)
- if length is half as long, then the picture has been reduced by 1 half (or scale factor 1 half).

20 min

Notes

Whole class activity to start
Use copy master, enlarged, coloured, cut out and stuck to BB (or any picture/drawing enlarged by 2 times and reduced by a half)

Ps come to BB or OHP to point.

Agreement, praising

Ps might also notice that, e.g.

- RH is enlargement of LH by scale factor 4
- LH is reduction of RH by scale factor 1 quarter

T gives hints if Ps do not suggest measuring.

Write measurements on BB

e.g. Width of bow tie:
12.5 mm : 25 mm : 50 mm

T gives a measurement for middle picture and elicits what the similar measurement would be in the reduction and the enlargement.

4

PbY3b, page 116

Q.1 Read: *Colour any large shape which is similar to the small shaded shape inside it..*

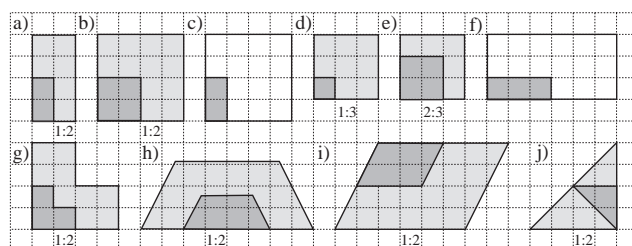
Do part a) with the whole class first to determine how to tell whether a shape is similar. (Count the units of matching sides and see if they are in the same ratio, e.g. in a), sides in larger shape are all twice as long as matching sides in smaller shape.)

T sets a time limit. Review at BB with whole class. Ps explain their reasoning. T helps with mathematical terms if necessary.

Discuss why c) and f) are not similar and by how much the similar shapes have been enlarged.

Compare the enlargement of lengths of sides with the enlargement of area.

Solution:



28 min

Individual work, monitored helped

Drawn on BB or use enlarged copy master or OHP

Discussion, agreement, self-correction, praising

Whole class analysis of results

e.g.

- a) sides enlarged by scale factor 2, i.e. in the ratio 1:2; area enlarged by scale factor 4, i.e. ratio 1:4
- d) sides enlarged by scale factor 3, i.e. in the ratio 1:3; area enlarged by scale factor 9, i.e. in the ratio 1:9
- j) reposition small triangle to see enlargement more easily

Extension

Y3

Lesson Plan 116

Activity

5

PbY3b, page 116

Q.2 Read: *Colour similar shapes in the same colour.*

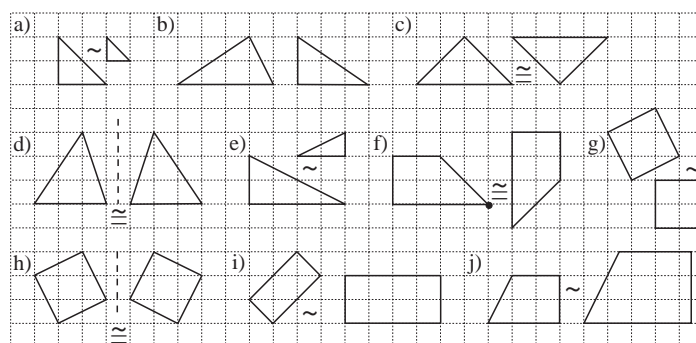
T sets a time limit. Review at BB with whole class. Ps come to BB or dictate to T. Class agrees/disagrees.

Which shapes are congruent? [c), d), f) and h)]

Which are in symmetrical positions? [d) and h) Who can draw the lines of symmetry?

How can we move one congruent shape on top of the other?
Ps suggest directions.

Solution:



34 min

Notes

Individual work, monitored
helped, corrected

Drawn on BB or use enlarged
copy master or OHP

Discussion, agreement, self-
correction, praising

Feedback for T

Remind Ps of the notation:

similar congruent
~ ≅

T could have copies of the
shapes cut out from card to
verify how to move one
congruent shape to the same
position as the other, e.g.

- d), h) reflection in mirror line
- f) rotation 1 quarter of a turn to
the right around point shown,
then move E1, S1

Extension

6

PbY2b, page 116

Q.3 Read: a) Write the letters of similar shapes below.

b) Draw over parallel lines in the same colour.

c) Mark right angles with red squares.

Deal with one part at a time. T reminds Ps about arrow notation
to show sets of parallel lines. Ps can use it if they wish.

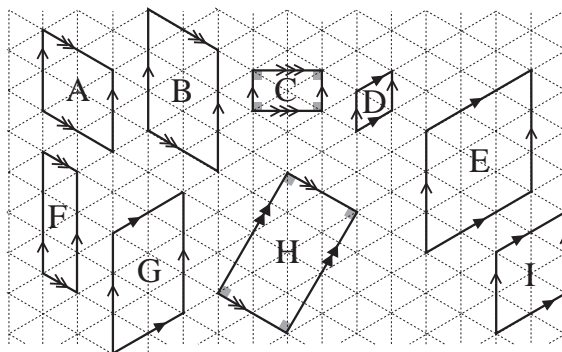
Elicit that right angles are formed from perpendicular lines.

Review at BB with whole class. Mistakes discussed/corrected.

Solution:

a) A ~ D ~ E ~ I, B ≅ G, C ~ H

b) and c):



Discuss the shapes. T elicits or tells:

- All the shapes have opposite sides parallel, so they are all parallelograms.
- C and H have right angle corners, so are also rectangles.
- A, D, E and I have sides of equal length, so are also rhombi.

40 min

Individual work, monitored
helped, corrected

Drawn on BB or use enlarged
copy master or OHP

Discussion, agreement, self-
correction, praising

Feedback for T

Extension

What else do you notice about
the shapes?

Extra praise if Ps notice these
common properties themselves.

BB:

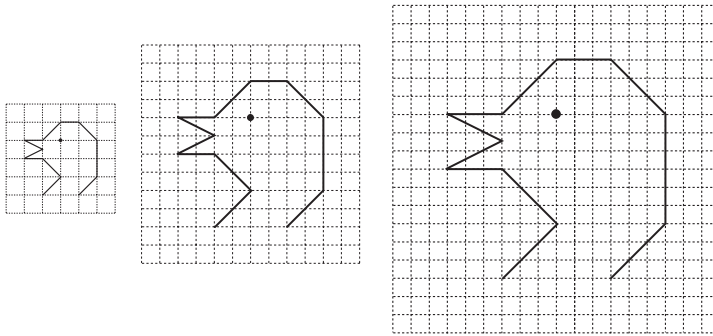
parallelogram: quadrilateral
with opposite sides parallel
rectangle: parallelogram with
square corners

rhombus: parallelogram with
all 4 sides of equal length

Y3*Lesson Plan 116***Activity****7****PbY3b, page 116**Q.4 Read: a) *Copy this bird's head in your exercise books.*b) *Enlarge it to 2 times and 3 times its size.*

Elicit that to make it 2 (3) times bigger, each line of the drawing should be 2 times (3 times) as long

If we had started with the larger drawing, by how much would we have reduced it to make the smaller drawing? (1 half, 1 third)

Solution:*45 min***Notes**Individual work, monitored
helped, correctedPs use *Ex. Bks* or grid sheetsT has enlargements already
prepared on BB or SB or OHT
for demonstration (or use
enlarged copy master)Discussion, agreement, self-
correction, praisingElicit that all three drawings
are similar (the same shape).

Y3

R: Calculations
 C: **Enlargements and reductions**
 E: *Ground plans, maps*

Lesson Plan 117

Activity**1****Problems**

Listen carefully and think what operations you would write to solve the problem. Show me it when I say. (On scrap paper or 'slates') Write the answer too if you have time. (Data can be noted in *Ex. Bks.*)

Ps who respond correctly explain to those who do not. Ps dictate calculation to T (or come to BB). Class says answer as a sentence.

- a) *Ann had £6.75. Her Dad gave her some 20 p coins. If Ann now has £8.55 how many 20 p coins did her Dad give her?*

Show me . . . now! (e.g. $(855 - 675) \div 20 = \square$)

BB: $\pounds 8.55 = 855 \text{ p}$, $\pounds 6.75 = 675 \text{ p}$

$$(855 \text{ p} - 675 \text{ p}) \div 20 \text{ p} = 180 \text{ p} \div 20 \text{ p} = 9 \text{ (times)}$$

Answer: Ann's Dad gave her nine 20 p coins.

- b) *Billy had £12.20. He bought some marbles at 40 p each and had £9 left. How many marbles did he buy?*

Show me . . . now! (e.g. $(1220 - 900) \div 40 = \square$)

Answer: Billy bought 8 marbles.

- c) *Carol had £5.84 in her piggy bank. Then she put in the same amount of money each day for 20 days and now has £15.84 in her piggy bank. How much money did Carol save each day?*

Show me . . . now! (e.g. $(1584 - 584) \div 20 = \square$)

Answer: Carol saved 50 p each day.

8 min

Notes

Individual work in writing but reviewed with whole class

T reads questions while walking round the class.

Use names of Ps in class.

Responses given in unison

Reasoning, agreement, self-correcting, praising

(Or done in *Ex. Bks* and mistakes corrected after review.)

BB: e.g.

$$\pounds 12.20 = 1220 \text{ p}, \pounds 9 = 900 \text{ p}$$

$$(1220 \text{ p} - 900 \text{ p}) \div 40 \text{ p}$$

$$= 320 \text{ p} \div 40 \text{ p} = 8 \text{ (times)}$$

BB: e.g.

$$\pounds 5.84 = 584 \text{ p}, \pounds 15.84 = 1584 \text{ p}$$

$$(1584 \text{ p} - 584 \text{ p}) \div 20$$

$$= 1000 \text{ p} \div 20 = 50 \text{ p}$$

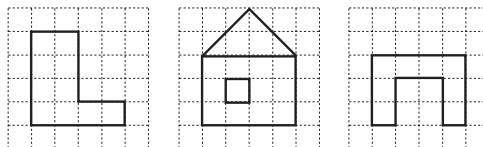
2**Enlargement and reduction**

T has grids drawn on BB or OHT. T draws a simple shape on the smallest grid, or Ps come to BB to draw one.

- a) Let's enlarge the shape to 2 times (3 times) its size. Ps come to BB to draw enlargements. Class points out errors.

Repeat for other shapes.

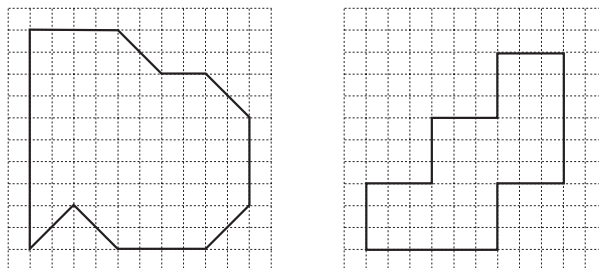
e.g. BB:



- b) Let's reduce this shape to half (1 third) its size. Ps come out to draw reductions. Class points out errors.

Repeat for other shapes

e.g. BB:



16 min

Whole class activity

Use squared BB or draw grids on BB or OHT or use enlarged copy master or OHP.

At a good pace


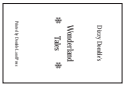
T helps where necessary

Agreement, praising

Feedback for T

(Or individual work if Ps wish. Each P has a copy of the grids on the copy master)

Praise creative original shapes.

Y3		<i>Lesson Plan 117</i>
<p>Activity</p> <p>3</p>	<p>PbY3b, page 117</p> <p>Q.1 Read: <i>This picture is a smaller copy of a larger picture.</i> <i>Scale: 1 mm on the copy means 1 cm on the real picture.</i></p> <p>Make sure that Ps understand the scale by referring to mm and cm on their rulers. Deal with one part at a time.</p> <p>a) Read: <i>By how much was the real picture reduced?</i> Elicit that 1 cm = 10 mm, so the real picture was reduced by <u>1 tenth</u> of its size (or by scale factor 1 tenth).</p> <p>b) Read: <i>How long were the sides of the real picture?</i> How could we find this out? (Measure the sides of the copy in Pbs, then multiply the lengths by 10, or measure in mm and change the units to cm) Review with whole class. Ask several Ps what they think. (Width = 32 cm and Height = 40 cm)</p> <p>c) Read: <i>How long is the perimeter of this copy?</i> Review at BB with whole class. Mistakes corrected. BB: $\text{perimeter} = 2 \times \text{width} + 2 \times \text{height}$ $= 2 \times 32 \text{ mm} + 2 \times 40 \text{ mm}$ $= 64 \text{ mm} + 80 \text{ mm} = \underline{144 \text{ mm}}$ (= 14.4 cm)</p> <p>d) Read: <i>What length of wood would be needed to make a frame for the real picture?</i> Elicit that the length needed will be the same as the perimeter of the real picture. BB: $\text{Perimeter of real picture} = 10 \times 14.4 \text{ cm}$ $= \underline{144 \text{ cm}}$ (= 1 m 44 cm) [or $2 \times (32 \text{ cm} + 40 \text{ cm}) = 2 \times 72 \text{ cm} = \underline{144 \text{ cm}}$]</p> <p style="text-align: right;">23 min</p>	<p style="text-align: center;">Notes</p> <p><i>Ps have rulers on desks</i></p> <p>Individual work, monitored, helped</p> <p>BB: 1 cm = 10 mm</p> <p>Discussion, agreement, self-correcting, praising</p> <p>Use enlarged copy master for discussion and demonstration only!</p> <p>T could have the frame already prepared from card to show to give Ps an idea of its real size.</p>
<p>4</p>	<p>PbY3b, page 117</p> <p>Q.2 Read: <i>This is an enlarged copy of the front cover of a tiny book.</i> <i>Draw the real book cover if the smaller side is 2 cm long.</i> <i>What is the length of the larger side of the real book?</i></p> <p>How do we know what length to make the longer side? Ask several Ps what they think. (Measure the shorter side on the copy, then compare it with 2 cm to find how much it has been reduced.) Ps measure and work out the scale. Agree that:</p> <p>BB: $\text{Scale: } 4 \text{ cm} \rightarrow 2 \text{ cm} \text{ or } 2 \text{ cm} \rightarrow 1 \text{ cm}$ (i.e. the real book cover is half the size of the copy)</p> <p>Ps measure the length of the longer side, then complete the drawing. Ps can use corner of ruler to ensure that the lines are perpendicular.</p> <p><i>Solution:</i></p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>4 cm</p> <p>6 cm</p> </div> <div style="text-align: center;"> <p>Real book cover</p>  <p>2 cm</p> <p>3 cm</p> </div> </div> <p style="text-align: right;">30 min</p>	<p>Whole class discussion first to determine the scale of the reduction</p> <p>Discussion, reasoning, agreement, praising</p> <p>BB: $4 \text{ cm} \rightarrow 2 \text{ cm}$ $6 \text{ cm} \rightarrow \underline{3 \text{ cm}}$</p> <p>N.B. Ps do not need to write the text!</p> <p>Extension</p> <p>What is the perimeter (area) of the real book cover?</p> <p>$P = 2 \times (3 \text{ cm} + 2 \text{ cm}) = 10 \text{ cm}$ $A = 2 \text{ cm} \times 3 \text{ cm} = 6 \text{ cm}^2$</p>

Y3*Lesson Plan 117***Activity****5****PbY3b, page 117**Q.3 Read: *This is the ground plan of a room.**Scale: 1 mm on the plan means 10 cm in real life.*

T makes sure that Ps understand the scale with quick oral practice. T says a length on the plan, e.g. 2 mm (5 mm, 10 mm, etc.), Ps say what it would measure in real life (and vice versa).

Discuss what the items on the plan mean. Ps come out to point to the door, windows, rug and say what they think the other items of furniture could be (e.g. bed, bedside cabinet, stool, dressing table, bookshelves, wardrobe or chest of drawers, etc)

Deal with one part at a time. Class decides which measure is the length and which is the width of the room.

In part b), iii) T might need to explain what a skirting board is and show where it is (or where it would be) in the classroom.

Review at BB with whole class. Discuss all results and class decides which measures are acceptable. Extra discussion about b) iii), as Ps might forget to take off the gap for the door.

*Solution:*a) In the plan:

i) width of room: 45 mm ii) length of room: 35 mm

b) In real life:

i) width of the door: 70 cm

ii) width of each window: 100 cm

iii) length of skirting board: $2 \times (450 \text{ cm} + 350 \text{ cm}) - 70 \text{ cm}$
 $= 2 \times 800 \text{ cm} - 70 \text{ cm}$
 $= 1600 \text{ cm} - 70 \text{ cm}$
 $= 1530 \text{ cm} (= 15 \text{ m } 30 \text{ cm})$

*38 min***Notes**

Whole class introduction

T chooses Ps at random. At speed. Praising

Use enlarged copy master for discussion and demonstration only.

Involve several Ps

Explanation/demonstration

Agreement, checking, self-correcting, praising

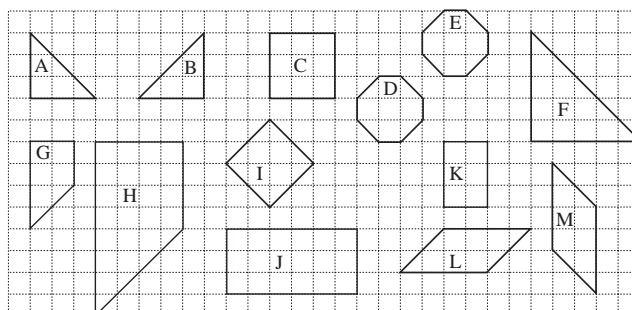
(Accept 1 mm more or less)

(Or do part b) iii) as a whole class activity if Ps are struggling)

6**Shapes revision**

T has various shapes drawn on a grid. Study these shapes.

BB: e.g.



Who can think of questions to ask about them? e.g.

- Which shapes are similar (congruent, symmetrical)?
- What is the name (perimeter, area) of each shape?
- Which shapes are enlargements (reductions) of other shapes?
- Show parallel lines (perpendicular lines, right angles.)
- How would you put them in sets? etc.

45 min

Whole class activity

Drawn on BB or use enlarged copy master or OHP

Involve as many Ps as possible

T repeats unclear questions using correct mathematical language.

Ps choose other Ps to answer their questions.

Class agrees/disagrees or points out omissions.

Praising, encouragement only

Extra praise for clever questions

Y3

R: Calculation. Plane shapes
 C: **Building solids from unit cubes**
 E: *Plane symmetry. Similarity of solids*

Lesson Plan 118

Activity

1

Missing numbers

Let's fill in the digits missing from these calculations.

BB: a) i)
$$\begin{array}{r} 342 \\ + 247 \\ \hline 589 \end{array}$$
 ii)
$$\begin{array}{r} 546 \\ + 830 \\ \hline 1376 \end{array}$$
 iii)
$$\begin{array}{r} 403 \\ + 540 \\ \hline 943 \end{array}$$

iv)
$$\begin{array}{r} 999 \\ + 889 \\ \hline 1888 \end{array}$$
 v)
$$\begin{array}{r} 312 \\ + 946 \\ \hline 1258 \end{array}$$
 vi)
$$\begin{array}{r} 138 \\ + 103 \\ \hline 241 \end{array}$$

b) i)
$$\begin{array}{r} 956 \\ - 342 \\ \hline 614 \end{array}$$
 ii)
$$\begin{array}{r} 743 \\ - 591 \\ \hline 152 \end{array}$$
 iii)
$$\begin{array}{r} 838 \\ - 526 \\ \hline 312 \end{array}$$

iv)
$$\begin{array}{r} 697 \\ - 479 \\ \hline 218 \end{array}$$
 v)
$$\begin{array}{r} 856 \\ - 234 \\ \hline 622 \end{array}$$
 vi)
$$\begin{array}{r} 751 \\ - 599 \\ \hline 152 \end{array}$$

Ps come out to fill in missing digits, explaining reasoning to class. Class checks that they are correct.

8 min

2

Tables practice relay

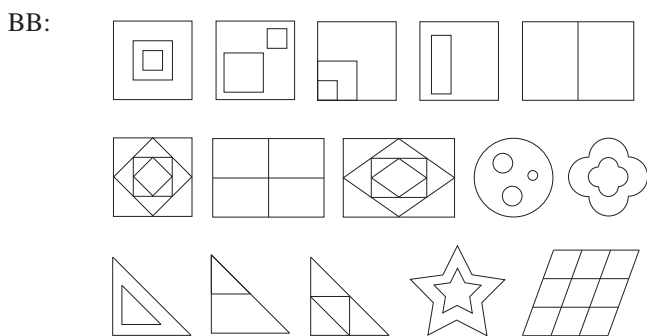
T says a multiplication or division. P says the result, then gives another multiplication or division to the next P. Class points out errors.

11 min

3

Shapes

What kind of shapes can you see in the diagram? (squares, rectangles, triangles, flowers (from 4 semicircles), stars, circles, parallelograms)



- Which shapes are similar? (e.g. Ps might point out that each unit parallelogram is similar to the large parallelogram and also to each 4-unit parallelogram)
- Which shapes are congruent? (T has BB ruler or measuring tape ready in case of disagreement)
- Which shapes are enlargements (reductions)?

Ps come out to point and explain. Class agrees/disagrees or suggests other examples.

16 min

Notes

Whole class activity

Written on BB or OHP or use enlarged copy master

At a good pace

Bold numbers missing

Reasoning, checking, agreement

Details of difficult calculations given where needed

Ps may do the calculations in *Ex. Bks* first before showing on BB.

Praising, encouragement only

Whole class activity

At speed round class

In good humour!

Whole class activity

Drawn on BB or use enlarged copy master or OHP

At a good pace

Revise what a parallelogram is (quadrilateral with opposite sides parallel, so squares and rectangles are also parallelograms)

Discussion, reasoning, agreement, praising

Encourage Ps to use mathematical terms

Feedback for T

Y3

Lesson Plan 118

Activity

4

Similarity of solids

T shows some congruent solids built from unit cubes. T places them in symmetrical positions. If these solids are mirror images of each other where would the mirror be? Ps come out to place mirror and check that the mirror image is in the same position as the second solid.

If I put one solid in this position and placed the mirror here, where would the mirror image be? Ps come out to place 2nd solid in correct position. Class agrees/disagrees. Check against mirror image.

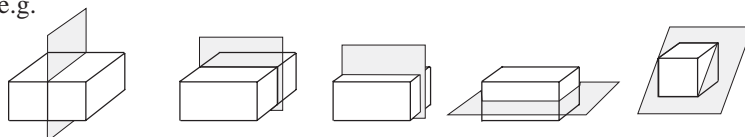
Elicit that the solids are in symmetrical positions on either side of the mirror.

T shows 2 congruent cuboids. How could we place the mirror between them so that they are in symmetrical positions. Ps come out to demonstrate different ways. Class describe what they can see.

If I cut one cuboid in half and put the mirror here, what do you notice? (The half cuboid and its mirror image seem to make a whole cuboid.) In what other ways could we do it? T does what Ps dictate.

We say that the cuboids have plane symmetry (i.e. are symmetrical on each side of a plane (flat surface)). Repeat with cubes.

e.g.



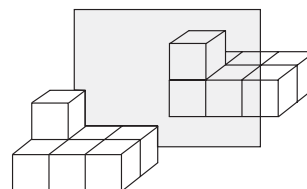
Everyone stand up. Can you hold your hands in a symmetrical position? Show me . . . now! T chooses Ps to show their different positions. Other Ps come out to show where the plane of symmetry (a mirror or piece of card) would be.

22 min

Notes

Whole class activity

T has solids already prepared



Demonstration, discussion, agreement, praising

Cuboids made from unit cubes or plasticine or any material which can be cut in half easily.

BB: Plane symmetry

Extra praise if Ps point out the diagonal plane of symmetry without help.

In unison

(e.g. palms facing, palms touching, etc.)

5

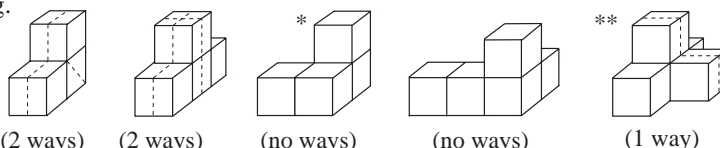
Building solids

Ps have unit cubes on desks. T has large models already prepared for demonstration.

Let's build different solids using 3 (4, 5) unit cubes. T chooses Ps to show their solids and to describe them to class.

T has 4 or 5 prepared models. Which of these could be cut into two equal parts so that each part is a mirror image of the other? Ps come out to show where they would cut them. Who agrees? Who can think of another way? etc.

e.g.



T chooses a couple of the solids. What would they look like if we drew them from the front (top, side)? Remind Ps about how to draw a ground plan as seen from above, showing the number of cubes in each column. Now we can see more easily whether the solid is symmetrical and where the plane of symmetry would be. Ps come out to draw them.

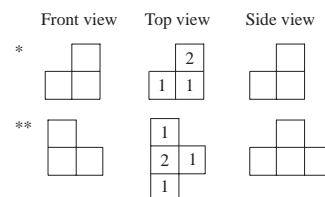
Individual (or paired) work in building solids, monitored

Demonstration, praising

Discussion, agreement, praising only

Ps must imagine the cuts.

T confirms by splitting them in half and checking with a mirror. (Models pre-cut)



Discussion, reasoning, agreement, praising

Extension

Discuss and elicit the surface area (in unit squares) and volume (in unit cubes) of one or two of the solids.

28 min

Y3

Lesson Plan 118

Activity

6

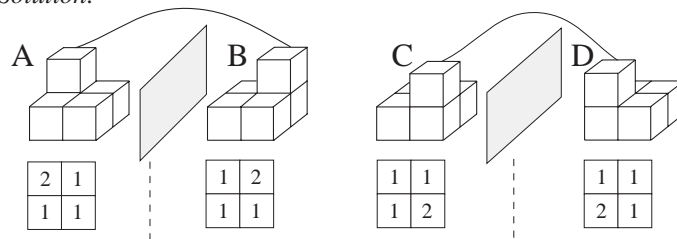
PbY3b, page 118

Q.1 Read: *These solids have been built from unit cubes. Join up the solids which are mirror images of each other.*

If you are not sure, build the solids first with unit cubes, then think where you would put the mirror. Use the ground plans to help you.

Review at BB with whole class. Ps come to BB to join up mirror images and draw where they would put the mirror. Class agrees/disagrees. Mistakes discussed and corrected.

Solution:



Discuss surface area and volume. (The same for all 4 solids)

33 min

Notes

Individual work, monitored, helped

Drawn on BB or use enlarged copy master or OHP (or T has large models made up for demonstration)

Agreement, self-correction, checking with models and large mirror, praising

Show that any two could be joined up if we were allowed to move them.

Area = 20 unit squares

Volume = 5 unit cubes

7

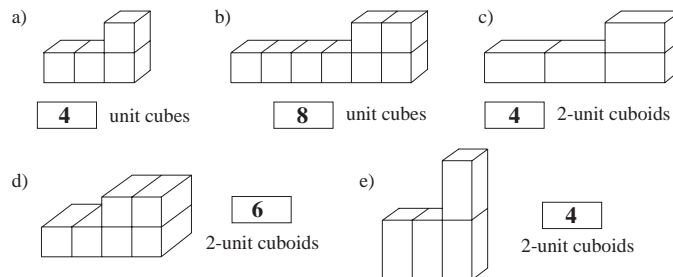
PbY3b, page 118

Q.2 Read: *Build these solids. How many units did you use for each one?*

Deal with one part at a time. Ps show models to class.

Review at BB with whole class. Mistakes corrected.

Solution:



Extensions

- How did we get from:
 - a) to b)? (stretching horizontally → to twice its length)
 - b) to c)? (replacing 1-unit cubes with 2-unit rods, $b) \cong c)$)
 - a) to e)? (stretching vertically ↑ to twice its height)

- What is the volume and area of each solid? Let's write it in a table.

BB:	a)	b)	c)	d)	e)
Volume (unit cubes)	4	8	8	12	8
Area (unit squares)	18	32	32	36	30

- If we enlarged a) to twice its size (by scale factor 2) what would it look like? Elicit that it should be twice the length, twice the width and twice the height. T shows model. Agree that it is similar to a). Discuss and compare its volume (8 times more) and area (4 times more) with those of a).

39 min

Ps have unit cubes on desks

Individual work, monitored, helped

Drawn on BB or use enlarged copy master or OHP (or T has large models made up for demonstration)

Agreement, self-correction, praising

Whole class activity

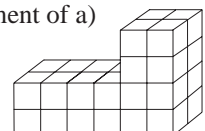
Discussion, agreement, praising

T has table already drawn on BB or OHT

Ps come to BB to fill in the values. Class agrees/disagrees

Enlargement of a)

by scale factor 2:



V = 32 unit cubes

A = 72 unit squares

Y3

Lesson Plan 118

Activity

8

PbY3b, page 118

Q.3 Read: Write how many unit cubes have been used to build each of these cuboids.

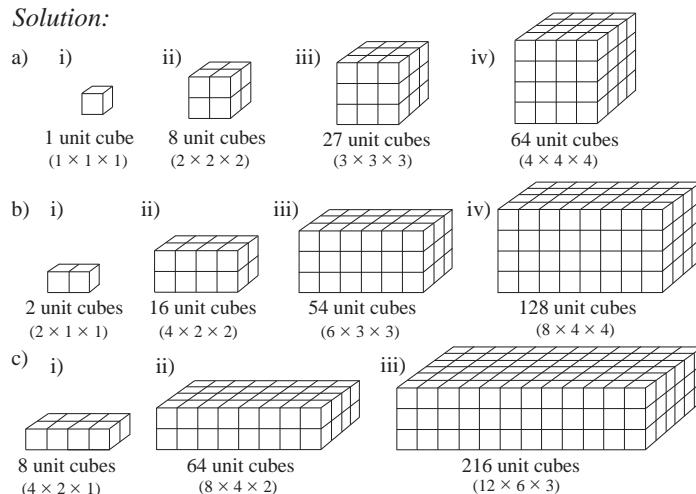
Think about what is the relationship between them.

Deal with parts a). b) and c) one at a time. Parts a) and b) can be done as individual work, reviewed with the whole class. Part c) can be done as a whole class activity.

Elicit that it is easier to count how many unit cubes long, how many wide and how many high, then multiply the numbers together. Mistakes discussed and corrected. Elicit that number of cubes used is the **volume** of the solid.

What do you notice about each part?

Solution:



Notes

Individual work to start, monitored, helped

Use enlarged copy master. T has large models already prepared for demonstration

Ps can build cuboids on desks if problems.

Discussion, reasoning, agreement, self-correction, praising

Ps might notice that:

i) \rightarrow ii): scale factor 2;

i) \rightarrow iii): scale factor 3

i) \rightarrow iv): scale factor 4

a) are similar cubes
(length = width = height)

b) are similar cuboids
(length = $2 \times$ width
= $2 \times$ height)

c) are similar cuboids
(length = $2 \times$ width
= $4 \times$ height)

Extension

- What is the surface area of each cuboid? Extra praise if Ps notice quick ways to calculate, rather than counting each square, e.g.

a): 6 equal faces, so area = $6 \times$ number of squares on 1 face
e.g. iii): $A = (6 \times 9 = \underline{54})$ unit squares

b): $4 \times$ number of squares on larger faces +
 $2 \times$ number of squares on smaller faces
e.g. iii): $A = (4 \times 18 + 2 \times 9 = 72 + 18 = \underline{90})$ unit squares

c): $2 \times$ each of 3 sizes of faces
e.g. iii): $A = 2 \times (3 \times 12 + 3 \times 6 + 6 \times 12)$ unit squares
 $= 2 \times (36 + 18 + 72)$ unit squares
 $= 2 \times 126$ unit squares
 $= \underline{252}$ unit squares

Whole class discussion
Reasoning, agreement,
praising

Surface area (unit squares):


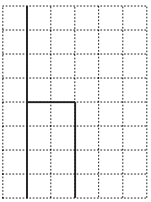
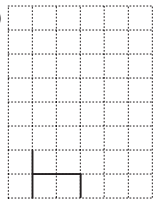

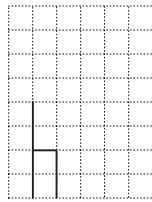
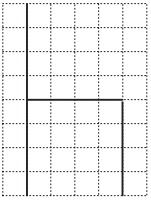
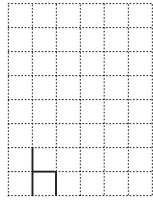
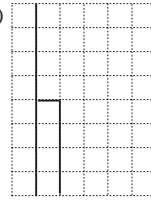
a) i) 6 ii) 24
 iii) 54 iv) 96

b) i) 10 ii) 40
 iii) 90 iv) 160

c) i) 28 ii) 112
 iii) 252

45 min

<h1>Y3</h1>	<p>R: Calculation. Similarity C: Building 3-D shapes E: <i>Symmetry. Views from front, side, top</i></p>	<h2>Lesson Plan 119</h2>				
<p>Activity</p> <p>1</p>	<p>PbY3b, page 119</p> <p>Q.1 Read: <i>Write as many 3-digit numbers as you can from the numbers 2, 3, 5 and 7.</i></p> <p>Encourage logical listing (e.g. starting with the smallest)</p> <p>Review at BB with whole class. T writes what Ps dictate in a logical order.</p> <p>BB: 235 325 523 723 237 327 527 725 253 352 532 732 257 357 537 735 273 372 572 752 275 375 573 753</p> <p>Elicit that there are 4 possible hundreds digits, that for every hundreds digit there are 3 possible tens digits, and that for every tens digit there are 2 possible units digits, i.e. there are $4 \times 3 \times 2 = 24$ possible 3-digit numbers.</p> <p>In your <i>Ex. Bks</i>:</p> <p>a) add up the smallest and the greatest numbers; b) subtract the smallest number from the greatest number.</p> <p>Review at BB with whole class. Mistakes discussed and corrected.</p> <p style="text-align: right;">8 min</p>	<p style="text-align: center;">Notes</p> <p>Individual work in listing numbers, monitored</p> <p>BB: 2 3 5 7</p> <p>Set a time limit</p> <p>Whole class review Agreement, praising</p> <p>Extra praise if Ps listed all 24 possible 3-digit numbers</p> <p>Feedback for T</p> <p>Discussion, agreement, praising</p> <p>Individual work, monitored Reasoning, agreement, praising</p> <p>BB:</p> <table style="margin-left: 20px;"> <tr> <td>a)</td> <td>$\begin{array}{r} 753 \\ +235 \\ \hline 988 \end{array}$</td> <td>b)</td> <td>$\begin{array}{r} 753 \\ -235 \\ \hline 518 \end{array}$</td> </tr> </table>	a)	$\begin{array}{r} 753 \\ +235 \\ \hline 988 \end{array}$	b)	$\begin{array}{r} 753 \\ -235 \\ \hline 518 \end{array}$
a)	$\begin{array}{r} 753 \\ +235 \\ \hline 988 \end{array}$	b)	$\begin{array}{r} 753 \\ -235 \\ \hline 518 \end{array}$			
<p>2</p>	<p>Problem 1</p> <p>Listen carefully and write the data in your <i>Ex. Bks</i>. Then try to work out the answer. You can discuss it with your neighbours if you wish.</p> <p><i>Ella had £3.60 in her piggy bank. She helped her Mum every day for a week and earned the same number of 10 p coins each day.</i></p> <p><i>Ella did not spend any of the money and at the end of the week she had more than £7.50 but less than £9 in her piggy bank. How many 10 p coins could Ella have earned each day?</i></p> <p>Set a time limit. Ps who think they have solved it explain solutions to class. Who agrees? Who did it another way? etc. If no P found correct solution, class tries to solve it together with T's help.</p> <p><i>Possible solutions:</i></p> <p>Had: £3.60 = 360 p Earned: $7 \times \square \times 10$ p</p> <p>Then had at least: $£7.50 + 10$ p = 760 p; at most $£9 - 10$ p = 890 p</p> <p>So earned at least: 760 p – 360 p = 400 p at most: 890 p – 360 p = 530 p</p> <p>So total number of 10 p coins earned is at least: 400 p \div 10 p = 40 at most: 530 p \div 10 p = 53</p> <p>So $40 \leq 7 \times \square \leq 53$.</p> <p>The only multiples of 7 between 40 and 53 are 42 and 49, so number of coins earned each day: $\square = 42 \div 7 = 6$, or $\square = 49 \div 7 = 7$</p> <p><i>Answer:</i> Ella could have earned six or seven 10 p coins each day.</p> <p style="text-align: right;">15 min</p>	<p>Individual or paired trial</p> <p>T repeats slowly. Ps repeat in own words (with reminders from T if necessary)</p> <p>Discussion, reasoning, checking, agreement, praising</p> <p>Accept 'Trial and Error' methods which lead to the correct answer, but also show a more logical solution.</p> <p>or</p> <p>$750 < 360 + 7 \times \square \times 10 < 900$ $390 < 7 \times \square \times 10 < 540$ $39 < 7 \times \square < 54$</p> <p>The number of coins must be a whole number, as it is impossible to have part of a coin.</p> <p>The only multiples of 7 more than 39 and less than 54 are 42 and 49. Continue as opposite.</p> <p><i>Check:</i> $7 \times 6 \times 10$ p = 420 p $(360 + 420 = 780)$ p = £7.80 ✓ $7 \times 7 \times 10$ p = 490 p $(360 + 490 = 850)$ p = £8.50 ✓</p>				

<h1>Y3</h1>		<p>Lesson Plan 119</p>
<p>Activity</p> <p>3</p>	<p>Problem 2</p> <p>Listen carefully and think how you would solve this problem. Show me the operation when I say. (On scrap paper or 'slates'.) Write the answer too if you have time. (Data noted in <i>Ex. Bks.</i>) Ps who respond correctly explain to those who do not. Ps dictate calculation to T (or come to BB). Class says answer as a sentence.</p> <p>a) <i>In the supermarket today there are 500 packets of Kit-Kat biscuits. Each day, 60 packets of the biscuits are delivered and 55 packets are sold. How many days ago did the supermarket have 450 packets of Kit-Kat biscuits?</i></p> <p>Show me . . . now! $(500 - 450) \div (60 - 55)$ or $450 + (60 - 55) \times \square = 500$</p> <p>BB: $(500 - 450) \div (60 - 55) = 50 \div 5 = 10$</p> <p><i>Answer:</i> The supermarket had 450 packets of Kit-Kat biscuits 10 days ago.</p> <p style="text-align: right;">20 min</p>	<p>Notes</p> <p>Individual work in writing the operation or equation</p> <p>(Or Ps work out answer in <i>Ex. Bks</i> and T asks Ps to explain their methods of solution.)</p> <p>T repeats slowly. (Use any item Ps are familiar with.)</p> <p>Ps repeat in own words (with reminders from T).</p> <p>In unison.</p> <p>Reasoning, agreement, self-correction, praising</p>
<p>4</p>	<p>Enlargements and reductions</p> <p>Draw this 'chair' in your <i>Ex. Bks</i> (or on squared grid sheets).</p>  <p>Draw another chair which is:</p> <ol style="list-style-type: none"> twice the height but the same width as the 1st chair; half the height and the same width as the 1st chair; the same height but twice the width as the 1st chair; the same height but half the width of the 1st chair; twice the height and twice the width as the 1st chair; half the height and half the width of the first chair; twice the height and half the width of the 1st chair.. <p>Which chairs are <u>similar</u> to the original chair? (e and f) Discuss why others are <u>not</u> similar.</p> <p><i>Solution:</i></p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>a)</p>  </div> <div style="text-align: center;"> <p>b)</p>  </div> <div style="text-align: center;"> <p>c)</p>  </div> <div style="text-align: center;"> <p>d)</p>  </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <p>e)</p>  </div> <div style="text-align: center;"> <p>f)</p>  </div> <div style="text-align: center;"> <p>g)</p>  </div> </div> <p style="text-align: right;">25 min</p>	<p>Individual work, monitored, helped, but class kept together on each shape</p> <p>Chair drawn on BB or OHT or use enlarged copy master or OHP (with rest of chairs covered up)</p> <p>T repeats instructions while walking round class.</p> <p>Review at BB with whole class. T uncovers each 'chair' as it is dealt with.</p> <p>Agreement, praising</p> <p>Elicit that:</p> <ol style="list-style-type: none"> is an enlargement, scale factor 2 (i.e. twice the size) is a reduction, scale factor 1 half (i.e. half the size)

Y3

Lesson Plan 119

Activity

5

PbY3b, page 119

Q.2 a) Read: *Build solids from unit cubes to match each of these ground plans.*

Elicit that in each solid there will be 9 columns.
Make sure that Ps realise that each number shows the number of cubes in that column.

If possible, the different solids could be made in different colours to make them easily identifiable. e.g. i) red, ii) blue, iii) green. T chooses Ps to show their solids to class.

b) Read: *How many unit cubes are needed to build each solid?*

Ps write total below each ground plan in *Pbs*.
T holds up each solid in turn and Ps show numbers on command or shout out in unison.

c) Read: *Which solid is symmetrical? Draw the line of symmetry.*

Discuss where the lines of symmetry would be on the ground plans and then show the planes of symmetry on the large models. (T has models already prepared so that a piece of card can be slipped between the two symmetrical halves and they can be split easily. Check with a mirror.)

Notes

Ps should have enough cubes on desks to build all 3 solids.

Individual or paired work, monitored, helped, corrected

Praising only

On scrap paper or 'slates'. Agreement, self-correcting, praising

Whole class discussion and demonstration

Solution:

i)

1	2	3
1	2	3
1	2	3

18 2 planes of symmetry

ii)

3	2	1
2	2	1
1	1	1

14 1 plane of symmetry

iii)

2	1	2
2	2	1
1	1	1

13 not symmetrical

30 min

6

PbY3b, page 119

Q.3 a) Read: *Rita built a solid from 6 unit cubes. She drew how it looks from above and made a ground plan.*

Draw in the grid what Rita's solid would look like from the front and side.

Ps can build Rita's solid first if they need to.

Review at BB with whole class. Ps come to BB to draw the 2 views. Class agrees/disagrees. Mistakes corrected.

Solution:

Top view	Ground plan	Front view	Side view																												
<table border="1" style="display: inline-table;"><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr></table>					<table border="1" style="display: inline-table;"><tr><td>2</td><td>2</td></tr><tr><td>1</td><td>1</td></tr></table>	2	2	1	1	<table border="1" style="display: inline-table;"><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr></table>																	<table border="1" style="display: inline-table;"><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr></table>				
2	2																														
1	1																														

Individual (or paired) work, monitored, helped

Drawn on BB or use enlarged copy master or oHP

Agreement, self-correction, praising

Feedback for T

Y3

Lesson Plan 119

Activity

6

PbY3b, page 119 (Continued)

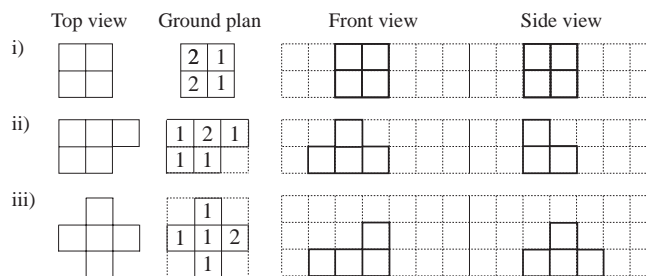
Q.3 b) Read: *Build solids from 6 unit cubes to match the views from the top.*

Make a ground plan and draw the front and side views in the grids.

T explains task by showing a possible solid for each part. Ps can build T's solid or make up their own shape.

T chooses Ps to show their solids to class and to draw their plans and views. Class points out errors or applauds if correct.

Various solutions are possible, e.g.



37 min

Notes

Individual (or paired) work, monitored, helped

Drawn on BB or use enlarged copy master or OHP

Demonstration to make sure that Ps know what to do.

Note to T:

- there are 6 possibilities
- there are 5 possibilities
- there are 5 possibilities

Demonstration, reasoning, agreement, praising

[If a P shows the first example, discuss the fact that all views are the same and you cannot tell the actual construction from them!]

7

PbY3b, page 120

Q.2 Read: *How would you fit the furniture into the bedroom?*

Draw a plan to show it.

Ps can first draw the items of furniture on grid sheets, label them, then cut them out. They can manipulate the items on the plan in their *Pbs* until they are satisfied with the positioning.

Then they draw the items on their plan. (Ps should use a pencil first, so that errors can be erased easily.)

T explains what the scale means. (1 mm on the plan means 4 cm in real life) Elicit that each grid square in the plan measures 5 mm.

T can ask mental questions to consolidate understanding, e.g.

- 8 mm (20 mm, etc.) on the map is what length in real life?
- If a real length is 12 cm (32 cm, 40 cm, etc.) what length would it be in the plan?

Ps first measure the lengths in the plan and write them in mm beside the relevant lines.

Calculating the real lengths can be done either individually, or as a whole class activity, with Ps coming to BB or OHP and class agreeing or disagreeing.

Ask Ps to give the real lengths in metres too.

If time runs out, activity can be completed in *Lesson 120*.

N.B. Solution given in Lesson Plan 120.

Ps have blank 5 mm grids and scissors on desks

Individual work, monitored, helped

Praising, encouragement only

Whole class discussion

BB:

Scale: 1 mm → 4 cm

Orally at speed. T chooses Ps at random

Agreement, praising

Individual work, monitored, helped, corrected

Reasoning, agreement, praising

Write details of difficult calculations on the BB, e.g.

In plan In real life

15 mm → 60 cm

$$15 \times 4 = 10 \times 4 + 5 \times 4 \\ = 40 + 20 = \underline{60}$$

45 min

Y3

Lesson Plan
120

Activity

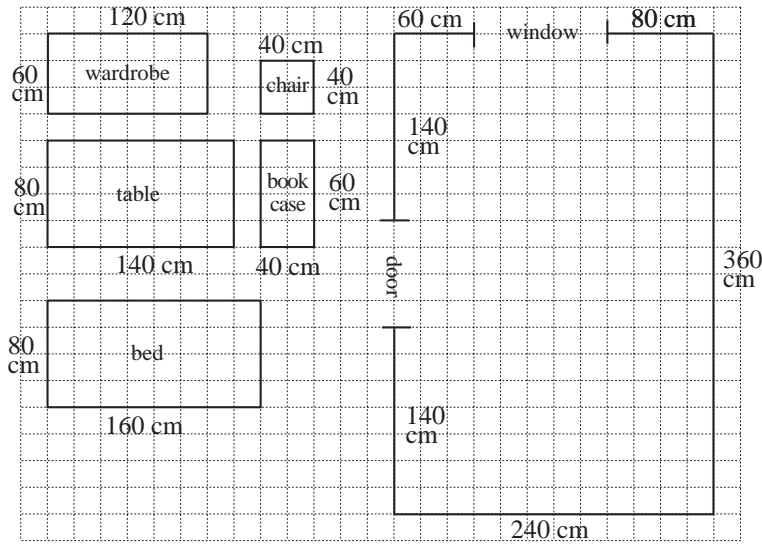
Notes

Calculation and tables practice, revision, activities, consolidation

PbY3b, page 120

Q.1 and finishing off Q.2

Q,2 solution: Real life lengths in cm



Y3

R: Calculation. Shapes
 C: **Fractions: using and finding halves, quarters, eighths, thirds**
 E: *Other fractions*

Lesson Plan 121

Activity**1****Sequence**

Write in your *Ex. Bks* only the results to the operations I say.

T: 3×4 , $7 \times 3 + 1$, 6×7 , 9×8 , $9 \times 9 + 31$

Review with whole class. T writes what Ps dictate on BB. Mistakes corrected. BB: 12, 22, 42, 72, 112

If these are the first 5 terms in a sequence, what is the rule? Give Ps time to think, then if no P knows, T gives hint about differences.

What are the next 10 terms? Ps come to BB to write them. Class agrees/disagrees.

BB: 12, 22, 42, 72, 112, (162, 222, 292, 372, 462, 562, 672, ...)

$\underbrace{12}_{10}$ $\underbrace{22}_{20}$ $\underbrace{42}_{30}$ $\underbrace{72}_{40}$ $\underbrace{112}_{50}$ $\underbrace{162}_{60}$ $\underbrace{222}_{70}$ $\underbrace{292}_{80}$ $\underbrace{372}_{90}$ $\underbrace{462}_{100}$ $\underbrace{562}_{110}$ $\underbrace{672}_{120}$...

5 min

Notes

Individual work in doing calculations

Ps nod heads when ready for next one.

Agreement, self-correction, praising

Agreement on rule: difference is increasing by 10

At a good pace

Feedback for T

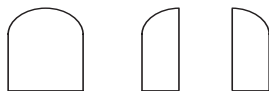
Extra praise if Ps notice rule without hint from T.

2**Cutting into equal parts**

T has various real items of food (e.g. slice of bread, melon, bar of chocolate, Swiss roll, etc.) and asks Ps to come to front to cut them into equal parts. e.g.

- a) **A**, come and cut this slice of bread into 2 equal parts. What is each part called? (1 half) Who can write an equation about it?

BB:

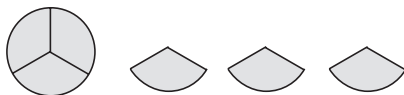


$$1 \text{ whole} = 1 \text{ half} + 1 \text{ half}$$

$$1 \text{ whole} = 2 \text{ halves}$$

- b) **B**, come and cut this melon into 3 equal parts. What is each part called? (1 third) Who can write an equation about it?

BB:



$$1 \text{ whole} = 1 \text{ third} + 1 \text{ third} + 1 \text{ third}$$

$$1 \text{ whole} = 3 \text{ thirds}$$

- c) **C**, come and cut this bar of chocolate into 4 equal parts. What is each part called? (1 quarter) Who can write an equation about it?

BB:



$$1 \text{ whole} = 1 \text{ quarter} + 1 \text{ quarter} + 1 \text{ quarter} + 1 \text{ quarter}$$

$$1 \text{ whole} = 4 \text{ quarters}$$

- d) **D**, come and cut this cake into 5 equal parts. What is each part called? (1 fifth) Who can write an equation about it?

BB:



$$1 \text{ whole} = 1 \text{ fifth} + 1 \text{ fifth} + 1 \text{ fifth} + 1 \text{ fifth} + 1 \text{ fifth}$$

$$1 \text{ whole} = 5 \text{ fifths}$$

11 min

Whole class activity

T shows real (or plasticine) items first then draws rough diagrams on BB or OHP.

Ps do the cutting with T's help. Class decides whether all the parts are equal in size and what fraction each is of the whole.

(T could have cutting lines marked on each item if Ps are not very able.)

Ps come to BB to write equations and class reads them aloud in unison.

At a good pace

Elicit that:

$$2 \text{ quarters} = 1 \text{ half}$$

Feedback for T

Y3

Lesson Plan 121

Activity

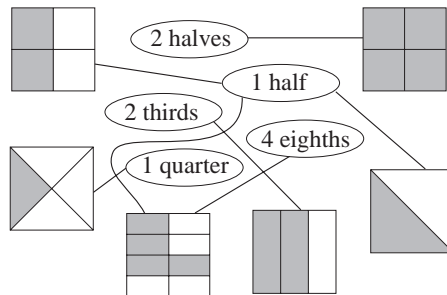
3

Equal values

Let's join up the fractions to the matching shapes.

Ps come out to draw joining lines, explaining reasoning. Class agrees/disagrees. Extra praise if Ps notice that 4 eighths = 1 half.

BB:



15 min

Notes

Whole class activity

Drawn on BB or use enlarged copy master or OHP

At a good pace

Reasoning, agreement, praising

Feedback for T

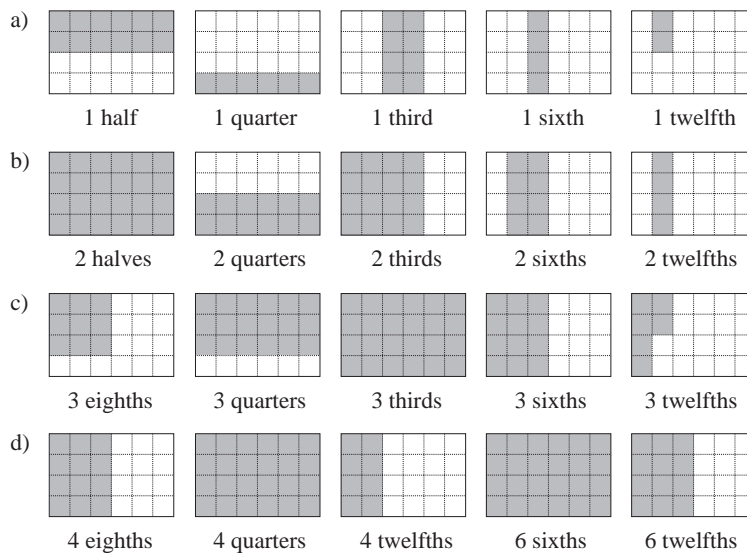
4

Shading fractions

Ps each have a sheet of 4×6 rectangles on desks. T tells Ps that each rectangle is 1 whole unit. Colour the parts of them that I say.

T reads the fraction and Ps show it by colouring the appropriate number of grid squares. Deal with one part at a time. Review at BB with whole class. Mistakes discussed and corrected. Ps might notice equivalent fractions.

BB: e.g.



25 min

Individual (or paired) work, monitored, helped

T has grids drawn on BB or use enlarged copy master or OHP

Ps finished first come to BB or OHP to draw their solutions.

Discussion, agreement, self-correction, praising

Elicit that each rectangle has been divided up into 24 (4×6) small grid squares, so, e.g.

$$1 \text{ twelfth of } 24 = 24 \div 12 = 2$$

$$6 \text{ twelfths of } 24 = 6 \times 2 = 12$$

$$1 \text{ eighth of } 24 = 24 \div 8 = 3$$

etc.

5

PbY3b, page 121

Q.1 Read: Circle in red the rectangles which have 1 half shaded.
Circle in blue the rectangles which have 1 third shaded.
Circle in green the rectangle which has 1 quarter shaded.

If you have time, write below the rectangles you have not circled what part has been shaded.

Review at BB with whole class. Mistakes discussed and corrected.

Solution:

Circled: 1 half: a) and c); 1 third: f) and h); 1 quarter: b)

Uncircled: d) 1 sixth; e) 2 thirds; g) 3 quarters

Individual work, monitored, helped

Drawn on BB or use enlarged copy master or OHP

Reasoning, agreement, self-correction, praising

Elicit that: $1 \text{ half} = 2 \text{ quarters} = 3 \text{ sixths} = 4 \text{ eighths}$

[Practice in spelling, saying and reading fractions]

38 min

Y3

Lesson Plan 121

Activity

6

PbY3b, page 121

Q.2 T explains that the shaded part of each diagram shows what one person got. Ps read problems silently themselves, study the diagram and then write the answer as a sentence.

Review with whole class. T writes on BB what Ps dictate. Ps check their wording and spelling.

a) Anna invited 5 friends to her birthday party. She cut her cake into 6 equal pieces. What part of the cake did each child get?

(Anna + 5 friends = 6 people, so each person got 1 piece)

Answer: Each child got 1 sixth of the cake.

b) How was the block of ice-cream divided up if each person at the table got 1 seventh of it?

Answer: The ice-cream was divided up into 7 equal parts.

c) This is how Mrs Mouse cut up the cheese to give to her 8 children. Did they each get 1 eighth of the cheese?

Elicit that the cheese was divided into 8 pieces, but the pieces were not equal sizes.

Answer: No, they did not get 1 eighth of the cheese each.

35 min


Notes

Individual work, monitored, helped

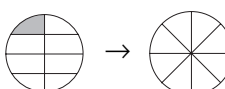
T has diagrams drawn on BB or OHP

Set a time limit.

Discussion, reasoning, agreement, self-correction, praising

a) BB: 

b) 

c) 

How should Mrs Mouse have divided up the cheese fairly? Ps come to BB to draw it. Agreement, praising

7


PbY3b, page 121


Q.3 Read: Colour the parts of the shapes given.


Review at BB with whole class. Ps come out to BB to colour diagrams and explain their reasoning. Mistakes corrected


e.g d): 'The shape is divided into 8 equal parts, so each part is 1 eighth. I colour 3 of them to show 3 eighths.'

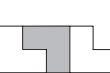
Solution:

a)  4 eighths

b)  3 quarters

c)  1 half

d)  3 eighths

e)  1 third

40 min

Individual work, monitored, helped

Drawn on BB or use enlarged copy master or OHP

Reasoning, agreement, self-correcting, praising

T repeats unclear reasoning correctly.

What part of each shape is not shaded?

8






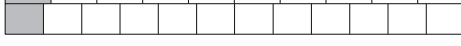

PbY3b, page 121, Q.4

Read: A strip of paper is 1 unit long. What is the value of each shaded part?

T has rectangle drawn (or strips of paper stuck) on BB and fractions shown by colouring (or by coloured strips of paper).

Ps come to BB to choose a row, count how many equal parts there are, explain reasoning as above and write fraction at the side. Class points out errors. For each part, T asks what fraction is not coloured.

BB:

a)		1 unit
b)		1 half
c)		1 third
d)		1 quarter
e)		1 sixth
f)		1 ninth
g)		1 tenth
		1 twelfth

45 min

Whole class activity (or individual work, monitored, helped)

Or use enlarged copy master or OHP

At a good pace

Reasoning, agreement, praising

What do you notice? e.g.

1 third = 2 sixths = 3 ninths = 4 twelfths, etc.

Who can write an addition (subtraction) about the strip? e.g. 1 ninth + 8 ninths = 1

<h1>Y3</h1>	<p>R: Calculation C: Fractions E: Comparison, completing diagrams</p>	<h2 style="text-align: center;">Lesson Plan 122</h2>
<p>Activity</p> <p>1</p>	<p>Mental practice</p> <p>a) Tell me the nearest whole 10 greater than: 600 (800, 440, 740, 934, 532, 301, 1766, 15, 171, etc.)</p> <p>b) Tell me the nearest whole 100 smaller than: 600 (800, 440, 740, 934, 532, 301, 1766, 15, 171, etc.)</p> <p>c) Tell me the nearest whole 10 smaller than: 600 (800, 440, 740, 934, 532, 301, 1766, 15, 171, etc.)</p> <p>d) Tell me the nearest whole 100 greater than: 600 (800, 440, 740, 934, 532, 301, 1766, 15, 171, etc.)</p> <p style="text-align: right;"><i>5 min</i></p>	<p style="text-align: center;">Notes</p> <p>Whole class activity T chooses Ps at random At speed If a P answers incorrectly, the next P corrects it Praising, encouragement only</p>
<p>2</p>	<p>Fractions of a line</p> <p>T has 4 lines of equal length drawn on the BB. T: Think of these lines as the same line divided into different numbers of equal parts.</p> <p>Who can come and colour over 1 half (1 third, 1 quarter, 1 eighth) of the lines? Ps come to BB to choose appropriate line, colour over the relevant part and label it. Class points out errors.</p> <p>BB:</p> <div style="text-align: center;"> </div> <p>Who can think of equations to write about the line? e.g. $1 \text{ half} + 1 \text{ half} = 1$; $1 \text{ third} + 2 \text{ thirds} = 1$; $1 - 7 \text{ eighths} = 1 \text{ eighth}$; $1 \text{ half} = 2 \text{ quarters}$, etc.</p> <p style="text-align: right;"><i>10 min</i></p>	<p>Whole class activity Lines drawn on BB or use enlarged copy master or OHP At a good pace Reasoning, agreement, praising Elicit that each line is 1 whole.</p> <p>Involve several Ps. Praising, encouragement only Extra praise for creativity</p>
<p>3</p>	<p>Fractions of shapes</p> <p>What part of each shape has been shaded?</p> <p>BB:</p> <div style="text-align: center;"> </div> <p>Ps come to BB to choose a shape and say and write the fraction, explaining reasoning, e.g. 'The rectangle has been divided into 3 equal parts, so each part is 1 third. Two of them are shaded, so the shaded part is 2 thirds of the whole rectangle.' Class agrees/disagrees. Which part is <u>not</u> shaded?</p> <p style="text-align: right;"><i>15 min</i></p>	<p>Whole class activity Drawn on BB or use enlarged copy master or OHP</p> <p>At a good pace Reasoning, agreement, praising Elicit that each shape is 1 whole.</p> <p>Discuss equivalent fractions: shaded part of circle: $3 \text{ sixths} = 1 \text{ half}$ shaded part of quadrilateral $5 \text{ fifteenths} = 1 \text{ third}$</p>

Y3

Lesson Plan 122

Activity

4

Missing numbers

Let's complete the missing numbers.

BB:

a) 1 (whole) = fifths b) 1 (whole) = sevenths

c) 1 (whole) = sixths d) 1 (whole) = tenths

e) 1 (whole) = eighths f) 1 (whole) = ninths

e.g. a) T: 1 whole equals how many fifths? Tell me . . . now! (5)

19 min

Notes

Whole class activity

T has BB or SB or OHT already prepared.

T points to each part in turn.

Class shouts out missing number on command and T writes in box.

Agreement, praising

5

Drawing the whole

Draw this in your *Ex. Bks* and colour it. BB:



How many grid squares does it cover? (4)

Draw the whole shape if this (T points to shaded square) is:

a) 1 half of the whole

b) 1 third of the whole

c) 1 quarter of the whole

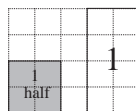
d) 1 fifth of the whole

e) 1 sixth of the whole

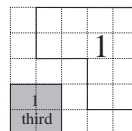
etc.

Deal with one part at a time. Review with whole class. Agree that the whole can be any shape which covers the correct number of squares.

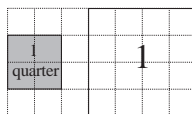
a) 1 (whole) = 2 × 1 half e.g.
 Area = 2 × 4 squares
 = 8 squares



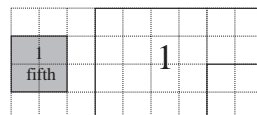
b) 1 (whole) = 3 × 1 third
 Area = 3 × 4 squares
 = 12 squares



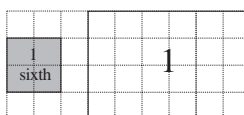
c) 1 (whole) = 4 × 1 quarter
 Area = 4 × 4 squares
 = 16 squares



d) 1 (whole) = 5 × 1 fifth
 Area = 5 × 4 squares
 = 20 squares



e) 1 whole = 6 × 1 sixth
 Area = 6 × 4 squares
 = 24 squares



25 min

Individual work, monitored, helped, corrected

Ps draw in squared *Ex Bks* or on squared grid sheets.

Discussion, reasoning, agreement, self-correcting praising

T has BB or SB or OHT already prepared (or use enlarged copy master) and uncovers each solution as it is dealt with.

(Or T chooses Ps to draw their shape on BB or OHP and class discusses it.)

Praise unusual (but correct) 'wholes'.

Elicit the names of the whole shapes.

e.g. for the shapes opposite:

a) and e) rectangles

b) and d) hexagons (irregular)

c) square

Y3

Lesson Plan 122

Activity

6

PbY3b, page 122

Q.1 Read: *This is 1 unit.*

What part of this unit is each of these drawings?

Elicit that the 1 (whole) unit covers 8 grid squares.



Review at BB with whole class. Ps come to BB to write the fractions, explaining reasoning. Who wrote the same? Who wrote another fraction? etc. Discuss equivalent fractions.

What fraction is needed to complete 1 unit?

Solution:



4 eighths
2 quarters
1 half



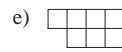
2 eighths
1 quarter



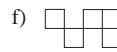
1 eighth



4 eighths
2 quarters
1 half



7 eighths



5 eighths

30 min

Notes

Individual work, monitored, helped

Drawn on BB or use enlarged copy master or OHP

Discussion, reasoning, agreement, self-correcting, praising

Orally round class

e.g. $1 \text{ half} + 1 \text{ half} = 1$

$7 \text{ eighths} + 1 \text{ eighth} = 1$

$1 \text{ quarter} + 3 \text{ quarters} = 1$

etc.

7

PbY3b, page 122

Q.2 Read: *This rectangle is 1 unit.*



Elicit that the 1 unit covers 12 grid squares.

Ps draw round appropriate number of grid squares to show the fractions given.

Review at BB with whole class. Ps come to BB to show the fractions, explaining reasoning. e.g.

g) $1 \text{ unit} = 12 \text{ (squares)}$. $1 \text{ sixth of a unit} = 12 \div 6 = 2 \text{ (squares)}$

$5 \text{ sixths of a unit} = 5 \times 2 = 10 \text{ (squares)}$

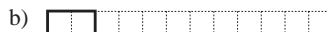
Mistakes discussed and corrected.

What fraction is needed to complete 1 unit?

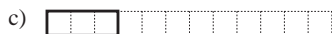
Solution:



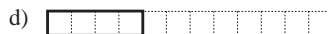
1 half



1 sixth



1 quarter



1 third



2 halves (= 1)



1 twelfth



5 sixths



5 twelfths

35 min

Individual work, monitored, helped

Grids drawn on BB or use enlarged copy master or OHP

Discussion, reasoning, agreement, self-correction, praising

Orally round class

e.g. $1 \text{ half} + 1 \text{ half} = 1$

$1 \text{ sixth} + 5 \text{ sixths} = 1$

etc.

Y3*Lesson Plan 122***Activity****8****PbY3b, page 122**

Q.3 Read: *A line is 1 unit long. Measure and colour over these parts of the line.*

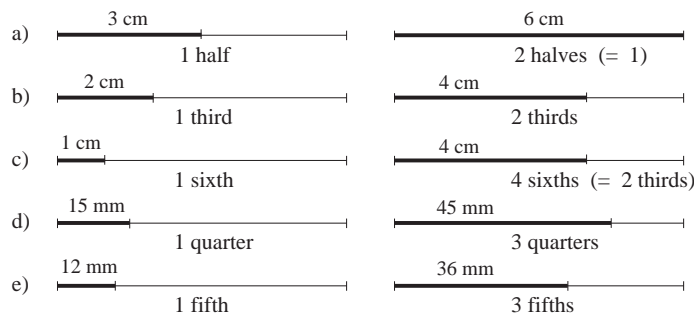
Let's measure the line to see how long 1 unit is. T reminds Ps how to measure accurately. Ask several Ps what they think. Agree on length. T writes on BB.

Deal with one part at a time. Ps can write calculations in *Ex. Bks* if they cannot do it mentally, then colour over the fraction and write the length above it (in cm or mm).

Review with the whole class. Ps explain reasoning. (BB) Mistakes discussed and corrected.

What fraction is needed to complete 1 unit? (Orally)

Solution:

*40 min***Notes**

Individual work, monitored, helped

Lines drawn on BB or use enlarged copy master or OHP

BB: 1 unit = 6 cm = 60 mm

Discussion, reasoning, agreement, self-correction, praising

BB: e.g.

e) 1 unit = 60 mm

1 fifth of a unit = $60 \text{ mm} \div 5$
= 12 mm

3 fifths of a unit = $3 \times 12 \text{ mm}$
= 36 mm

[or $3 \times (60 \text{ mm} \div 5)$]

Ps might notice that:

2 halves = 1

4 sixths = 2 thirds

Feedback for T

9**PbY3b, page 122, Q.4**

Read: *Which positive whole numbers can be written instead of the letters?*

Who can tell me the positive whole numbers? (1, 2, 3, 4, 5, ...)

Deal with one part at a time. T writes statement on BB. Let's read it together. e.g. 'a times 1 half is less than 1'

X, what number do you think *a* could be? Why? Who agrees? Who thinks something else? etc. Let's check.

BB:

$a \times 1 \text{ half} < 1,$

$b \times 1 \text{ half} = 1,$

$c \times 1 \text{ half} > 1,$

$d \times 1 \text{ quarter} < 1,$

$e \times 1 \text{ quarter} = 1,$

$f \times 1 \text{ quarter} > 1,$

Solution:

$a = 1$ (as $2 \times 1 \text{ half} = 1$)

$b = 2$

$c: 3, 4, 5, \dots$ ($c: > 2$)

$d: 1, 2, 3$ (as $4 \times 1 \text{ quarter} = 1$)

$e = 4$

$f: 5, 6, 7, \dots$ ($f: > 4$)

45 min

Whole class activity

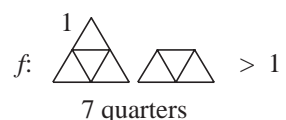
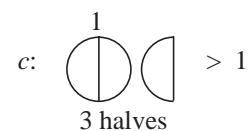
(or individually if Ps wish)

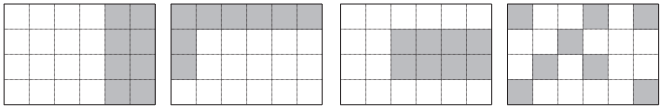

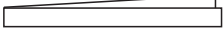



Agreement, praising


In unison

Reasoning, agreement, checking, praising

T checks by drawing diagrams on the BB, e.g.



<h1>Y3</h1>	<p>R: Calculation C: Fractions E: Fractional parts</p>	<h2>Lesson Plan 123</h2>
<p>Activity</p> <p>1</p>	<p>Sequences</p> <p>T says first few terms of a sequence, Ps continue it. Elicit the rule.</p> <p>a) 144, 149, 159, 174, (194, 219, 249, 284, 324, 369, 419, ...) +5 +10 +15 +20 +25 +30 +35 +40 +45 +50 <i>Rule:</i> <u>difference</u> is increasing by 5.)</p> <p>b) 512, 256, 128, (64, 32, 16, 8, 4, 2, 1, 1 half, 1 quarter) <i>Rule:</i> Each following term is half of the previous term. ($\div 2$)</p> <p style="text-align: right;">5 min</p>	<p>Notes</p> <p>Whole class activity Ps write the terms in <i>Ex. Bks</i> first. Give Ps time to think. T chooses Ps at random. T gives hint about rule if Ps do not think of it. Discussion, reasoning, checking, praising</p>
<p>2</p>	<p>Fractions</p> <p>T has several copies of a rectangle (6×4) drawn or stuck on BB or SB.</p> <p>a) A, come and colour 1 third of the rectangle. A explains reasoning too. Who agrees? Who can think of another way to do it? Ask 3 or 4 Ps to colour 1 third in different ways. Class checks that they have coloured 8 grid squares.</p> <p>e.g.</p>  <p>b) Who can colour 1 quarter (1 eighth) of the rectangle?</p> <p style="text-align: right;">10 min</p>	<p>Whole class activity Or use enlarged copy master or OHP BB: 1 unit = 24 squares 1 third of 24 = $24 \div 3$ = 8 (squares) 1 quarter of 24 = $24 \div 4$ = 6 (squares) 1 eighth of 24 = $24 \div 8$ = 3 (squares) Agreement, praising</p>
<p>3</p>	<p>Folding</p> <p>Each P has a strip of paper on desks. T has large strip for demonstration.</p>  <p>a) Fold the paper in two like this. Make sure that the ends meet exactly.</p>   <p>What fraction of the whole strip of paper can you see? (1 half) Let's check. Unfold your strip of paper. How many equal parts has it been divided into? (2) Elicit that 2 halves = 1 whole.</p> <p>b) This time, fold the paper in two, then in two again. What fraction of the whole strip of paper can you see now? (1 quarter)</p>  <p>Let's check. Unfold your strip of paper. How many equal parts has it been divided into? (4) Elicit that 4 quarters = 1 whole.</p> <p>c) This time, fold the paper in two, then in two again, then in two again. What fraction of the whole strip of paper can you see now? (1 eighth)</p>  <p>Let's check. Unfold your strip of paper. How many equal parts has it been divided into? (8) Elicit that 8 eighths = 1 whole</p> <p style="text-align: right;">15 min</p>	<p>Individual folding but whole class discussion on results T demonstrates at front of class. T asks several Ps what they think and why. Reasoning, agreement, praising Feedback for T Discuss the relationship between the parts: BB: 1 = 2 halves = 4 quarters = 8 eighths 1 half = 2 quarters = 4 eighths 1 quarter = 2 eighths</p>

<h1>Y3</h1>		<p>Lesson Plan 123</p>
<p>Activity</p> <p>4</p>	<p>Problems</p> <p>Listen carefully and think how you would calculate the answer.</p> <p>Ps come to BB to explain reasoning and write calculations on BB. Class checks that they are correct.</p> <p>a) <i>John had 400 1 p coins. He divided them into 2 equal parts. How many coins were in each part? What fraction of John's money was in each part?</i> BB: $400 \div 2 = 100$ Answer: 100 coins were in each part. Each part was 1 half of John's money.</p> <p>b) <i>John divided up his 400 1 p coins into equal parts. There was 50 p in each part. Into how many equal parts did John divide up his money? What fraction of John's money was in each part?</i> BB: $400 \text{ p} \div 50 \text{ p} = 40 \text{ p} \div 5 \text{ p} = 8$ Answer: John divided his money into 8 equal parts. Each part was 1 eighth of John's money.</p> <p>c) <i>John divided up his 400 1 p coins into equal parts. Each part was 1 quarter of his money. Into how many equal parts did John divide up his money? How much was in each part?</i> BB: $1 \text{ whole} = 1 \text{ quarter} \times 4$; $400 \text{ p} \div 4 = 100 \text{ p}$ Answer: John divided his money into 4 equal parts. There was 100 p (= £1) in each part.</p> <p style="text-align: right;">20 min</p>	<p>Notes</p> <p>Whole class activity</p> <p>At a good pace</p> <p>T repeats slowly. Ps repeat problem in own words (with T's help)</p> <p>Ps can do calculations in <i>Ex. Bks</i> first if they wish.</p> <p>Discussion, reasoning, agreement, praising</p> <p>Feedback for T</p>
<p>5</p> <p>Extension</p>	<p>PbY3b, page 123</p> <p>Q.1 Read: <i>Circle: a) 1 half, b) 1 quarter, c) 1 third.</i></p> <p>Elicit that there are $4 \times 9 = 36$ items in each picture.</p> <p>Review at BB with whole class. Ps come to BB to explain and write divisions. Class agrees/disagrees. Mistakes discussed and corrected.</p> <p><i>Solution: e.g.</i></p> <p>a) 1 half b) 1 quarter c) 1 third</p>  <p>How many flowers (apples, socks) would be in 2 halves (2 quarters, 2 thirds, 3 quarters, 4 quarters) of the picture?</p> <p>What part of each picture would one item be? (1 thirtysixth)</p> <p style="text-align: right;">25 min</p>	<p>Individual work, monitored (helped)</p> <p>Use enlarged copy master or OHP</p> <p>Discussion, reasoning, agreement, self-correction, praising</p> <p>BB:</p> <p>a) 1 half of 36 = $36 \div 2 = 18$</p> <p>b) 1 quarter of 36 = $36 \div 4 = 9$</p> <p>c) 1 third of 36 = $36 \div 3 = 12$</p> <p>Ps can choose the fractions too. Praising, encouragement only</p> <p>Ask several Ps what they think.</p>

Y3

Lesson Plan 123

Activity

6

PbY3b, page 123




Q.2 Read: *Fill in the missing numbers.*
If 1 unit is this, what are these parts?





Into how many equal parts has this unit been divided? (12)
 Elicit that each part (a square) is 1 twelfth of 1 unit (the rectangle).
 Deal with one part at a time. Review at BB with the whole class.
 Ps come to BB to write missing numbers and explain reasoning.
 Class agrees/disagrees. Mistakes discussed and corrected.






Read: *Colour: red the shapes equal to 1,*
green the shapes more than 1.






Review at BB with whole class. T points to each shape in turn
 and class shouts out whether it should be red, green or neither.
 Discuss equivalent fractions. Ps dictate them to T to write on BB.

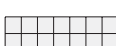
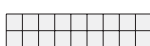
Solution

a)    R

b)    

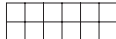
c)     

d)     

31 min

Notes

Individual work, monitored, helped
 Drawn on BB or use enlarged copy master or OHP
 BB: 1 unit 
 12 twelfths = 1

Reasoning, agreement, self-correction, praising

Individual work, monitored (or whole class activity)

Agreement, praising

BB:
 1 half = 2 quarters = 3 sixths
 1 third = 2 sixths
 2 halves = 3 thirds = 4 quarters = 6 sixths = 1
 3 halves = 1 and a half
 4 thirds = 1 and a third etc.

Praising, encouragement only

Feedback for T

7

PbY3b, page 123


Q.3 Read: *Draw the whole unit if this is:*
 a) 1 half, b) 1 quarter, c) 1 fifth, d) 1 third.

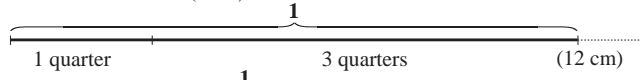
Deal with one part at a time. Ps measure given fraction accurately with a ruler, then calculate the whole unit (by addition or multiplication). Ps extend the line already given to the required length.

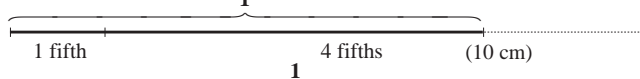
Review at BB with whole class. Ps explain reasoning, writing calculations on BB and giving the measurements.
 Class agrees/disagrees. Mistakes corrected.

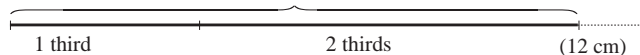
What fraction of the line did you have to draw to make 1 unit?

Solution:

a) 

b) 

c) 

d) 

37 min

Ps have rulers on desks


Individual work, monitored, helped, corrected

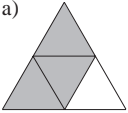
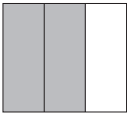
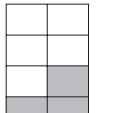
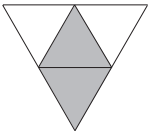
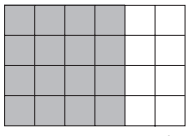
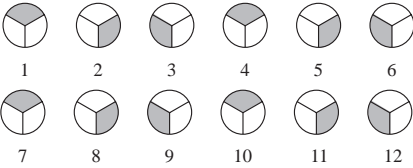




Draw on BB or use enlarged copy master or OHP for demonstration only!

Reasoning, agreement, self-correction, praising

BB:
 a) 1 unit = 2 × 2 cm = 4 cm
 b) 1 unit = 4 × 3 cm = 12 cm
 c) 1 unit = 5 × 2 cm = 10 cm
 d) 1 unit = 3 × 4 cm = 12 cm

Elicit that:
 1 half + 1 half = 1
 1 quarter + 3 quarters = 1
 1 fifth + 4 fifths = 1
 1 third + 2 thirds = 1

Y3		<i>Lesson Plan 123</i>
<p>Activity</p> <p>8</p>	<p>Fractions of time</p> <p>T has a large clock to demonstrate. Elicit that 1 revolution of the minute hand is 1 hour. BB: 1 hour = 60 minutes.</p> <p>Let's use 1 hour as 1 unit of time (BB)</p> <ul style="list-style-type: none"> Who can move the minute hand to show 1 half (1 quarter, 3 quarters, 1 sixth, 1 twelfth, 1 tenth, etc.) of an hour? <p>P comes out to move the minute hand. Class agrees/disagrees. How many minutes has it moved? Who can write an equation about it? e.g.</p> <p>BB: 1 quarter of an hour = $60 \text{ min.} \div 4 = \underline{15 \text{ min.}}$</p> <p>3 quarters of an hour = $15 \text{ min.} \times 3 = 30 \text{ min.} + 15 \text{ min.} = 45 \text{ min.}$ etc.</p> <ul style="list-style-type: none"> T (or P) moves the minute hand. Class says how many minutes moved and what fraction it is of 1 hour. <p style="text-align: right;"><i>42 min.</i></p>	<p>Notes</p> <p>Whole class activity</p> <p>Or draw clock on BB and Ps come out to draw hands and shade the appropriate part.</p> <p>e.g.  $60 \text{ min.} \div \underline{12} = 5 \text{ min.}$</p> <p>1 twelfth of an hour</p> <p>Discussion, reasoning, agreement, praising</p> <p>At a good pace</p> <p>Praising, encouragement only</p>
<p>9</p> <p>Extension</p>	<p>Fractions of length</p> <p><i>Ps have cm ruler on desks.</i> How many mm are in 1 cm? (10)</p> <p>Let's use 10 cm as our unit of measure. How many mm is that? (100)</p> <ul style="list-style-type: none"> How many mm there are in 1 half, (1 fifth, 1 tenth, 1 quarter) of 10 cm? Ps use their rulers to help them. T asks several Ps what they think. Class agrees/disagrees. (50 mm, 20 mm, 10 mm, 25 mm) T says a length in cm (e.g. 10 cm, 5 cm, 2 cm, 2 and a half cm, and Ps say what part of 10 cm it is. (1 whole, 1 half, 1 fifth, 1 quarter). <p>In what other way could we write 2 and a half cm? Ps come to BB to write and explain. (2.5 cm, meaning 2 whole cm and 5 <u>tenths</u> of a cm)</p> <p style="text-align: right;"><i>45 min.</i></p>	<p>Whole class activity</p> <p>BB: 1 unit = 10 cm = 100 mm</p> <p>Discussion, reasoning, agreement, praising</p> <p>At a good pace</p> <p>BB: e.g.</p> <p>1 quarter of 10 cm = $10 \text{ cm} \div 4 = 2 \text{ and a half cm} (= 2.5 \text{ cm})$</p> <p>Reasoning, agreement, praising</p>

<h1>Y3</h1>	<p>R: Mental calculation C: Fractions E: Fractional parts</p>	<h2 style="text-align: center;">Lesson Plan 124</h2>
<p>Activity</p> <p style="text-align: center;">1</p>	<p>Secret numbers</p> <p>a) I thought of a number. I subtracted 130 from it and the result was 148. What was the number I first thought of? Show me . . . now! (278) (Written on 'slates' or scrap paper) P who responded correctly explains to those who did not.</p> <p>b) I thought of a number. I added 143 to it and the result was 220. What was the number I first thought of? Show me . . . now! (77) (Written on 'slates' or scrap paper) P who responded correctly explains to those who did not.</p> <p style="text-align: right;">5 min</p>	<p style="text-align: center;">Notes</p> <p>Whole class activity Ps can do vertical calculations in <i>Ex. Bks</i> if they need to. In unison Reasoning, agreement, praising BB: a) $148 + 130 = 278$</p> <p>In unison BB: b) $220 - 143 = 73$</p>
<p style="text-align: center;">2</p>	<p>Find the mistakes</p> <p>This is <i>Silly Sammy's</i> homework. What do you think he had to do? (Write below each diagram what part of it is shaded.)</p> <p>Has <i>Silly Sammy</i> made a mistake? Let's check it for him.</p> <p>Ps come to BB to check each diagram, pointing out any mistake and correcting it.</p> <p>Discuss equivalent fractions where relevant.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>a)  1 half 3 quarters</p> </div> <div style="text-align: center;"> <p>b)  2 thirds ✓</p> </div> <div style="text-align: center;"> <p>c)  3 eighths ✓</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <p>d)  2 quarters ✓ 1 half</p> </div> <div style="text-align: center;"> <p>e)  3 quarters 16 twentyfourths 8 twelfths 4 sixths 2 thirds</p> </div> </div> <p style="text-align: right;">10 min</p>	<p>Whole class activity Drawn on BB or use enlarged copy master or OHP</p> <p>Agree that each large shape is 1 whole unit.</p> <p>Reasoning, agreement, correcting, praising</p> <p>BB: 2 quarters = 1 half 16 twentyfourths = 8 twelfths = 4 sixths = 2 thirds</p>
<p style="text-align: center;">3</p>	<p>Sequence</p> <p>What can you tell me about the shapes on the BB? (12 circles, each divided into 3 equal parts. Each part is 1 third of the circle.) Let's make a sequence by colouring 1 third of each circle. Where should we start? (e.g. at the top and go round clockwise).</p> <p>BB: e.g.</p> <div style="display: flex; justify-content: center; align-items: center;">  </div> <p>We can see 12 terms but imagine the sequence up to the 30th term!</p> <p>a) What would be the numbers of the terms coloured like this?</p> <p>i)  (2, 5, 8, 11, 14, 17, 20, 23, 26, 29) }</p> <p>ii)  (1, 4, 7, 10, 13, 16, 19, 22, 25, 28) } <i>Rule: + 3</i></p> <p>Elicit that when divided by 3 the numbers in i) give a remainder of 2 and in ii) give a remainder of 1 and that every 3rd number (3, 6, 9, . . .) is exactly divisible by 3 (i.e. a multiple of 3).</p> <p>Extension</p> <p>How many circles could be formed by 9  ? </p> <p style="text-align: right;">15 min</p>	<p>Whole class activity Drawn on BB or use enlarged copy master or OHP</p> <p>BB: 3 thirds = 1</p> <p>Ps come to BB to colour each circle as shown.</p> <p>At a good pace</p> <p>T writes what class dictates. Ps might notice that these numbers form a sequence increasing by 3.</p> <p>Discussion, agreement, praising</p> <p>BB: $9 \times 1 \text{ third} = 9 \text{ thirds} = 3$</p>

Y3

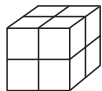

Lesson Plan 124

Activity



4


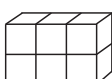
Fractions of solids



T has various solids made up from unit cubes as below.

a) If this is 1 unit,  build 1 half (1 quarter, 1 eighth, 3 quarters, 5 eighths, etc.) of it.  e.g. 1 half

b) Build 1 whole solid if this (T shows large model to class)

i)  is 1 half of it. e.g. 

ii)  is 2 thirds of it, e.g. 

iii)  is 3 quarters of it, e.g. 

Repeat each fraction with with other shapes.

21 min

Notes

Individual (or paired) work
Ps have cubes on desks.

Deal with one fraction at a time. T shows 1 unit to class.
Ps can show their solids to T on command or T chooses Ps to show different possible solutions and class checks that they are correct.

(Or done as a whole class activity, with Ps building the solids in front of the class.)

Reasoning, agreement, praising only

Extra praise for creative solutions


5


PbY3b, Page 124


Q.1 Read: *If this solid is 1 unit, what part of a unit are these solids?*


Deal with one part at a time. Ps build the 1 unit solid on desks.
How many cubes are in 1 unit? (12, so 1 cube is 1 twelfth of 1 unit)
Ps build the parts to compare with it. Ps write fraction in *Pbs*.
Review at BB with whole class. Check with a large model.


Solution:


a) 
11 twelfths


b) 
9 twelfths
3 quarters

c) 
8 twelfths
4 sixths
2 thirds

d) 
6 twelfths
3 sixths
1 half

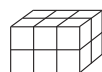
e) 
3 twelfths
1 quarter

f) 
5 twelfths

g) 
4 twelfths
2 sixths
1 third

28 min

Paired work (or individual work if Ps wish)

BB: 1 unit = 
(3 × 2 × 2 = 12) cubes

Or done as a whole class activity with large models already prepared by T, or a combination of all three.

Diagrams drawn on BB or use enlarged copy master or OHP

Reasoning, agreement, self-correcting, praising

Discuss equivalent fractions, e.g. 9 twelfths = 3 quarters, etc.

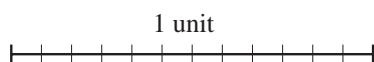
Feedback for T

6

Comparing fractions

T draws a line on BB (or use a piece of card or metre stick) divided into 12 equal sections. Elicit that each section is 1 twelfth of the line.

BB:



Which part of the line is longer:

- a) 1 quarter or 1 half b) 1 sixth or 1 quarter
c) 5 twelfths or 7 twelfths d) 1 third or 2 sixths?

T asks several Ps what they think. Ps come to BB in pairs to show each fraction, to explain reasoning and to write a statement about it.

30 min


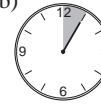

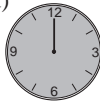






Whole class activity

BB: 1 unit = 12 twelfths




Reasoning, agreement, praising

BB:

- a) 1 quarter < 1 half
b) 1 sixth < 1 quarter
c) 5 twelfths < 7 twelfths
d) 1 third = 2 sixths

Y3		Lesson Plan 124
<p>Activity</p> <p>7</p>	<p>PbY3b, Page 124, Q.2</p> <p>Read: <i>Only the minute hand is on the clock. What part of an hour does it show?</i></p> <p>Elicit that 1 hour = 60 minutes. T (or P) shows movement of minute hand on model (or real) clock for each part.</p> <p>Ps come to BB to explain reasoning and write the fraction. Class agrees/disagrees. If problems, write equations on BB or check on clock.</p> <p>Solution:</p> <p>a)  20 minutes <u>1 third</u> of an hour</p> <p>b)  5 minutes <u>1 twelfth</u> of an hour</p> <p>c)  12 minutes <u>1 fifth</u> of an hour</p> <p>d)  60 minutes <u>1 whole</u> hour</p> <p>e)  45 minutes <u>3 quarters</u> of an hour</p> <p style="text-align: center;">_____ 35 min _____</p>	<p>Notes</p> <p>Whole class activity (or individual work if Ps wish)</p> <p>Drawn on BB or use enlarged copy master or OHP</p> <p>At a good pace</p> <p>Reasoning, agreement, praising</p> <p>e.g. reasoning: e) 45 min. = 3×15 min. 15 min. = $60 \text{ min.} \div 4$ 15 min. = <u>1 quarter</u> of an hour 45 min. = <u>3 quarters</u> of an hour</p>
<p>8</p>	<p>PbY3b, page 124</p> <p>Q.3 Read: <i>Fill in the missing numbers.</i></p> <p>Set a time limit. Review at BB with whole class. T could use models (e.g. 1 finger is 1 fifth of the number of fingers on one hand) or T or Ps draw diagrams on BB or SB or OHT.</p> <p>Solution:</p> <p>a) $2 \text{ fifths} + 3 \text{ fifths} = 1$ b) $3 \text{ quarters} + 1 \text{ quarter} = 1$ c) $2 \text{ sixths} + 4 \text{ sixths} = 1$ d) $5 \text{ eighths} + 3 \text{ eighths} = 1$ e) $3 \text{ tenths} + 7 \text{ tenths} = 1$ f) $5 \text{ hundredths} + 95 \text{ hundredths} = 1$, (e.g. use £1 as the unit: £1 = 100 p, so 1 p = 1 hundredth of a £1, 5 p + 95 p = £1)</p> <p style="text-align: center;">_____ 40 min _____</p>	<p>Individual work, monitored, helped</p> <p>Reasoning, agreement, praising</p> <p>BB: e.g.</p> <p>a)  b) </p> <p>c)  d) </p> <p>e) </p>
<p>9</p>	<p>PbY3b, page 124,</p> <p>Q.4 Read: <i>Fill in the missing numbers.</i></p> <p>Deal with one part at a time. Set a time limit. Review orally with whole class. If problems, Ps write operations on BB.</p> <p>e.g. BB: 1 quarter of a metre = $100 \text{ cm} \div 4$ = $80 \text{ cm} \div 4 + 20 \text{ cm} \div 4$ = $20 \text{ cm} + 5 \text{ cm} = 25 \text{ cm}$</p> <p>3 quarters of a metre = $3 \times 25 \text{ cm}$ = $3 \times 20 \text{ cm} + 3 \times 5 \text{ cm}$ = $60 \text{ cm} + 15 \text{ cm} = \underline{75 \text{ cm}}$</p> <p>Solution:</p> <p>a) half a metre = <u>50</u> cm b) half a kg = <u>500</u> g 1 fifth of a metre = <u>20</u> cm 1 quarter of a kg = <u>250</u> g 1 tenth of a metre = <u>10</u> cm 1 tenth of a kg = <u>100</u> g 3 quarters of a metre = <u>75</u> cm 3 quarters of a kg = <u>750</u> g 3 fifths of a metre = <u>60</u> cm 5 tenths of a kg = <u>500</u> g 7 tenths of a metre = <u>70</u> cm 2 fifths of a kg = <u>400</u> g 11 hundredths of a metre = <u>11</u> cm 9 hundredths of a kg = <u>90</u> g</p> <p style="text-align: center;">_____ 45 min _____</p>	<p>Individual work, monitored, helped (or done orally round the class if time is short)</p> <p>BB: 1 m = 100 cm 1 kg = 1000 g</p> <p>Differentiation by time limit</p> <p>T could have BB or SB or OHT already prepared and uncover each equation as it is dealt with (or use enlarged copy master or OHP)</p> <p>Reasoning, agreement, self-correction, praising</p> <p>In a) T could ask for answers in mm too.</p> <p>Feedback for T</p>

Y3		<i>Lesson Plan</i> 125
<i>Activity</i>	Tables practice, revision, calculations, activities, consolidation <i>PbY3b, page 125</i>	<i>Notes</i>

<h1>Y3</h1>	<p>R: Mental calculation, Fractions C: Revision and practice. Equations, inequalities E: <i>Combinatorics, set problems</i></p>	<h2>Lesson Plan 126</h2>
<p>Activity</p> <p>1</p>	<p>Problems</p> <p>Listen carefully and show me the answer when I say. You can draw a diagram in your <i>Ex. Bks.</i> to help you.</p> <p>a) <i>If 2 thirds of a birthday cake was eaten, what part of it was left?</i> Show me . . . now! (1 third) A, come and draw a diagram on the BB and explain your solution. (e.g. 'The cake was cut into thirds, so there were 3 equal pieces. Two of the 3 thirds were eaten, so 1 third was left.')</p> <p>b) <i>If 3 quarters of a chocolate cake was eaten, what part of it was left?</i> Show me . . . now! (1 quarter) B, come and draw a diagram on the BB and explain your solution.</p> <p>c) <i>If 5 eighths of a fruit cake was eaten, what part of it was left?</i> Show me . . . now! (3 eighths) C, come and draw a diagram on the BB and explain your solution.</p> <p style="text-align: right;"><i>6 min</i></p>	<p>Notes</p> <p>Individual drawing and calculating, monitored T reads problems while walking round class. Answers written on scrap paper or on 'slates' and shown in unison. Reasoning, agreement, praising BB: e.g. (shaded part is left)</p> <p>a)  3 thirds – 2 thirds = <u>1 third</u></p> <p>b)  4 quarters – 3 quarters = <u>1 quarter</u></p> <p>c)  8 eighths – 5 eighths = <u>3 eighths</u></p>
<p>2</p>	<p>Oral practice</p> <p>T asks a question. Ps answer in complete sentences, explaining reasoning too. e.g.</p> <p>a) What part of 48 is 12? (12 is <u>1 quarter</u> of 48, because $48 \div 4 = 12$, or because $4 \times 12 = 48$)</p> <p>b) What is half of 48? (Half of 48 = 24, as $48 \div 2 = 24$)</p> <p>c) What is 1 quarter of 48? (1 quarter of 48 = <u>12</u>, as $48 \div 4 = 12$)</p> <p>d) What part of 48 is 24? (24 is <u>1 half</u> of 48, because $48 \div 2 = 24$, or because $2 \times 24 = 48$)</p> <p>e) What part of 48 is 6? (6 is <u>1 eighth</u> of 48, because $48 \div 8 = 6$, or because $8 \times 6 = 48$)</p> <p>f) What is 1 sixth of 48? (1 sixth of 48 = <u>8</u>, as $48 \div 6 = 8$)</p> <p style="text-align: right;"><i>12 min</i></p>	<p>Whole class activity</p> <p>T chooses Ps at random</p> <p>At a good pace</p> <p>T repeats unclear explanations correctly as a model for Ps to follow.</p> <p>Agreement, praising</p> <p>Feedback for T</p>
<p>3</p>	<p>Estimation and calculation</p> <p>T writes operations on BB. How could we estimate the result? (By rounding numbers to the nearest 100, or to the nearest 10). Agree that rounding to the nearest 10 gives a closer estimate.</p> <p>Then Ps do vertical calculations in <i>Ex. Bks.</i> Review at BB with whole class. Compare the calculated result with the estimates.</p> <p>BB: <i>Estimations</i></p> <p>a) $678 + 354 - 217 \approx 700 + 400 - 200 = 1100 - 200 = 900$ or $\approx 680 + 350 - 220 = 680 - 130 = 810$ <i>Check:</i> $810 \approx 815$</p> <p>Repeat for:</p> <p>b) $1264 - (628 + 594) \approx 1300 - (600 + 600) = 1300 - 1200 = 100$ or $\approx 1260 - (630 + 590) = 1260 - 1220 = 40$ <i>Check:</i> $40 \approx 42$</p> <p style="text-align: right;"><i>18 min</i></p>	<p>Whole class activity</p> <p>Discussion, agreement, praising</p> <p>T writes what Ps dictate.</p> <p>Individual work, monitored</p> <p>Reasoning, agreement, self-correcting, praising</p> <p>BB:</p> <p>a) $\begin{array}{r} 678 \quad 1032 \\ + 354 \quad - 217 \\ \hline 1032 \quad 815 \end{array}$</p> <p>b) $\begin{array}{r} 628 \quad 1264 \\ + 594 \quad - 1222 \\ \hline 1222 \quad 42 \end{array}$</p>

Y3*Lesson Plan 126***Activity****6****PbY3b, page 126**

Q.2 Read: *Write as many different 3-digit numbers as you can from these numbers.*

Deal with one part at a time. Set a time limit. Encourage logical listing. Ps who finish early can be asked to calculate the sum and the difference of the greatest and smallest numbers in their list.

Review orally with the whole class. T writes what Ps dictate on BB in order. Ps correct mistakes or add missed numbers.

Extension

How do we know that we have all the numbers? Elicit that in:

- a) there are $3 \times 2 \times 1 = \underline{6}$ possible numbers (there are 3 possible hundreds digits and for every hundreds digit there are 2 possible tens digits and for every tens digit there is 1 possible units digit);
- b) there are $4 \times 3 \times 2 = \underline{24}$ possible numbers (there are 4 possible hundreds digits and for every hundreds digit there are 3 possible tens digits and for every tens digit there are 2 possible units digits);

Solution: a) 789, 798, 879, 897, 978, 987

b) 345, 346, 354, 356, 364, 365,
435, 436, 453, 456, 463, 465,
534, 536, 543, 546, 563, 564,
634, 635, 643, 645, 653, 654

*34 min***Notes**

Individual work, monitored, (helped)

e.g. starting at the smallest and listing in increasing order

Discussion, agreement, self-correction, praising

(Do not expect every number. Praise all correct ones.)

Ask several Ps what they think.

Discussion, agreement, praising

T gives hints only if Ps are struggling to explain.

BB:

$$\begin{array}{r} 987 \\ + 789 \\ \hline S = 1776 \end{array} \quad \begin{array}{r} 987 \\ - 789 \\ \hline D = 198 \end{array}$$

$$\begin{array}{r} 654 \\ + 345 \\ \hline S = 999 \end{array} \quad \begin{array}{r} 654 \\ - 345 \\ \hline D = 309 \end{array}$$

7**PbY3b, page 126**

Q.3 Read: *Write these numbers in the correct place in the diagrams.*

Deal with one part at a time. T reads out the numbers and Ps write them in the correct places in their *Pbs*.

Review at BB with whole class. T writes what Ps dictate.

Mistakes discussed and corrected.

Solution:

0, 4, 13, 30, 72, 95, 100, 321, 679, 1000, 1006, 1027, 2000

Even	Odd	Whole tens	Not whole tens
0 4 30 72	13 95 321	0 30	13 95 321
100 1000	679 1027	100 1000	679 72
1006 2000		2000	1006 1027

3-digit	Not 3-digit	Whole hundreds	Not whole hundreds
100 321	0 4 30 72	100 0	13 95 321
679	13 30 95	1000	4 72
	1006 1000	2000	679 1027
	1027 2000		1006 30

40 min

Individual work, monitored but class kept together

T reads out numbers while walking round class.

Drawn on BB or use enlarged copy master or OHP

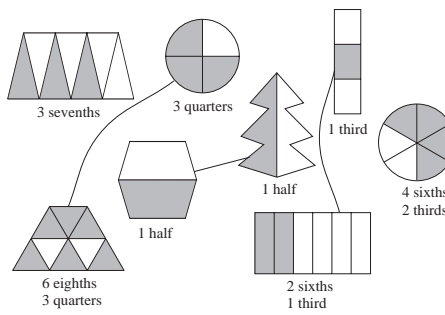
Reasoning, agreement, self-correction, praising

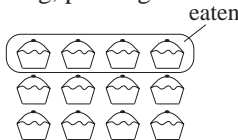
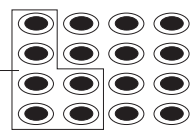
Who can think of other ways to sort the numbers?

(e.g. < 500 , > 500 ; multiples of 3, not multiples of 3, etc.)

Praise all valid suggestions.

Feedback for T

<p>Y3</p>	<p>R: Calculation (mental) C: Revision and practice. Problems in context E: <i>Fractions in context</i></p>	<p><i>Lesson Plan</i> 127</p>
<p>Activity</p> <p>1</p>	<p>Matching fractions</p> <p>Study these shapes. BB:</p> <p>What can you tell me about them?</p> <p>Ps come to BB to choose a shape and describe it. (e.g 1st shape is a quadrilateral with the two horizontal lines parallel; the shape has been divided into 7 equal triangles, 3 of them are shaded.)</p> <p>Ps write the part shaded below each shape.</p> <p>Let's join up the shapes which have the same fraction shaded.</p> <p>Ps come to BB to draw joining lines and explain reasoning. Class agrees/disagrees. Discuss equivalent fractions.</p>  <p style="text-align: right;">5 min</p>	<p>Notes</p> <p>Whole class activity Shapes drawn on BB or use enlarged copy master or OHP</p> <p>At a good pace</p> <p>Agreement, praising</p> <p>BB: 2 sixths = 1 third 4 sixths = 2 thirds 6 eighths = 3 quarters</p> <p>Feedback for T</p>
<p>2</p> <p>Numbers</p> <p>T dictates some numbers. Ps write them in <i>Ex. Bks</i>.</p> <p>T: '240, 806, 347, 580, 785, 950'</p> <p>a) Write them again in increasing order. Ps list in <i>Ex. Bks</i>, then dictate to T: BB: 240 < 347 < 580 < 785 < 806 < 950</p> <p>b) Do these calculation in your <i>Ex. Bks</i> and show me the results when I say (on scrap paper or 'slates'). Ps who respond correctly explain.</p> <p>i) What is the sum of the two greatest numbers? (1756) ii) What is the difference between two smallest numbers? (107)</p> <p>Extension</p> <p>What else can you think of to do with the numbers? (e.g. Put them in sets according to various criteria. How much more needs to be added to each one to make 1000? Which two numbers can be added (subtracted, multiplied together) to make these numbers?)</p> <p style="text-align: right;">10 min</p>	<p>Individual work, monitored Reviewed at BB with the whole class</p> <p>Agreement, self-correction, praising</p> <p>Responses shown in unison Reasoning, agreement, self-correction, praising</p> <p>BB: i) $\begin{array}{r} 806 \\ + 950 \\ \hline 1756 \end{array}$ ii) $\begin{array}{r} 347 \\ - 240 \\ \hline 107 \end{array}$</p> <p>Involve several Ps. Extra praise for creativity</p>	
<p>3</p> <p>Secret numbers</p> <p>a) I thought of a number. I added 679 to it and the result was 1128. What was the number I first thought of? Show me . . . now! (449) (on 'slates' or scrap paper) P who responded correctly explains to those who did not. Mistakes discussed and corrected.</p> <p>BB: $\square + 679 = 1128$, $\square = 1128 - 679 = 449$</p> <p>b) This time I will give you the equation for a similar question. What could the question be? What is the secret number? (e.g. I thought of a number. I subtracted 340 from it and the result was 563. What was the number I first thought of?) Show me the secret number . . . now! (903) P who responded correctly explains to those who did not. Mistakes discussed and corrected.</p> <p style="text-align: right;">15 min</p>	<p>Whole class activity Ps can do calculations in <i>Ex. Bks</i> if they need to.</p> <p>In unison Reasoning, agreement, self-correcting, praising</p> <p>BB: $\square - 340 = 563$</p> <p>Ask several Ps what they think. T helps with wording.</p> <p>In unison</p> <p>BB: $\begin{array}{r} \square = 563 + 340 \\ = 903 \end{array} \quad \begin{array}{r} + 340 \\ \hline 903 \end{array}$</p>	

<h1 style="text-align: center;">Y3</h1>		<p style="text-align: center;"><i>Lesson Plan 127</i></p>
<p>Activity</p> <p style="text-align: center;">4</p>	<p>Problems</p> <p>Listen carefully, do a rough drawing to help you if you need to and show me the answer when I say.</p> <p>a) <i>Mum baked 12 fairy cakes. Ann ate 2 sixths of them. How many cakes were left?</i> Show me . . . now! (8) A, come and explain how you worked out the answer. Who agrees? Who did it a different way? etc. Deal with all cases. BB: e.g. Eaten: 1 sixth of 12 = 2 (or Eaten: 2 sixths = 1 third 2 sixths of 12 = 4 Left: 1 – 1 third = 2 thirds Left: 12 – 4 = <u>8</u> 2 thirds of 12 = <u>8</u>) <i>Answer:</i> There were 8 cakes left.</p> <p>b) <i>Granny baked 16 jam tarts. Billy ate 3 eighths of them. How many jam tarts were left?</i> Show me . . . now! (10) B, come and explain how you worked out the answer. Who agrees? Who did it a different way? etc. Deal with all cases. BB: e.g. Eaten: 1 eighth of 16 = 16 ÷ 8 = 2 3 eighths of 16 = 3 × 2 = 6 Left: 16 – 6 = <u>10</u> (or Left: 5 eighths of 16 = 5 × 2 = <u>10</u>) <i>Answer:</i> There were 10 jam tarts left.</p> <p style="text-align: right;">20 min</p>	<p style="text-align: center;">Notes</p> <p>Individual work in drawing and calculating, monitored, helped (or whole class activity, with cakes drawn or stuck on BB or use enlarged copy master) In unison Reasoning, agreement, self-correcting, praising</p> <p>BB: </p> <p>Ps say answer in unison</p> <p>In unison Reasoning, agreement, self-correcting, praising</p> <p>BB: </p> <p>Ps say answer in unison</p>
<p style="text-align: center;">5</p>	<p>Which operation?</p> <p>Study these operations.</p> <p>BB: $321 - (247 - 159)$ (= $321 - 88 = 233$) ✓ $\begin{array}{r} 247 \\ -159 \\ \hline 88 \end{array}$ $\begin{array}{r} 321 \\ -88 \\ \hline 233 \end{array}$ $321 - 247 - 159$ ✗ $321 + 247 + 159$ ✗ $321 - 247 + 159$ (= $74 + 159 = 233$) ✓ $\begin{array}{r} 321 \\ -247 \\ \hline 74 \end{array}$ $\begin{array}{r} 74 \\ +159 \\ \hline 233 \end{array}$</p> <p>Which of them could be used to solve this problem?</p> <p><i>Tina had 321 marbles. She gave 247 to her friend and got 159 marbles back. How many marbles does Tina have now?</i></p> <p>T points to each operation in turn and Ps say whether or not it solves the problem. Why? (Why not?) Ps explain reasoning.</p> <p>Ps do calculations mentally or in <i>Ex. Bks</i> and dictate to T (or come to BB) as a check.</p> <p style="text-align: right;">25 min</p>	<p>Whole class activity</p> <p>Only the operations already written on BB or SB or OHT</p> <p>T repeats slowly and P repeats in own words.</p> <p>Discussion, reasoning, agreement, checking, praising</p> <p>Feedback for T</p>

Y3		<i>Lesson Plan 127</i>
Activity 6	<p><i>PbY3b, page127</i></p> <p>Q.1 Read: <i>Tick the operations which answer the problem and then do the calculations.</i></p> <p>Ps read the problem themselves, then work out <u>only</u> the operations which are correct.</p> <p><i>Lee had a £10 note and 22 p. He spent £2.56, then his sister gave him 35 p. How much money does Lee have now?</i></p> <p>Review at BB with the whole class. Ps explain reasoning to class. Class agrees/disagrees. Mistakes corrected.</p> <p>BB: ✗ $1022 + 256 - 35 =$ ✗ $1022 - 256 - 35 =$ ✓ $1022 - 256 + 35 = 766 + 35 = \underline{801}$ (p) ✗ $1022 + 256 + 35 =$ ✓ $1022 - (256 - 35) = 1022 - 221 = 801$ (p)</p> <p style="text-align: right;"><i>30 min</i></p>	<p style="text-align: center;">Notes</p> <p>Individual work, monitored, helped</p> <p>Encourage Ps not to calculate every operation!</p> <p>Operations written on BB or SB or OHT</p> <p>Ps can do necessary calculations at side of <i>Pbs</i></p> <p>Reasoning, agreement, checking, self-correction, praising only</p> <p>Elicit that the numbers shown are pence.</p> <p>Agree that 801 p = £8.01</p>
7	<p><i>PbY3b, page127</i></p> <p>Q.2 Read: <i>Make a plan, do the calculation and write the answer in a sentence.</i></p> <p>Ps read the problem themselves, then write a plan.</p> <p><i>Hetty Hedgehog had 347 apple pips. She got 172 orange pips from her Mum. Then she swapped 268 apple pips for grape pips with a friend. How many pips does Hetty Hedgehog have now?</i></p> <p>Review the plan with the whole class first. Deal with all cases. (Ps might notice that swapping 268 apple pips for grape pips does not change the amount so is not really needed in the operation, or that $-268 + 268 = 0$, so only one calculation needs to be done.)</p> <p>Then Ps do calculation and write the answer as a sentence. Review at BB with whole class. Ps explain reasoning. Class agrees/disagrees. Mistakes corrected.</p> <p><i>Solution:</i></p> $\text{Plan: } 347 + 172 - \overbrace{268 + 268}^0 = \quad C: \quad \begin{array}{r} 347 \\ + 172 \\ \hline 519 \end{array}$ <p style="padding-left: 40px;">(or $347 + 172 =$)</p> <p><i>Answer:</i> Hetty Hedgehog has 519 apple pips now.</p> <p style="text-align: right;"><i>34 min</i></p>	<p>Individual work, monitored, helped</p> <p>Discussion, agreement, correcting, praising</p> <p>Reasoning, agreement, self-correction, praising</p>

Y3		<i>Lesson Plan 127</i>
Activity 8	<p><i>PbY3b, page127</i></p> <p>Q.3 First elicit that 1 litre = 100 cl, 1 cl = 10 ml (BB)</p> <p>Ps read the problems themselves and choose two to solve. Review at BB with whole class. Ps explain reasoning. Who agrees? Who did it a different way? etc. Mistakes corrected.</p> <p>a) Read: <i>A 2 litre bottle was full of water. We poured out 35 cl of water. How much water is left in the bottle?</i></p> <p>BB: $200 \text{ cl} - 35 \text{ cl} = \underline{165 \text{ cl}}$ (= <u>1 litre 65 cl</u>)</p> <p>b) Read: <i>A 2 litre bottle contained 35 cl of water. We poured in another 35 cl of water. How much water is in the bottle now?</i></p> <p>BB: $35 \text{ cl} + 35 \text{ cl} = \underline{70 \text{ cl}}$</p> <p>c) Read: <i>A 2 litre bottle contained 36 cl of water. We poured out 10 cl 9 ml of water. How much water is left in the bottle?</i></p> <p>BB: $36 \text{ cl} - 10 \text{ cl } 9 \text{ ml} = 360 \text{ ml} - 109 \text{ ml} = \underline{251 \text{ ml}}$ (= <u>25 cl 1 ml</u>)</p> <p style="text-align: right;">40 min</p>	<p style="text-align: center;">Notes</p> <p>Individual work, monitored, helped</p> <p>T warns Ps that not all the information in a question is needed in the calculation!</p> <p>Reasoning, agreement, self-correcting, praising</p> <p>Ps must listen to the problem they did not do and say whether they disagree with the reasoning.</p> <p>Praising, encouragement only</p> <p>Feedback for T</p>
9	<p><i>PbY3b, page127, Q.4</i></p> <p>Read: <i>Last April it rained on 3 fifths of the days.</i></p> <p>How many days are there in April? (30, as shown on the calendar)</p> <p>T (or P) reads each part and Ps do calculations in <i>Pbs</i>, using the calendar to help them. Ps show solutions on scrap paper or 'slates' on command.</p> <p>Ps who responded correctly explain to those who did not.</p> <p>a) Read: <i>On how many days did it rain?</i></p> <p>Show me . . . now! (15)</p> <p><i>Solution:</i> e.g. $1 \text{ fifth of } 30 \text{ days} = 30 \text{ days} \div 5 = 6 \text{ days}$ $3 \text{ fifths of } 30 \text{ days} = 6 \text{ days} \times 3 = \underline{18 \text{ days}}$</p> <p>b) Read: <i>Did it rain on more than half the days?</i></p> <p>Show me . . . now! (Yes)</p> <p><i>Solution:</i> e.g. $1 \text{ half of } 30 \text{ days} = 30 \text{ days} \div 2 = 15 \text{ days}$ $18 \text{ days} > 15 \text{ days}$, i.e. more than half the days.</p> <p>c) Read: <i>What part of April was dry?</i></p> <p>Show me . . . now! (2 fifths)</p> <p><i>Solution:</i> e.g. It rained on 3 fifths of the days.. $5 \text{ fifths} - 3 \text{ fifths} = 2 \text{ fifths}$ It was dry on <u>2 fifths</u> of the days. (= 12 days)</p> <p style="text-align: right;">45 min</p>	<p>Individual work, monitored, helped</p> <p>(Or whole class activity and Ps dictate solution to T)</p> <p>Reasoning, agreement, self-correcting. praising</p> <p>Deal with all methods</p> <p>Feedback for T</p>

Y3	R: Calculation C: Opposite quantities and numbers. Negative temperature E: <i>Positive and negative quantities or numbers</i>	<i>Lesson Plan</i> 128
Activity 1	<p>Sequences</p> <p>T says the first 3 terms of a sequence. Ps continue it, then give the rule.</p> <p>a) 800, 400, 200, (100, 50, 25, 12 and 1 half, 6 and 1 quarter, 3 and 1 eighth)</p> <p><i>Rule:</i> Each following term is half of the previous term. ($\div 2$)</p> <p>b) 800, 600, 400..., (200, 0, -200, -400, -600, -800, ...)</p> <p><i>Rule:</i> decreasing by 200.</p> <p>c) 10°C, 13°C, 16°C, (19°C, 22°C, 25°C, ...)</p> <p><i>Rule:</i> increasing by 3°C.</p> <p>d) 6°C, 5°C, 4°C, (3°C, 2°C, 1°C, 0°C, -1°C, -2°C, -3°C, ...)</p> <p><i>Rule:</i> decreasing by 1°C</p> <p>T explains that the 'degree Celsius' is a unit used to measure <u>temperature</u>. What is temperature? (How hot or cold something is.) What can you tell me about it? Ps' tell own experiences (e.g. ice in the freezer, snow in winter, sunburn in summer, temperature rising when they are ill, shivering when they are cold, boiling water, etc.) Involve several Ps.</p> <p>This is what we use to measure temperature. Who knows what it is called? (<u>thermometer</u>) Who knows how it works? T explains briefly if nobody knows. (Bulb at bottom of glass tube holds a substance called <u>Mercury</u>. When hot it expands and rises up the tube and when cold it shrinks and falls back down the tube. It remains liquid at extreme temps.)</p> <p>T shows a large thermometer and talks about it. (e.g. the scale is in degrees Celsius (°C) and this thermometer shows temperatures from + 20°C to minus 20 °C) Which temperature do you think is hottest (coldest)? Ps come out to point and say it. (+ 20 degrees Celsius is hottest, <u>minus</u> 20 degrees Celsius is coldest)</p> <p>T tells the class (or elicits) that water freezes at a temperature of 0°C. Who can point to this temperature on the thermometer?</p> <p>What do you think + 10°C (- 10°C) means? (10 degrees more than 0°C, 10 degrees less than 0°C) What does the scale remind you of? (e.g. a vertical number line) We say that these numbers (T points) are <u>positive</u> (i.e. > zero) and these numbers are <u>negative</u> (i.e. < zero).</p> <p>T tells class that the '+' sign is usually left off the positive numbers.</p> <p style="text-align: right;"><i>8 min</i></p>	<p style="text-align: center;">Notes</p> <p>Whole class activity</p> <p>T chooses Ps at random</p> <p>T notes which Ps know about negative numbers already. If one P knows, P tries to explain the meaning to class and other Ps might follow the pattern.</p> <p>Ps should concentrate on the <u>numbers</u> and copy what T says for the unit.</p> <p>Agreement on rules, praising</p> <p>BB: <u>temperature</u></p> <p>1°C : <u>1 degree Celsius</u></p> <p>Discussion</p> <p>Praise all contributions</p> <p>BB: <u>thermometer</u></p> <p>Use large model or large real thermometer (or enlarged copy master or OHP)</p> <p>Or T has various scales to show different ranges of temperature. Ps come out to point to and read the highest (lowest) point on each scale.</p> <p>BB: +10°C <u>positive</u> > 0°C - 10°C <u>negative</u> < 0°C 10°C means +10°C</p>
2	<p>Temperatures</p> <p>Ps each have a model thermometer on desks (or colour copies of copy master from <i>Activity 1</i>).</p> <p>a) Set your thermometer to the temperature I am showing on mine. Ps hold them up and T does a quick check. Let's read it out together. (e.g. 7°C, 0°C, -3°C, etc.) Is it positive or negative?</p> <p>b) Set your thermometer to the temperature I say. Ps hold them up and T does a quick check. (e.g. 8°C, -5°C, 0°C, etc.)</p> <p>c) T shows some temperatures. Ps read them aloud.</p> <p>d) T says two temperatures. Which is higher (lower)? Who can write it in a mathematical way?</p> <p>How many degrees higher (lower)?</p> <p style="text-align: right;"><i>13 min</i></p>	<p>Whole class activity</p> <p>T shows large model and Ps show theirs on command.</p> <p>Reading scale with T's help</p> <p>Or Ps come to large model to show and say the temperatures and class agrees/disagrees.</p> <p>In unison. Praising only</p> <p>e.g. BB: -5°C < 2°C</p> <p>Ps count 'ticks' on the scale.</p> <p>Praising</p>

Y3

Lesson Plan 128

Activity

3

PbY3b, page 128

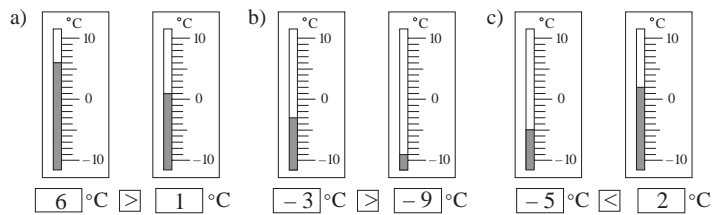
Q.1 Read: Write the temperature below the thermometers.
Write in the missing sign.

Deal with one part at a time. Make sure that Ps know to count how many ticks above or below 0°C the top of the Mercury is.

Ps write in the numerical values, then compare them and write in the appropriate sign.

Review at BB with whole class. Mistakes discussed/corrected.

Solution:



Notes

Individual work, monitored, helped

T uses 2 large model thermometers or enlarged copy master or OHP

If possible, Ps use magnifying glasses to make the ticks easier to count (or enlarged copies of copy master)

Discussion, agreement, self-correction, praising

Ps can say the inequalities in unison as practice for reading 'minus' and 'degrees Celsius'.

Feedback for T

4

Opposites

Tell me the opposite of what I say. e.g.

cold (hot), high (low), colder (hotter), higher (lower), in (out), savings (debts), save (spend), under (over), below (above), up (down), in front of (behind), front (back), left (right), forwards (backwards), positive (negative), below sea level (above sea level), North (South), East (West), more than (less than), plus (minus), light (dark/heavy), white (black), curved (straight), divide (multiply), etc.

22 min

Whole class activity

BB: opposite

T chooses Ps at random

Rest of class points out errors

In good humour!

T writes difficult words on BB

Praising, encouragement only

5

Problem

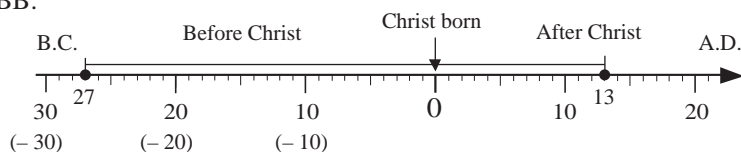
Listen carefully and think about what the problem has to do with this diagram. What could the letters stand for? What happened in the year zero?

A Roman gladiator had his 40th birthday in the 13th year after Christ was born. In what year was the Roman gladiator born?

How might the Romans have written the year he was born and the year in which he was 40?

T asks several Ps what they think. Ps make suggestions. Elicit that B.C. means 'Before Christ was born', the zero is the year Christ was born and A.D. means 'After Christ was born'. Ps come to BB to draw dots at the year of the general's birth and when he was 40 and label them. Discuss how these years could be written in Roman numerals.

BB:



T points out that the years B.C. can be thought of as negative years and the years A.D. can be thought of as positive years, but the Romans did not know about positive and negative numbers; they used B.C. and A.D. instead.

26 min

Whole class activity

Year line drawn on BB or use enlarged copy master or OHP

T repeats slowly to give Ps time to think. Ps can discuss it with their neighbours.

Discussion involving several Ps. Ps come to BB to explain and demonstrate.

Reasoning, agreement, praising

BB: Born in XXVII B.C.

40 years old in XIII A.D.

Check: 27 + 13 = 40

Or Ps might notice by themselves

Repeat with another example if there is time.

Y3

Lesson Plan 128

Activity

6

PbY3b, page 128

Q.2 Read: *Mark the temperatures on the thermometers.*
Which is higher and by how much?

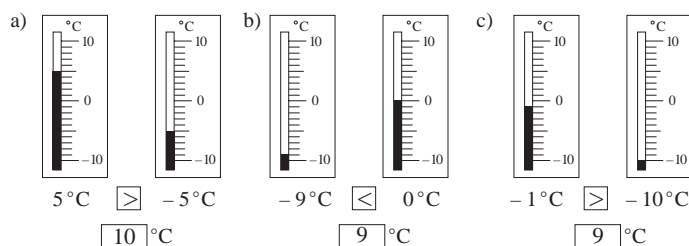
T explains task. Ps colour the tube of the thermometers up to the given levels. Then they compare the 2 temperatures and write the appropriate sign in the square. Then they count the ticks to find out how many degrees more the higher temperature is

Deal with one part at a time. Review at BB with whole class.

Ps dictate results to T or come to BB to explain reasoning.

Class agrees/disagrees. Mistakes discussed and corrected.

Solution:



30 min

Notes

Individual work, monitored, helped

Use 2 model thermometers or enlarged copy master or OHP

Do part a) with whole class first if necessary.

Reasoning, agreement, self-correction, praising

(Ps can use magnifying glass to make counting the ticks easier or have copy of enlarged copy master.)

Ps read the inequalities in unison.

7

Negative numbers

Let's put these temperatures in decreasing order.

BB: 3°C , -5°C , 0°C , -2°C , 7°C , -10°C , 8°C

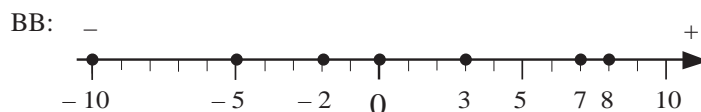
Ps come out to BB to rewrite order, crossing out values when used while rest of Ps list them in *Ex. Bks.* Class points out any errors.

BB: $8^{\circ}\text{C} > 7^{\circ}\text{C} > 3^{\circ}\text{C} > 0^{\circ}\text{C} > -2^{\circ}\text{C} > -5^{\circ}\text{C} > -10^{\circ}\text{C}$

Remind Ps that: 8°C means 8°C more than 0°C , i.e. is positive (+)
 -2°C means 2°C less than 0°C , i.e. is negative (-)

Let's see if we can find these numbers on the number line!

Ps come out to point. Class agrees/disagrees.



Discuss and compare pairs of values (+ and -) and how far they are from zero and from each other. (Ps might notice that zero is similar to a line of symmetry, with, e.g. -5 and 5 the same distance away from it.)

35 min

Whole class activity

T has BB already prepared

At a good pace.

Agreement, praising

Use negative and positive segments of class number line or draw on BB.

At a good pace

Discussion, agreement

Extra praise if Ps notice the symmetry.

Y3

Lesson Plan 128

Activity

8

PbY3b, page 128

Q.3 Read: *How much does each child have? Who has more?*
Write in the missing sign.

T explains the meaning of the symbols, talking about the money you have at this moment, e.g. in your purse or piggy bank (cash) and money you owe to someone, e.g. borrowed and have to pay back, or you have ordered something from a shop and you will have to pay for it later on (being in debt).

Deal with one part at a time. Review at BB with whole class. Ps dictate results to T or come to BB to explain reasoning. Class agrees/disagrees. Mistakes discussed and corrected.

How much more is the bigger amount? Ps write on BB.

Solution:

a) Ann	Paul	b) Ben	Rose	c) Colin	Sonia
$2 > -2$		$0 = 0$		$-2 < 1$	
4				3	

T asks individual Ps to describe each situation in real life. e.g. 'Ann has £4 in cash, but she is £2 in debt (or owes £2), so she really has only £2.' We say that the Ann's balance is £2.

Similarly for the other names.

40 min

Notes

Individual work, monitored, helped

Drawn on BB or use enlarged copy master or OHP

(or part a) done as whole class activity with 2 Ps at front of class using card coins and debt slips)

Reasoning, agreement, self-correction, praising

Elicit that, e.g.

1 and -1 give a balance of zero.

Show amounts and differences between them on the class number line.

[Comparison is preparation for subtraction of negative whole numbers.]

BB: balance

9

PbY3b, page 128

Q.4 Read: *Complete the drawings to make the statements correct.* Make sure that Ps understand the meaning of the symbols and that each (1) and (-1) makes 0. (Each such pair can be joined up or crossed out and what is left should be the balance.)

T could do part a) with the whole class first if necessary, with cards for (1) and (-1) stuck to BB.

Review at BB with the whole class. Demonstrate with cards on BB and also show on number line. Mistakes discussed and corrected.

[Note that there are many correct solutions, e.g.

e.g. a) (1) (1) (-1) (-1) (-1) (-1) (-1) (-1) (-1) ((1) (-1) (-1) (-1))

Solution: (most straightforward)

a) Alice's balance is -£6: (1) (1) (-1) (-1) (-1) (-1) (-1) (-1) (-1) ((-1) (-1))

b) Barry's balance is £3: (1) (1) (1) (-1) (-1) ((1) (1))

c) Carol's balance is £0: (1) (1) (1) (1) (-1) (-1) (-1) (-1) ✓

d) Dan's balance is -£4: (1) (1) (1) ((-1) (-1) (-1) (-1) (-1) (-1) (-1))

e) Eve's balance is £5: (1) (1) (1) (1) (1) (1) ((-1))

How could we write them as equations? e.g.

a) $1 + 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 = -6$,
or $2 + (-8) = -6$, or $2 - 8 = -6$

45 min

Individual work, monitored, helped

(or whole class activity with Ps at front of class to be A, B, C, D and E, with cash and debt cards stuck on BB)

Discussion, reasoning, agreement, self-correction, praising

T can demonstrate this on BB if no P has done it.

Whole class discussion

Ps suggest ways.

Agreement, praising

Show on class number line.

Extension

Y3

Lesson Plan 129

Activity

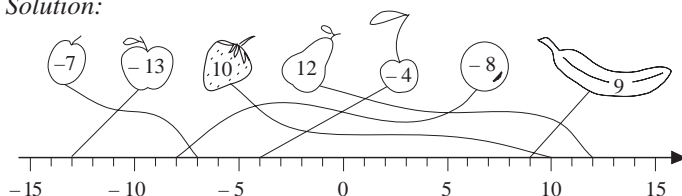
3

PbY3b, page 129

Q.1 Read: *Join up the fruit to the corresponding point on the number line.*

Review at BB with whole class. Ps come to BB to draw joining lines. Class agrees/disagrees. Mistakes corrected.

Solution:



• Let's say them in

- increasing order: $-13, -8, -7, -4, 9, 10, 12$
(moving to the right along the number line or up on vertical scale)
- decreasing order: $12, 10, 9, -4, -7, -8, -13$
(moving to the left along the number line or down on vertical scale)

- T (or P) says 2 of the numbers. Ps say which is greater, e.g. $12 > 9, 10 > -7, -4 > -8, -8 < -7$, etc.

Elicit that when comparing negative numbers, the greatest is nearest zero (the smallest is furthest away from zero).

21 min

Notes

Individual work, monitored, helped

Drawn on BB or use enlarged copy master or OHP (or fruit cut out and stuck to BB above class number line)

Agreement, self-correction, praising

Feedback for T

In unison

T shows on either or both scales.

At a good pace

T chooses Ps at random:

e.g. 'minus four is greater than minus eight'

(BUT opposite is true for positive numbers)

4

Negative values

Listen carefully and think how to explain it.

- a) *The temperature is higher than -5°C but lower than 8°C .*

T asks several Ps what the temperature could be.

e.g. $-4^{\circ}\text{C}, -3^{\circ}\text{C}, \dots, 0^{\circ}\text{C}, 1^{\circ}\text{C}, \dots, 7^{\circ}\text{C}$, or could also include fractions of a degree, e.g. 2 and a half $^{\circ}\text{C}$, -1 and a half $^{\circ}\text{C}$.

B, come and show it on the thermometer (or vertical scale drawn on BB). Agree that temperature is not as cold as -5°C but is colder than 8°C .

Who could write it as an inequality? BB: $-5^{\circ}\text{C} < \square < 8^{\circ}\text{C}$

- b) *The balance of Ian's bank account is more than $-\pounds 5$ but less than $\pounds 8$.*

T asks several Ps how much money Ian could have in his account.

e.g. P_1 : He could have debts of $\pounds 4, \pounds 3, \pounds 2$ or $\pounds 1$. ($-\pounds 4, \dots, -\pounds 1$)

P_2 : He could have no money left in his account. ($\pounds 0$)

P_3 : He could have $\pounds 1, \pounds 2, \dots, \pounds 7$ in his account.

or P_5 : He could have debts of $\pounds 6$ and savings of $\pounds 2$, as that would give a balance of $-\pounds 4$.

or P_6 : He could have debts of $\pounds 2$ and savings of $\pounds 9$ as that would give a balance of $\pounds 7$.

Agree that Ian could have any amount of savings and debts so long as the balance of his account was from $-\pounds 4.99$ up to $\pounds 7.99$.

Who could write it as an inequality? BB: $-\pounds 5 < \square < \pounds 8$

25 min

Whole class activity

Ps can note data in *Ex. Bks* (or on 'slates')

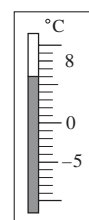
Ps make suggestions.

Class agrees/disagrees.

Ps explain

using model or diagram drawn on BB:

Ps write inequality in *Ex. Bks*.

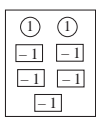
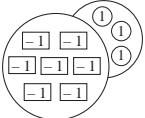
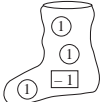
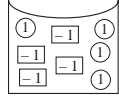

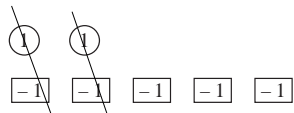


Discussion, reasoning, agreement, praising

Ps explain using $\textcircled{1}$ and $\textcircled{-1}$ cards stuck on BB and on class number line.

Extra praise if Ps think of last 2 possibilities or of using \pounds and pence.

Ps write inequality in *Ex. Bks*.

<h1>Y3</h1>		<p>Lesson Plan 129</p>
<p>Activity</p> <p>5</p>	<p>Find the mistakes</p> <p>For homework, <i>Tiggy Tiger</i> had to write an inequality to show that the temperature was between -3°C and 5°C. These are his attempts. Which one is correct? Let's help him decide.</p> <p>BB: $5 < T < -3$ ✗ $T > -3$ (not enough information) $T < 5$ (not enough information) $-3 < T < 5$ ✓ $T > 5$ ✗ $-3 > T > 5$ ✗</p> <p>Ps come to BB to check each inequality, saying whether it is correct or not and explaining reasoning on model thermometer or vertical scale. Class agrees or disagrees.</p> <p style="text-align: right;">30 min</p>	<p>Notes</p> <p>Whole class activity</p> <p>T has BB or SB or OHT already prepared.</p> <p>Elicit that $T = \text{Temperature}$</p> <p>At a good pace</p> <p>Reasoning, agreement, praising</p> <p>Feedback for T</p>
<p>6</p>	<p>PbY3b, page 129</p> <p>Q.2 Read: <i>How much money does each child really have?</i> <i>Write the amounts in increasing order.</i></p> <p>Revise the meaning of the symbols and that each ① and $\boxed{-1}$ makes 0. Each such pair can be joined up or crossed out and what is left is the balance.</p> <p>Review balance of each diagram first. Ps come to BB, explaining reasoning. Mistakes discussed and corrected.</p> <p>Then Ps write balances in increasing order. Review with the whole class. Class dictates order to T to write on BB. Show each value on class number line.</p> <p><i>Solution:</i></p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;"> <p>Lisa</p>  <p>-3</p> </div> <div style="text-align: center;"> <p>Charlie</p>  <p>-4</p> </div> <div style="text-align: center;"> <p>Billy</p>  <p>2</p> </div> <div style="text-align: center;"> <p>Clare</p>  <p>0</p> </div> <div style="text-align: center;"> <p>Diane</p>  <p>5</p> </div> </div> <p style="text-align: center;">$-4 < -3 < 0 < 2 < 5$</p> <p style="text-align: right;">35 min</p>	<p>Individual work, monitored, helped</p> <p>Drawn on BB or use enlarged copy master or OHP</p> <p>(Or whole class activity with 5 Ps at front of class with different 'purses' containing ① s and $\boxed{-1}$ s.)</p> <p>Reasoning (with T's help), e.g. 'Lisa has £2 in cash but is £5 in debt, so she is really £3 in debt'</p>  <p>Agreement, self-correction, praising</p>
<p>7</p>	<p>PbY3b, page 129</p> <p>Q.3 Read: <i>Draw two different ways of showing these amounts.</i> <i>Use ① and $\boxed{-1}$.</i></p> <p>Deal with one part at a time. Review orally with whole class. Deal with all cases. Class decides whether they are valid. Mistakes corrected. Refer to number line if problems.</p> <p>Agree that there are many possible solutions (only limitation is the space given in the response boxes).</p> <p><i>Solution:</i> e.g.</p> <p>a) $-\text{£}3 = \boxed{-1} \boxed{-1} \boxed{-1} = \boxed{-1} \boxed{-1} \boxed{-1} \boxed{-1} \text{①}$</p> <p>b) $\text{£}3 = \text{①} \text{①} \text{①} = \text{①} \text{①} \text{①} \text{①} \boxed{-1}$</p> <p>c) $\text{£}0 = \boxed{} = \boxed{-1} \boxed{-1} \boxed{-1} \text{①} \text{①} \text{①}$</p> <p style="text-align: right;">40 min</p>	<p>Individual work, monitored, helped</p> <p>T can stick ① s and $\boxed{-1}$ s on BB to show Ps' solutions.</p> <p>Reasoning, agreement, self-correction, praising</p> <p>Agree on the <u>general rule</u> for each part. There must be in:</p> <p>a) 3 more $\boxed{-1}$ s than ① s</p> <p>b). 3 more ① s than $\boxed{-1}$ s</p> <p>c) an equal number of $\boxed{-1}$ s and ① s.</p>

Y3

Lesson Plan 129

Activity

8

*PbY3b, page 129*Q.4 Read: *Wendy went to Austria for a winter holiday.**One day, she decided to note down the outside temperature every hour.**She made this table to show her data.*

Who can tell us what the table means? (e.g. Top row shows the time of day Wendy read the thermometer: 7 hours means 7 o'clock in the morning and 19 hours means 7 o'clock in the evening. Bottom row shows the temperature at that time of day.)

Ps read the questions and answer them in *Pbs*.

Review at BB with whole class. Check on model thermometer (or vertical scale). Mistakes discussed and corrected.

Solution:

a) When was it: i) coldest (8.00 am or 08.00 hours)

ii) warmest? (3.00 am or 15.00 hours)

b) Write the temperatures in increasing order.

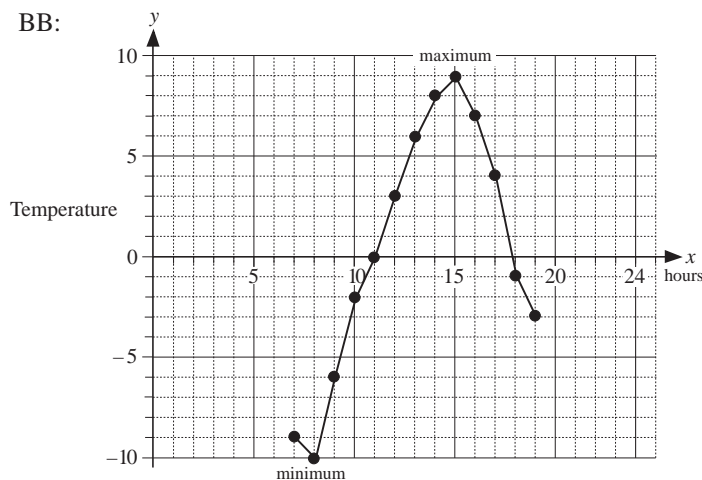
$$(-10 < -9 < -6 < -3 < -2 < -1 < 0 < 3 < 4 < 6 < 7 < 8 < 9)$$

Let's show the temperatures on this graph. T explains or elicits what each axis shows. (*x* axis shows the hours and *y* axis shows the temperatures)

Ps come out to choose a column from table, point to the relevant hour with RH and temperature with LH and move both along relevant grid lines until they meet. P draws (or sticks on) a dot at the correct point. Class agrees/disagrees.

Let's join up the dots. What have we drawn? (a graph) What does it show? (how the temperature rises and falls) What does the top (bottom) of the graph show? (highest temperature; lowest temperature) We call these points the maximum and minimum points on the graph.

BB:



Extension

If Wendy noted the reading on the thermometer every hour after 7 pm how do you think the graph would continue? T asks several Ps what they think. (It would probably keep falling as it usually becomes colder the later it is in the day.)

Notes

Whole class discussion to start

Table drawn on BB or use enlarged copy master or OHP

Discussion, agreement, praising

Quick revision of notation of time if necessary.

Individual work, monitored, helped

Reasoning, agreement, self-correction, praising

Graph drawn on BB or on a grid sheet or use enlarged copy master or OHP

At a good pace

With T's help if necessary

Agreement, praising

Whole class discussion

T encourages Ps to explain in own words

BB: maximum : highest point

minimum : lowest point

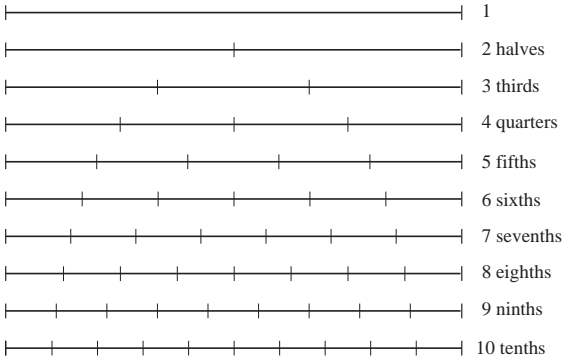
Discuss how day temperature changes in relation to the sun.

(Ps could have copies of copy master on desks and draw the points and line as individual work if they wish.

If short of time, Ps can complete graph in *Lesson 130*, or at home.)

Discussion, demonstration on graph, reasoning, agreement, praising

Y3		<i>Lesson Plan</i> 130
<i>Activity</i>	Tables practice, revision, activities, consolidation <i>PbY3b, page 130</i>	<i>Notes</i>

<h1>Y3</h1>	<p>R: (Mental) calculation C: Multiplication. Properties of multiplication E: <i>Expressing the rules of multiplication</i></p>	<h2>Lesson Plan 131</h2>
<p>Activity</p> <p>1</p>	<p>Competition</p> <p>T divides class into 3 (or 6) teams of roughly equal ability. T writes a number for each team on different parts of the BB (or on SB, flip chart, or large sheets of paper stuck to wall).</p> <p>I will give you 2 minutes to write as many different ways as you can to describe your number. You must start and stop when I say.</p> <p>Start ... now! Ps from each team come to BB one after another to write different descriptions. Rest of team correct their team-mates' errors, point out repetitions and note ideas from other teams. . . . Stop!</p> <p>Quick check of each team's descriptions. Each team's score is the number of correct forms minus the number of wrong ones.</p> <p style="text-align: right;"><i>5 min</i></p>	<p>Notes</p> <p>Whole class activity</p> <p>At a good pace</p> <p>e.g.</p> <p>BB: <u>150</u> <u>200</u> <u>250</u></p> <p>3×50 5×30 $100 + 50$ $300 \div 2$ etc.</p> <p>Class applauds the winners</p>
<p>2</p>	<p>Find the mistake</p> <p>Let's decide whether these inequalities are correct or not.</p> <p>BB: a) $-3 < -9$ ✗ b) $-15 < -11$ ✓ $\begin{array}{l} < \\ 6 \end{array}$ $\begin{array}{l} < \\ 4 \end{array}$</p> <p>$(-3 > -9)$</p> <p>c) $-8 < -2$ ✗ d) $-5 < 3$ ✗ $\begin{array}{l} < \\ 6 \end{array}$ $\begin{array}{l} < \\ 8 \end{array}$</p> <p>$(-8 < -2)$ $(-5 < 3)$</p> <p>e) $-2 < 1$ ✗ f) $-20 < 10$ ✓ $\begin{array}{l} < \\ 3 \end{array}$ $\begin{array}{l} < \\ 30 \end{array}$</p> <p>$(-2 < 1)$</p> <p>Ps come to BB to check each inequality, saying whether it is correct or not and explaining reasoning on vertical scale or class number line. Ps write correct inequality where relevant. Class agrees or disagrees.</p> <p style="text-align: right;"><i>10 min</i></p>	<p>Whole class activity</p> <p>Inequalities written on BB or use enlarged copy master or OHP</p> <p>At a good pace</p> <p>Ps write corrected inequalities in <i>Ex. Bks.</i></p> <p>Reasoning, agreement, praising</p> <p>Ps can make up inequalities too for class to check.</p>
<p>3</p>	<p>Equivalent fractions</p> <p>This line has been divided into different numbers of equal parts. What are the parts called? T points to each line in turn and Ps say what it has been divided into. (1 whole, 2 halves, 3 thirds, etc.)</p> <p>Let's find different ways of expressing the same segment of the line.</p> <p>BB:</p>  <p>Ps come to BB to choose a line segment and to write its value in different ways. e.g,</p> <p>BB: 1 half = 2 quarters = 3 sixths = 4 eighths = 5 tenths 1 third = 2 sixths = 3 ninths; 2 thirds = 4 sixths = 6 ninths 1 quarter = 2 eighths; 3 quarters = 6 eighths, etc.</p> <p style="text-align: right;"><i>15 min</i></p>	<p>Whole class activity</p> <p>Lines drawn on BB or use enlarged copy master or OHP</p> <p>Ps could have copies of copy master on desks too.</p> <p>T writes what Ps dictate.</p> <p>At a good pace</p> <p>T (Ps) could check equivalent fractions by drawing a dotted vertical line or lining the ticks up against a ruler.</p> <p>Reasoning, agreement, praising</p> <p>Class points out errors.</p> <p>Feedback for T</p>

Y3

Lesson Plan 131

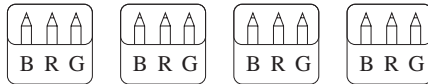
Activity

4

Multiplication revision 1

We have blue, red and green coloured pencils and we have to put one of each colour into the 4 wallets like this. How could we do it?

BB:



After discussion, elicit that there are 2 ways.

- a) We could put a blue pencil in each wallet, then a green pencil in each wallet, then a red pencil in each wallet.

How could we write it mathematically?

$$\text{BB: } 4 + 4 + 4 = 12 = 3 \times 4$$

Elicit (or tell) that in this equation, 3 is the multiplier (i.e. number of groups) and 4 is the multiplicand (i.e. number in each group).

- b) We could put a blue, a red and a green pencil in the first wallet, then do the same for the other 3 wallets.

How could we write it mathematically?

$$\text{BB: } 3 + 3 + 3 + 3 = 12 = 4 \times 3$$

Elicit that in this case 4 is the multiplier (i.e. number of groups) and 3 is the multiplicand (i.e. number in each group).

We can also say that 3 and 4 are factors of 12. (i.e. when multiplied together they give a product of 12) In multiplication does it matter which way round the factors are? (No, the result is the same for both ways.) Confirm with a diagram on the BB.

Whole class activity

Drawn on BB or use enlarged copy master or OHP

Ask several Ps what they think
Discussion, reasoning, agreement, checking,

T explains both ways if Ps have not suggested them.

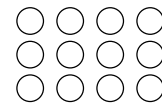
Ps can demonstrate each way on BB or OHT with coloured chalk or pens (vertical lines would do for pencils and squares for the wallets)

$$\begin{array}{c} \text{BB: } \quad 3 \times 4 \\ \quad \swarrow \quad \searrow \\ \quad \underline{\text{multiplier}} \quad \underline{\text{multiplicand}} \\ \quad \searrow \quad \swarrow \\ \quad 4 \times 3 \end{array}$$

Discussion, revision

BB: factors

$$3 \times 4 = 4 \times 3 = 12$$



Extension

What are all the factors of 12? (1×12 , 2×6 , 3×4)

20 min

5

Multiplication revision 2

Let's see how much money I have in this purse! (T opens purse and sticks the model coins on the BB.)

BB: $\textcircled{10}$ $\textcircled{10}$ $\textcircled{10}$ How much money do I have? (60 p)
 $\textcircled{10}$ $\textcircled{10}$ $\textcircled{10}$ What multiplications could we write?
 (e.g. $6 \times 10 = 60$)

Think about the rows and columns. What other multiplications could we write? e.g.

BB:

- a) there are 2 rows, with 3 $\textcircled{10}$ s in each: $2 \times (3 \times 10) = 60$, or

- b) there are 3 columns, with 2 $\textcircled{10}$ s in each: $3 \times (2 \times 10) = 60$, or

- c) there are 2×3 coins, each coin is $\textcircled{10}$: $(2 \times 3) \times 10 = 60$, or

- d) there are 3×2 coins, each coin is $\textcircled{10}$: $(3 \times 2) \times 10 = 60$,

If we left off the brackets, would it make a difference to the product? (No, the product would be the same, working from left to right.)

If we did the calculation from right to left (in any order) would the product change? (No)

Confirm that if all the operations are multiplications, then the order does not matter. What other operation is this true for? (addition)

Whole class activity

Purse already prepared

T writes what Ps dictate

Reasoning, agreement, praising

After Ps' suggestions, T writes these operations on BB.

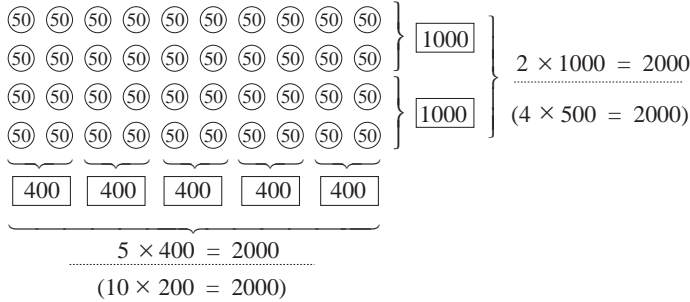
Ps copy into *Ex. Bks.*

Whole class discussion

Agreement, praising

Feedback for T

25 min

<h1 style="text-align: center;">Y3</h1>		<p><i>Lesson Plan 131</i></p>
<p>Activity</p> <p style="text-align: center;">6</p>	<p><i>PbY3b, page 131</i></p> <p>Q.1 Read: <i>How much is in the picture? Fill in the missing numbers.</i></p> <p>T explains task. Elicit that each blank box refers only to the two columns or rows indicated and that the dotted lines refer to the whole amount.</p> <p>Review at BB with whole class. Ps come to BB to write in missing numbers explaining reasoning. Class agrees/disagrees. Mistakes discussed and corrected.</p> <p>What other multiplications could we have written? e.g. 4 rows of 500: $4 \times 500 = 2000$, (or $4 \times 10 \times 50 = 2000$); 10 columns of 200: $10 \times 200 = 2000$ (or $10 \times 4 \times 50 = 2000$)</p> <p><i>Solution:</i></p>  <p>Discuss how the factors change. (e.g. $4 \times 500 = 5 \times 400$; $2 \times 1000 = 10 \times 200$; $4 \times 500 = 40 \times 50$)</p> <p>Read: <i>What is 30×50?</i></p> <p>Ps suggests ways to do it. (e.g. using first 3 rows in the diagram or writing the multiplication in a different way: e.g.</p> <p>BB: $30 \times 50 = 3 \times 10 \times 50 = 3 \times 500 = 1500$</p> <p style="text-align: right;"><i>30 min</i></p>	<p style="text-align: center;">Notes</p> <p>Individual trial first, monitored, helped (or whole class activity)</p> <p>Diagram drawn on BB or use enlarged copy master or OHP</p> <p>Discussion, reasoning, agreement, self-correction, praising</p> <p>Ps make suggestions and class agrees/disagrees.</p> <p>T confirms on diagram</p> <p>Praising, encouragement only</p> <p>Whole class discussion</p> <p>Ps tell what they notice. T helps with wording if necessary.</p> <p>Reasoning, agreement</p> <p>Praising only (Do not expect too much!)</p>
<p>Extension</p>	<p>7</p> <p><i>PbY3b, page 131</i></p> <p>Q.2 Read: <i>Write additions and multiplications about the pictures.</i></p> <p>Deal with one part at a time. Review at BB with whole class. Deal with all cases. Mistakes discussed and corrected.</p> <p><i>Solution:</i> e.g.</p> <p>a) $\textcircled{1} \textcircled{1} \textcircled{1} \textcircled{1}$ b) $\textcircled{10} \textcircled{10} \textcircled{10} \textcircled{10}$ c) $\textcircled{100} \textcircled{100} \textcircled{100} \textcircled{100}$</p> <p>$\textcircled{1} \textcircled{1} \textcircled{1} \textcircled{1}$ $\textcircled{10} \textcircled{10} \textcircled{10} \textcircled{10}$ $\textcircled{100} \textcircled{100} \textcircled{100} \textcircled{100}$</p> <p>$\textcircled{1} \textcircled{1} \textcircled{1} \textcircled{1}$ $\textcircled{10} \textcircled{10} \textcircled{10} \textcircled{10}$ $\textcircled{100} \textcircled{100} \textcircled{100} \textcircled{100}$</p> <p>$4 + 4 + 4 = 12$ $40 + 40 + 40 = 120$ $400 + 400 + 400 = 1200$</p> <p>$3 + 3 + 3 + 3 = 12$ $30 + 30 + 30 + 30 = 120$ $300 + 300 + 300 + 300 = 1200$</p> <p>$3 \times 4 = 12$ $3 \times 40 = 120$ $3 \times 400 = 1200$</p> <p>$4 \times 3 = 12$ $4 \times 30 = 120$ $4 \times 300 = 1200$</p> <p>What do you notice about the amount in each part? (e.g. amount in b) is 10 times more than in a) and 1 tenth of the amount in c); amount in c) is 10 times more than in b) and 100 times more than in a))</p> <p style="text-align: right;"><i>35 min</i></p>	<p>Individual work, monitored, helped</p> <p>Diagram drawn on BB or use enlarged copy master or OHP</p> <p>Reasoning, agreement, self-correction, praising</p> <p>Accept other multiplications, e.g. $3 \times 4 \times 10 = 120$ $2 \times 60 = 120$ $12 \times 100 = 1200$</p> <p>BB: $1200 = 10 \times 120$ $= 100 \times 12$</p>

Y3

Lesson Plan 131

Activity

8

PbY3b, page 131

Q.3 Read: *Three brothers were each left 257 dollars in their American uncle's will.
How much did their uncle leave them in total?
Fill in the missing numbers.*

Who can explain what the diagram means? (A, B and C are the 3 brothers. Each brother has two 100 dollar notes, one 50 dollar note, a 5 dollar coin and a 2 dollar coin, i.e. 257 dollars)

Ps write the sub-totals in the blank boxes (horizontally and vertically, then write the total amount on the dotted line.

Review at BB with whole class. Ps come to BB or dictate to T, explaining reasoning. Class agrees/disagrees. Mistakes discussed and corrected. Let's say the answer in a sentence.

Answer: Their uncle left the brothers 771 dollars in total.

Solution:

$$\begin{array}{r}
 \text{A: } \boxed{100} \boxed{100} \quad \boxed{50} \quad \text{\textcircled{5}} \text{\textcircled{2}} \\
 \text{B: } \boxed{100} \boxed{100} \quad \boxed{50} \quad \text{\textcircled{5}} \text{\textcircled{2}} \\
 \text{C: } \boxed{100} \boxed{100} \quad \boxed{50} \quad \text{\textcircled{5}} \text{\textcircled{2}}
 \end{array}
 \left. \vphantom{\begin{array}{r} \text{A:} \\ \text{B:} \\ \text{C:} \end{array}} \right\} 3 \times (\boxed{200} + \boxed{50} + \boxed{7})$$

$$\begin{array}{r}
 \underbrace{3 \times \boxed{200}}_{\boxed{600}} + \underbrace{3 \times \boxed{50}}_{\boxed{150}} + \underbrace{3 \times \boxed{7}}_{\boxed{21}} = \dots\dots\dots 600 + 150 + 21 = \underline{\underline{771}}
 \end{array}$$

40 min

Notes

Individual work, monitored, helped

(Or done as a whole class activity, with Ps as the three brothers and model money stuck on BB.)

Diagram drawn on BB or use enlarged copy master or OHP

Initial discussion/explanation

Reasoning, agreement, self-correction, praising

In unison. Praising

If possible, T could have real American dollars to show to class and show how the unit of money is written: \$ (dollar)

[Preparation for vertical multiplication with place value columns]

9

PbY3b, page 131

Q.4 Read: *Write the results. Underline the operation which is impossible.*

Let's see how many of these can you can do in 4 minutes!
Start . . . now! . . . Stop! Ps change pencils and mark their own work.

Review orally round class. Mistakes discussed and corrected.

Agree that the impossible operation is $10 \div 0$, as you cannot divide a number into no equal parts!

Who had all correct (1, 2, 3, more than 3 mistakes)? What were your mistakes? Make a note of them and try to learn those tables by heart at home!

45 min

Individual work, monitored
Differentiation by time limit.

(Less able Ps may use their multiplication tables.)

Quick check

Agreement, self-correction, praising

Evaluation. T notes the most common mistakes for revision in *Lesson 135*.

<h1>Y3</h1>	<p>R: Multiplication and division tables. Other operations C: Multiplication: properties E: <i>Expressing properties of multiplication</i></p>	<h2>Lesson Plan 132</h2>
<p>Activity</p> <p>1</p>	<p>Jumps along the number line</p> <p><i>Kangaroo</i> is jumping 10 units at a time along the number line. <i>Squirrel</i> is jumping 5 units at a time along the number line.</p> <p>What numbers do they each land on if:</p> <p>a) they start at zero? K: 0, 10, 20, 30, 40, 50, ... (+ 10) S: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, ... (+ 5)</p> <p>b) they start at 150 and jump to the right? K: 150, 160, 170, 180, 190, 200, ... (+ 10) S: 150, 155, 160, 165, 170, 175, 180, ... (+ 5)</p> <p>c) they start at 500 and jump backwards to the left? K: 500, 490, 480, 470, 460, 450, 440, 430, ... (- 10) K: 500, 495, 490, 485, 480, 475, 470, 465, ... (- 5)</p> <p>Ps show each set of jumps on number line too.</p> <p style="text-align: right;">_____ 6 min _____</p>	<p>Notes</p> <p>Whole class activity</p> <p>Boys could be <i>Kangaroo</i> and girls could be <i>Squirrel</i>.</p> <p>At speed, in relay or in unison</p> <p>Girls (boys) point out each others' mistakes.</p> <p>Elicit the rule for each sequence.</p> <p>Use class number line or appropriate segments drawn on BB or OHP.</p>
<p>2</p>	<p>Sequences</p> <p>Write only the results in your <i>Ex. Bks.</i> Continue the sequence if you can!</p> <p>T dictates: $6 \times 6 - 2$, $7 \times 7 - 20$, $5 \times 8 - 21$, $6 \times 4 - 20$, ...</p> <p>What is the sequence? T writes what Ps dictate. What is the rule?</p> <p>BB: 34, 29, 19, 4, (-16, -41, ...) Rule: <u>difference</u> is increasing by 5. -5, -10, -15, -20, -25, ...</p> <p>What do you notice about the differences? (They make another sequence: -5, -10, -15, -20, -25 ... Rule: decreasing by 5)</p> <p style="text-align: right;">_____ 10 min _____</p>	<p>Whole class activity but individual writing in <i>Ex. Bks.</i></p> <p>Do not expect many Ps to continue the sequence but one or two might be able to do it.</p> <p>Discussion, agreement on the rule. T gives hint if necessary.</p> <p>Accept other wording, e.g. 'subtract 5 more each time'</p> <p>Agreement, praising</p>
<p>3</p> <p>Extension</p>	<p>Multiplication and division practice</p> <p>T says a multiplication or division, Ps say result. Listen carefully and put your hand on your head if anyone makes a mistake!</p> <p>e.g. 5×1 $50 \div 5$ 4×3 $21 \div 3$ $25 \div 5$ 10×2 $40 \div 4$ 2×6 $42 \div 6$ 10×10 7×5 $6 \div 2$ 9×2 $63 \div 9$ $27 \div 3$ 5×9 $80 \div 8$ 7×3 $18 \div 6$ 4×8 5×2 $35 \div 5$ 6×7 $18 \div 9$ $56 \div 8$ 2×3 $8 \div 2$ 7×9 $18 \div 3$ 10×0</p> <p style="text-align: center;">etc.</p> <p>Here are some of the operations. Can you find a relationship between any of them? (e.g. $21 \div 3 = 42 \div 6 = 63 \div 9 = 7$: if dividend and divisor are increased by the same number of times, the quotient stays the same; or $18 \div 6$ is half of $18 \div 3$: if dividend is the same but the divisor is doubled, then the quotient will be halved)</p> <p style="text-align: right;">_____ 15 min _____</p>	<p>Whole class activity</p> <p>In relay round class at speed</p> <p>If a P makes a mistake, class puts hands on heads and next P has to correct it.</p> <p>In good humour!</p> <p>Praising, encouragement only</p> <p>Ps can give extra facts too.</p> <p>Written on BB or OHT</p> <p>Agreement, praising</p> <p>T encourages (or helps) Ps to explain using correct mathematical terms.</p>

<h1>Y3</h1>		<p>Lesson Plan 132</p>
<p>Activity</p> <p>4</p>	<p>PbY3b, page 132</p> <p>Q.1 Read: <i>Fill in the missing numbers.</i></p> <p>Elicit that there are 5 rows of 4 (= 20) calculations. Let's see how many you can do in 3 minutes! Start . . . now! Stop!</p> <p>Review orally with whole class. Ps change pencils and mark own work, correcting mistakes, then write how many correct out of 20 at the side of <i>Pbs</i>.</p> <p>Who had all 20 correct? Who made a mistake in row a), etc.? What was your mistake? Who did the same? etc.</p> <p>Stand up if you you did not finish them all. Sit down if you finished row d), c), etc.</p> <p>Note your mistakes and try to learn those facts by heart.</p> <p style="text-align: right;">20 min</p>	<p>Notes</p> <p>Individual work, monitored</p> <p>Less able Ps may use their multiplication tables.</p> <p>Differentiation by time limit</p> <p>Ps give results. T asks some Ps to explain their reasoning (e.g. in first 3 columns, use reverse operation; in last column, divide by quotient to find missing divisor)</p> <p>Praising, encouragement only</p>
<p>5</p>	<p>Multiplication and addition</p> <p>Let's write multiplications and additions about the diagrams.</p> <p>Ps come to BB to write an operation, explaining reasoning. Class agrees/disagrees . (T helps with wording and mathematical terms.)</p> <p>BB:</p> <p>a) $\textcircled{2} \textcircled{2} \textcircled{2}$ $\textcircled{20} \textcircled{20} \textcircled{20}$ $\textcircled{200} \textcircled{200} \textcircled{200}$</p> <p>$3 \times 2 = 6$ $3 \times 20 = 60$ $3 \times 200 = 600$</p> <p>$2 + 2 + 2 = 6$ $20 + 20 + 20 = 60$ $200 + 200 + 200 = 600$</p> <p>b) $\textcircled{2} \textcircled{2} \textcircled{2}$ $\textcircled{20} \textcircled{20} \textcircled{20}$ $\textcircled{200} \textcircled{200} \textcircled{200}$</p> <p>$\textcircled{2} \textcircled{2} \textcircled{2}$ $\textcircled{20} \textcircled{20} \textcircled{20}$ $\textcircled{200} \textcircled{200} \textcircled{200}$</p> <p>$\underbrace{2 \times 3 \times 2 = 12}$ $\underbrace{2 \times 3 \times 20 = 120}$ $\underbrace{2 \times 3 \times 200 = 1200}$</p> <p>$6 \times 2 = 12$ $6 \times 20 = 120$ $6 \times 200 = 1200$</p> <p>$2+2+2+2+2+2$ $20+20+20+20+20+20$ $200+200+200+200+200+200$</p> <p>$4 + 4 + 4 = 3 \times 4$ $40 + 40 + 40 = 3 \times 40$ $400 + 400 + 400 = 3 \times 400$</p> <p>$6 + 6 = 2 \times 6$ $60 + 60 = 2 \times 60$ $600 + 600 = 2 \times 600$</p> <p>What do you notice about how the factors and products change? Ask several Ps what they think. Encourage Ps to use mathematical terms.</p> <p>Elicit that, e.g., if one of the factors is 10 (100) times more but the other factor is the same, then the product is also 10 (100) times more.</p> <p style="text-align: right;">25 min</p>	<p>Whole class activity (or individual work in <i>Ex. Bks</i> first, monitored)</p> <p>Coins drawn or stuck on BB or use enlarged copy master or OHP</p> <p>At a good pace</p> <p>T helps where necessary</p> <p>Reasoning, agreement, praising</p> <p>Possible equations are shown</p> <p>Discussion, comparison, agreement, praising</p> <p>T repeats unclear statements correctly.</p>
<p>6</p>	<p>PbY3b, page 132</p> <p>Q. 2 Read: <i>Write additions and multiplications about the pictures.</i></p> <p>Elicit similarity to previous activity. There is space for only 3 operations in your <i>Pbs</i>, but you can write more in your <i>Ex. Bks</i> if you have time.</p> <p>Review at BB with whole class. Ps dictate to T or come out to write on BB. Class agrees/disagrees. Deal with all cases.</p> <p>Solution: e.g.</p> <p>a) $\textcircled{2} \textcircled{2} \textcircled{2}$ b) $\textcircled{20} \textcircled{20} \textcircled{20}$ c) $\textcircled{200} \textcircled{200} \textcircled{200}$</p> <p>$\textcircled{2} \textcircled{2} \textcircled{2}$ $\textcircled{20} \textcircled{20} \textcircled{20}$ $\textcircled{200} \textcircled{200} \textcircled{200}$</p> <p>$\textcircled{2} \textcircled{2} \textcircled{2}$ $\textcircled{20} \textcircled{20} \textcircled{20}$ $\textcircled{200} \textcircled{200} \textcircled{200}$</p> <p>$\underline{3 \times 3 \times 2 = 18}$ $\underline{3 \times 3 \times 20 = 180}$ $\underline{3 \times 3 \times 200 = 1800}$</p> <p>$\underline{6 + 6 + 6 = 18}$ $\underline{60 + 60 + 60 = 180}$ $\underline{600 + 600 + 600 = 1800}$</p> <p>$\underline{3 \times 6 = 18}$ $\underline{3 \times 60 = 180}$ $\underline{3 \times 600 = 1800}$</p> <p style="text-align: right;">30 min</p>	<p>Individual work monitored, helped</p> <p>Coins drawn or stuck on BB or use enlarged copy master or OHP</p> <p>Reasoning, agreement, self-correction, praising</p> <p>What do you notice?</p> <p>Elicit again that if one of the factors is 10 (100) times more but the other stays the same, the result will also be 10 (100) times more.</p>

Y3

Lesson Plan 132

Activity

7

PbY3b, page 132

Q.3 Read: *Fill in the missing products. Note how they change.*
Deal with one row at a time. Review at BB with whole class.
Ps dictate missing products. Mistakes discussed and corrected
Compare the columns. What do you notice about them?
Ps point out how the factors and products change. T helps with wording and mathematical terms. (e.g. there is no change in result between columns 2 and 3, as in both cases one factor is 10 times more than in 1st column. It does not matter which factor it is.)

Solution:

a) $5 \times 3 = \boxed{15}$ $50 \times 3 = \boxed{150}$ $5 \times 30 = \boxed{150}$ $5 \times 300 = \boxed{1500}$ $50 \times 30 = \boxed{1500}$
 b) $8 \times 2 = \boxed{16}$ $80 \times 2 = \boxed{160}$ $8 \times 20 = \boxed{160}$ $8 \times 200 = \boxed{1600}$ $80 \times 20 = \boxed{1600}$
 c) $3 \times 3 = \boxed{9}$ $30 \times 3 = \boxed{90}$ $3 \times 30 = \boxed{90}$ $3 \times 300 = \boxed{900}$ $30 \times 30 = \boxed{900}$
 d) $4 \times 5 = \boxed{20}$ $40 \times 5 = \boxed{200}$ $4 \times 50 = \boxed{200}$ $4 \times 500 = \boxed{2000}$ $40 \times 50 = \boxed{2000}$

$\begin{matrix} < & = & < & = \\ \times 10 & & \times 10 & \end{matrix}$

35 min

Notes

Individual work, monitored, helped
T could have solution already prepared on BB or SB (or use enlarged copy master or OHP) and uncovers each row as it is dealt with.
Agreement, self-correction, praising
Discussion on what Ps notice about relationship between columns.
e.g. $4 \times 500 = 2000$
 $40 \times 50 = 2000$
If one factor is 10 times more but the other factor is 10 times less, the result is the same.

8

PbY3b, page 132

Q.4 Read: *How many pennies does each person have?*
Calculate in different ways.
Deal with one person at a time. Ps write 2 or 3 different operations, separating each operation with a semi-colon (;).
Review at BB with whole class. Ps come out to BB to write operations, explaining reasoning on the diagrams. Class points out errors. Mistakes corrected. Deal with all cases.

Solution: e.g.

John	Katy	Lorna	Michael
$40 + 8 = 48$;	$4 \times (10 + 2) = 48$;	$4 \times 10 + 4 \times 2 = 48$;	
$120 + 120 + 120 + 120 = 480$;	$4 \times 100 + 4 \times 20 = 480$;	$10 \times 48 = 480$;	
$3 \times 50 + 3 \times 2 + 3 \times 1 = 159$;	$3 \times (50 + 2 + 1) = 159$;		
$530 + 530 + 530 = 1590$;	$3 \times 53 \times 10 = 1590$;	$3 \times (500 + 30) = 1590$;	

40 min

Individual work, monitored, helped
Drawn on BB or use enlarged copy master or OHP
Reasoning, agreement, self-correction, praising
At a good pace
Extra praise for 'clever' operations.
Compare the amounts.
Elicit that:
K has 10 times more than J
M has 10 times more than L

Extension
How many £s would they each have?
(J: £0.48; K: £4.80; L: £1.59; M: £15.90)

9

Multiplying 2-digit numbers

Study this diagram. BB:
What can you tell me about it?
What has the diagram to do with the operations?
What do you think the missing numbers should be?

$57 \times 6 =$
 $50 \times 6 + 7 \times 6$
 $= 300 + 42$
 $= 342$
 $57 \times 6 = 342$

45 min

Whole class activity
Drawn on BB or use enlarged copy master or OHP
Ps come to BB to reason and explain. Class agrees/disagrees.
Ps decide on operation and calculation. Check result by estimation or vertical addition.
Praising

<h1>Y3</h1>	R: Multiplication and division tables C: Estimation of products E: Preparation for vertical multiplication	<h2>Lesson Plan</h2> <h1>133</h1>										
Activity 1	Oral work What are the missing products? What do you notice about how the factors and products change? BB: a) $40 \times 3 = \boxed{120}$ $40 \times 6 = \boxed{240}$ $40 \times 12 = \boxed{480}$ $\times 2$ $\times 4$ b) $30 \times 4 = \boxed{120}$ $30 \times 8 = \boxed{240}$ $30 \times 12 = \boxed{360}$ $\times 2$ $\times 3$ c) $50 \times 2 = \boxed{100}$ $50 \times 6 = \boxed{300}$ $50 \times 20 = \boxed{1000}$ $\times 3$ $\times 10$ <p style="text-align: right;">5 min</p>	Notes Whole class activity Operations written on BB or use enlarged copy master or OHP Ps dictate the products to T or come out to write on BB, explaining reasoning (with T's help if necessary). Class points out missed relationships. Agreement, praising Feedback for T										
2	PbY3b, page 133 Q.1 Read: <i>Fill in the missing products.</i> Deal with one part at a time. Review with whole class. What did you notice? (The product of the multiplication in the bottom row is the sum of the products in the first 2 rows.) Mistakes discussed and corrected. Solution: a) $6 \times 10 = \underline{60}$ b) $5 \times 10 = \underline{50}$ c) $30 \times 3 = \underline{90}$ $6 \times 4 = \underline{24}$ $5 \times 7 = \underline{35}$ $5 \times 3 = \underline{15}$ $6 \times 14 = \underline{84}$ $5 \times 17 = \underline{85}$ $35 \times 3 = \underline{105}$ Let's do these multiplications in the same way. BB: <table style="margin-left: 40px;"> <tr> <td>130×7</td> <td>5×175</td> </tr> <tr> <td>$100 \times 7 = 700$</td> <td>$5 \times 100 = 500$</td> </tr> <tr> <td>$30 \times 7 = + 210$</td> <td>$5 \times 70 = 350$</td> </tr> <tr> <td>$130 \times 7 = 910$</td> <td>$5 \times 5 = + 25$</td> </tr> <tr> <td></td> <td>$5 \times 175 = 875$</td> </tr> </table> <p style="text-align: right;">10 min</p>	130×7	5×175	$100 \times 7 = 700$	$5 \times 100 = 500$	$30 \times 7 = + 210$	$5 \times 70 = 350$	$130 \times 7 = 910$	$5 \times 5 = + 25$		$5 \times 175 = 875$	Individual work, monitored, helped Written on BB or SB or OHT Discussion, reasoning, agreement, self correction, praising Whole class activity Ps dictate to T what to write or come to BB, explaining reasoning. Class agrees/disagrees. T adds + sign and horizontal lines to emphasise the addition.
130×7	5×175											
$100 \times 7 = 700$	$5 \times 100 = 500$											
$30 \times 7 = + 210$	$5 \times 70 = 350$											
$130 \times 7 = 910$	$5 \times 5 = + 25$											
	$5 \times 175 = 875$											
3	Estimation Listen to this problem and think how we could estimate the answer. <i>There are 283 nails in each box. How many nails are in 3 boxes?</i> (Ps might suggest rounding to nearest 100 and nearest 10.) We could estimate in 3 ways. T starts each method of solution, then asks Ps for help with the details. Let B = number of nails in 1 box, T = total number of nails in 3 boxes a) Let's estimate by rounding to the nearest 100: BB: $B = 283$ $T = 3 \times 283$ $B \approx 300$ $T \approx 3 \times 300 = 900$ As $B < 300$, then $T < 3 \times 300 = 900$	Whole class activity Give Ps the chance to suggest methods first. Then T leads Ps through the 3 estimations, allowing Ps to help where they can. Encourage Ps to say if they do not understand the reasoning. Ps copy the 3 methods into Ex. Bks as T works on BB. a) $T < 900$										

Y3

Lesson Plan 133

Activity

Notes

3
(continued)

b) Let's estimate by rounding to the nearest 10:
 BB: $B = 283$ so $T = 3 \times 283$
 $B \approx 280$ so $T \approx 3 \times 280 = 840$
 $B > 280$ so $T > 3 \times 280 = 840$

c) Let's estimate using an inequality:
 i) using nearest 100s:
 $200 < B < 300$, so $3 \times 200 < T < 3 \times 300$
 $600 < T < 900$

ii) using nearest 10s:
 $280 < B < 290$, so $3 \times 280 < T < 3 \times 290$
 $840 < T < 870$

What is the exact value? ($3 \times 283 = 3 \times 280 + 3 \times 3 = 840 + 9 = 849$)
 Which method of estimation do you think is best? Why?

BB: $3 \times 200 = 600$
 $3 \times 80 = 240$
 $3 \times 280 = 840$

b) $T > 840$

c) i) $600 < T < 900$
 ii) $840 < T < 870$

BB: $3 \times 200 = 600$
 $3 \times 90 = 270$
 $3 \times 290 = 870$

Agreement, praising
 Discussion. Ask several Ps what they think.

18 min

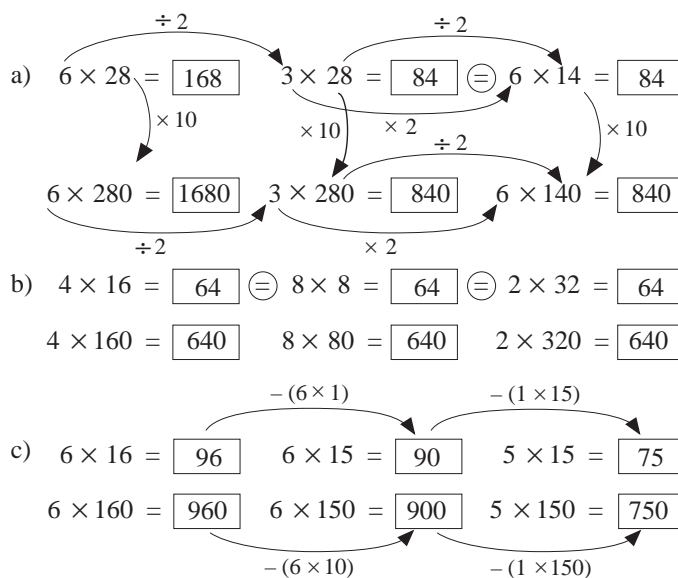
4

Multiplication

Let's fill in the missing products. Try to think of easy ways to do the calculations! Ps come out to fill in missing numbers and explain reasoning. Class agrees/disagrees or suggests easier methods.

Elicit relationships between factors and products (some are given in the solution below.)

BB:



d) **PbY3b, page 133**

Q.2 Read: *Fill in the missing products.*

Let's see if you can do these calculations on your own!

Review at BB with whole class. Relationships discussed. Mistakes corrected.

Solution:

a) $3 \times 24 = 72$ b) $6 \times 12 = 72$ c) $3 \times 12 = 36$
 $3 \times 240 = 720$ $6 \times 120 = 720$ $3 \times 120 = 360$

26 min

Whole class activity

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

Ps try to do calculations in steps mentally. Write details on BB if necessary, e.g.

$$6 \times 28 = 6 \times 20 + 6 \times 8 = 120 + 48 = 168$$

Discuss how the factors and products change.

Ps point out what they notice.

Praising, encouragement only!

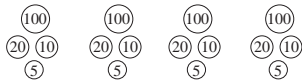
Individual work, monitored

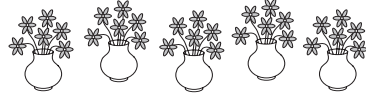

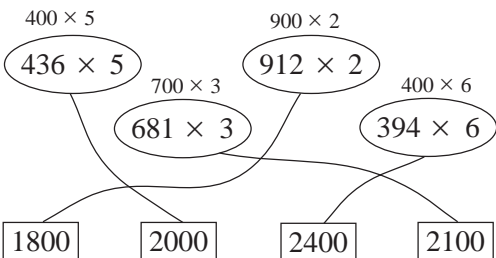
Written on BB or SB or OHT

Discussion, reasoning, agreement, self-correction, praising

Feedback for T

Y3		<i>Lesson Plan 133</i>
<p>Activity</p> <p>5</p>	<p>PbY3b, page 32</p> <p>Q.3 Read: <i>Estimate the product (P). Is the estimate more or less than the exact product?</i></p> <p>Do part a) with the whole class first. We don't need to work out the product exactly but just compare it with our estimates.</p> <p>Ps come out to BB to fill in the missing numbers and signs, explaining reasoning. T and /or other Ps help if necessary.</p> <p>a) 227×4</p> <p>i) <i>Rounding 227 to the nearest hundred:</i> BB: $P \approx 200 \times 4 = 800$ $P > 800$</p> <p>ii) <i>Rounding 227 to the nearest ten:</i> BB: $P \approx 230 \times 4 = 920$ $P < 920$</p> <p>Now let's see if you can do part b) on your own. You may do the calculations at the side of your <i>Pbs</i>, or in your <i>Ex. Bks</i>.</p> <p>Review at BB with whole class. (Inequalities could be shown on 'slates' on command.) Ps dictate results to T. Mistakes corrected.</p> <p>b) 468×6</p> <p>i) <i>Rounding 468 to the nearest hundred:</i> BB: $P \approx 500 \times 6 = 3000$ $P < 3000$</p> <p>ii) <i>Rounding 468 to the nearest ten:</i> BB: $P \approx 470 \times 6 = 2820$ $P < 2820$</p> <p>What are the <u>exact</u> products? Ps do calculations in <i>Ex. Bks</i>.</p> <p>a) $227 \times 4 = 200 \times 4 + 20 \times 4 + 7 \times 4 = 800 + 80 + 28 = 908$</p> <p>b) $468 \times 6 = 400 \times 6 + 60 \times 6 + 8 \times 6 = 2400 + 360 + 48 = 2808$</p> <p style="text-align: right;"><i>34 min</i></p>	<p>Notes</p> <p>Whole class activity to start</p> <p>Written on BB or SB or OHT or use enlarged copy master or OHP</p> <p>BB: $P =$ product</p> <p>Reasoning, agreement, praising</p> <p>Details of calculations written at side of BB, e.g</p> $230 \times 4 = 200 \times 4 + 30 \times 4$ $= 800 + 120 = 920$ <p>Individual work, monitored, helped</p> <p>(or continue as whole class activity if Ps are still unsure)</p> <p>Reasoning, agreement, self-correction, praising</p> <p>BB:</p> $470 \times 6 = 400 \times 6 + 70 \times 6$ $= 2400 + 420$ $= 2820$ <p>Individual work, monitored, reviewed, corrected</p> <p>Or done vertically as at beginning of lesson.</p> <p>Praising</p>
<p>Extension</p>	<p>6</p> <p>Estimation practice</p> <p>Let's estimate these products by rounding to the nearest 100. Will the exact product be more or less than the estimate?</p> <p>Ps come to BB or dictate to T. Class points out errors.</p> <p>BB:</p> <p>a) $162 \times 5 \approx (200 \times 5 = 1000)$ $162 \times 5 < 1000$</p> <p>b) $177 \times 4 \approx (200 \times 4 = 800)$ $177 \times 4 < 800$</p> <p>c) $315 \times 3 \approx (300 \times 3 = 900)$ $315 \times 3 > 900$</p> <p>d) $231 \times 4 \approx (200 \times 4 = 800)$ $231 \times 4 > 800$</p> <p style="text-align: right;"><i>38 min</i></p>	<p>Whole class activity</p> <p>(or individual work in <i>Ex. Bks</i>)</p> <p>Written on BB or SB or OHT or use enlarged copy master from <i>Activity 7</i>.</p> <p>Reasoning, agreement, praising</p> <p>At a good pace</p> <p>Feedback for T</p>

Y3		<i>Lesson Plan 133</i>
Activity 7	<p>PbY3b, page 133</p> <p>Q.4 Read: <i>Estimate the product by rounding to the nearest ten.</i></p> <p>Compare your estimate with the exact product too. You can write any necessary calculations in your <i>Ex. Bks.</i> or at the side of your <i>Pbs</i> (or on your 'slates').</p> <p>Deal with one part a time. Review at BB with the whole class. Ps dictate results to T or come to BB to write in missing numbers and signs, explaining reasoning. Mistakes discussed/corrected.</p> <p><i>Solution:</i></p> <p>a) $162 \times 5 \approx \underline{160} \times 5 = \underline{800}$ $162 \times 5 > 800$</p> <p>b) $177 \times 4 \approx \underline{180} \times 4 = \underline{720}$ $177 \times 4 < 720$</p> <p>c) $315 \times 3 \approx \underline{320} \times 3 = \underline{960}$ $315 \times 3 < 960$</p> <p>d) $231 \times 4 \approx \underline{230} \times 4 = \underline{920}$ $231 \times 4 > 920$</p> <p style="text-align: right;">42 min</p>	<p style="text-align: center;">Notes</p> <p>Individual work, monitored, helped (Or whole class activity if time is short)</p> <p>Written on BB or use enlarged copy master or OHP</p> <p>Reasoning, agreement, self-correction, praising</p> <p>Details of calculations written on BB: e.g.</p> $160 \times 5 = 100 \times 5 + 60 \times 5$ $= 500 + 300 = \underline{800}$ <p>(or vertically if Ps suggest it)</p>
8	<p>PbY3b, page 133</p> <p>Q.5 Read: <i>In your exercise book, estimate, calculate and check the answer. Write it below.</i></p> <p>Ps read the problem themselves, write the operation required, then estimate the product to the nearest 10. Then Ps calculate exact product and compare with their estimation as a check. Then they write the answer as a sentence in their <i>Pbs</i>.</p> <p>Either keep Ps together for each step, then review, or if Ps are able and wish it, let them do the whole exercise before review.</p> <p>In both cases, Ps dictate solution to T and correct their mistakes. Class says answer as a sentence in unison.</p> <p><i>Grandpa gave £1.35 to each of his 4 grandchildren. How much did he give them altogether?</i></p> <p><i>Solution:</i> (Could be already prepared and each part uncovered as it is dealt with)</p> <p><i>Plan:</i> Each grandchild: $\pounds 1.35 = 135 \text{ p}$ 4 grandchildren: $4 \times 135 \text{ p}$</p> <p><i>E:</i> $4 \times 135 \approx 4 \times 140 = 4 \times 100 + 4 \times 40 = 560 \text{ (p)}$</p> <p><i>C:</i> $4 \times 135 = 4 \times 100 + 4 \times 30 + 4 \times 5$ $= 400 + 120 + 20 = \underline{540} \text{ (p)}$ $= \underline{\pounds 5.40}$</p> <p><i>Answer:</i> He gave them $\pounds 5.40$ altogether.</p> <p style="text-align: right;">45 min</p>	<p>Individual work, monitored, helped (Or whole class activity if time is short)</p> <p>T could have diagram drawn (or coins stuck) on BB to help Ps: e.g.</p>  <p>Reasoning, agreement, self-correction, praising</p> <p>Agree that $4 \times 135 < E$ (or vertically if Ps suggest it)</p> $4 \times 100 = 400$ $4 \times 30 = 120$ $4 \times 5 = + 20$ $4 \times 135 = \underline{540}$ <p><i>Check:</i> $540 < 560 \checkmark$</p>

<h1>Y3</h1>	<p>R: Mental calculation C: Multiplication. Estimation E: Preparation for vertical multiplication (without crossing tens)</p>	<h2>Lesson Plan 134</h2>
<p>Activity</p> <p>1</p>	<p>Addition and multiplication</p> <p>How many flowers are in the vases? Who can write an addition and multiplication for each part?</p> <p>BB:</p> <p>a)  $6 + 6 + 6 + 6 + 6 = 30$ $5 \times 6 = 30$</p> <p>b)  $5 + 5 + 5 + 5 + 5 + 5 = 30$ $6 \times 5 = 30$</p> <p>Ps come to BB to write operations, explaining reasoning. Class points out errors and makes sure that operations match the pictures.</p> <p style="text-align: right;">3 min</p>	<p>Notes</p> <p>Whole class activity</p> <p>Drawn on BB or use enlarged copy master or OHP, or plastic flowers in real vases, or Ps at front of class holding flowers, windmills, etc.)</p> <p>Reasoning, agreement, praising</p> <p>Agree that:</p> $5 \times 6 = 6 \times 5 = 30$ <p>Feedback for T</p>
<p>2</p>	<p>Find the mistakes</p> <p>This is <i>Barry Bear's</i> homework but he did it in a hurry. Let's correct it for him.</p> <p>BB:</p> <p>a) $25 \times 2 = \overset{50}{\cancel{58}} \times$ b) $12 \times 3 = 36 \checkmark$ c) $18 \times 5 = \overset{90}{\cancel{105}} \times$</p> <p>d) $4 \times 21 = 84 \checkmark$ e) $6 \times 19 = \overset{114}{\cancel{138}} \times$ f) $2 \times 54 = \overset{108}{\cancel{134}} \times$</p> <p>Ps come to BB to tick correct answers or cross out mistakes and correct them, explaining reasoning. Class agrees/disagrees.</p> <p style="text-align: right;">8 min</p>	<p>Whole class activity</p> <p>T has BB or SB or OHT already prepared</p> <p>At a good pace</p> <p>Reasoning, agreement, praising</p> <p>Ps write details of calculations at side of BB where necessary.</p>
<p>3</p>	<p>Missing signs</p> <p>Which operation signs could be written in the circles to make the inequalities correct? Try it in your <i>Ex. Bks</i> first.</p> <p>Ps dictate their results to T who writes in the signs. Who agrees? Who thinks something else? etc. Let's check the calculation.</p> <p>BB: e.g.</p> <p>a) $6 \text{ (}\times\text{)} 7 \text{ (}\oplus\text{)} 8 \leq 51$ b) $(3 \text{ (}\oplus\text{)} 3) \text{ (}\times\text{)} 8 > 33$</p> <p>c) $(9 \text{ (}\ominus\text{)} 4) \text{ (}\times\text{)} 9 < 67$ d) $3 \text{ (}\times\text{)} 7 \text{ (}\ominus\text{)} 5 > 12$</p> <p style="text-align: right;">13 min</p>	<p>Whole class activity</p> <p>Written on BB or SB or OHT</p> <p>Or Ps try out possible signs on 'slates' or on scrap paper</p> <p>Reasoning, agreement, checking, praising</p> <p>One solution given but others are possible.</p>
<p>4</p>	<p>Estimation</p> <p>Let's join up each operation to its estimated value. How have the estimates been calculated? (by rounding the number to the nearest 100)</p> <p>BB:</p>  <p>Ps come to BB to draw joining lines (or rearrange cards), explaining reasoning. Class agrees/disagrees.</p> <p style="text-align: right;">18 min</p>	<p>Whole class activity</p> <p>Written on BB or on cards stuck to BB, or use enlarged copy master or OHP</p> <p>Ps can try it out in <i>Ex. Bks</i> first before coming to BB.</p> <p>Reasoning, agreement, checking, praising</p> <p>What would the <u>numbers</u> be rounded to the nearest 10?</p> <p>T points to each and class shouts out : e.g. $436 \approx 440$</p>

Y3		<i>Lesson Plan 134</i>
Activity 5	<p>PbY3b, page 134</p> <p>Q.1 Read: <i>Write a plan, estimate the answer to the nearest 10 p, then do the calculation.</i></p> <p><i>Ribbon costs £2.54 per metre.</i></p> <p><i>How much do 3 metres cost?</i></p> <p>Use the diagram to help you understand the problem.</p> <p>Review at BB with whole class (or after each step if necessary).</p> <p>Ps come to BB to explain their solutions. Class agrees/disagrees. Check solution against estimate and confirm by rearranging coins.</p> <p><i>Solution:</i> .</p> <p><i>Plan:</i> Cost of: 1 metre: £2.54 = 254 p; 3 metres: 3×254 p</p> <p><i>Estimate:</i> $3 \times 254 \approx 3 \times 250 = 3 \times 200 + 3 \times 50 = 750$ (p)</p> <p><i>Calculation:</i> $3 \times 254 = 3 \times 200 + 3 \times 50 + 3 \times 4 = 762$ (p)</p> <p><i>Answer:</i> 3 metres of ribbon cost 762 p (= £7.62).</p> <p style="text-align: right;"><i>23 min</i></p>	<p style="text-align: center;">Notes</p> <p>Individual work, monitored helped</p> <p>Coins stuck on BB:</p> <p style="text-align: center;"> </p> <p>Ps could show final answer on scrap paper or on 'slates' in unison on command.</p> <p>Reasoning, agreement, self-correction, praising</p> <p>Agree that $E < C$</p> <p><i>Check:</i> $750 \text{ p} < 762 \text{ p}$ ✓</p> <p style="text-align: center;"> </p>
6	<p>PbY3b, page 134</p> <p>Q.2 Read: <i>Estimate the result in your head first, then do the calculation.</i></p> <p>Ps estimate by rounding number to nearest 10 and calculating mentally (or at side of <i>Pbs</i> or in <i>Ex. Bks</i> or on 'slates').</p> <p>Ps could write estimate lightly above each operation.</p> <p>Ps write details of calculations in <i>Ex. Bks</i> if necessary before writing the products in <i>Pbs</i>.</p> <p>Review after each row. Ps explain reasoning and compare calculated product with estimate. Class agrees/disagrees. Mistakes discussed and corrected.</p> <p><i>Solution:</i></p> <p>a) $32 \times 30 = 960$ $24 \times 20 = 480$ $16 \times 50 = 800$ $38 \times 20 = 760$</p> <p>b) $14 \times 60 = 840$ $17 \times 50 = 850$ $13 \times 70 = 910$ $21 \times 40 = 840$</p> <p>c) $56 \times 30 = 1680$ $40 \times 37 = 1480$ $89 \times 20 = 1780$ $50 \times 34 = 1700$</p> <p style="text-align: right;"><i>30 min</i></p>	<p>Individual work, monitored helped</p> <p>Written on BB or SB or OHT (or estimates can be done orally as whole class activity first)</p> <p>T may differentiate, as part c) is more difficult.</p> <p>Reasoning, agreement, checking against estimate, self-correction, praising</p> <p>Ps explain calculations in detail, e.g.</p> <p><i>E:</i> $32 \times 30 \approx 30 \times 30 = 900$ (so exact product is > 900)</p> <p><i>C:</i> $32 \times 30 = 32 \times 3 \times 10$ $= 96 \times 10 = 960$</p> <p>Praise 'clever' methods, e.g.</p> <p>$16 \times 50 = 8 \times 100 = 800$</p>
7	<p>Problem</p> <p>Listen carefully and think about how you would solve this problem.</p> <p><i>An air ticket costs £213. How much will 4 air tickets cost?</i></p> <p>What should we do first? (Write a plan.) What should I write? What should we do next? etc. Ps dictate what to do next and what T should write on BB. T directs Ps' thinking by asking appropriate questions.</p> <p>BB:</p> <p><i>Plan:</i> Cost of 1 ticket: £213 Cost of 4 tickets: $4 \times £213$</p> <p><i>Estimate:</i> $4 \times £213 \approx 4 \times £200 = £800$, so $C > £800$</p> <p>Let's show the calculation in a place value table.</p>	<p>Whole class activity</p> <p>T repeats slowly and Ps repeat in own words.</p> <p>Give Ps time to think about it.</p> <p>Discussion, reasoning, agreement, praising</p> <p>Drawn on BB or SB or only table drawn and coins stuck on, or use enlarged copy master or OHP.</p>

Y3

Lesson Plan 134

Activity

7

(Continued)

Let's do an addition first. Who can explain these place value tables?
Ps give reasoning. Class agrees/disagrees.

BB: Calculation:

Hundreds	Tens	Units
100 100	10	1 1 1
100 100	10	1 1 1
100 100	10	1 1 1
100 100	10	1 1 1

H	T	U
2	1	3
2	1	3
2	1	3
2	1	3

$3U + 3U + 3U + 3U$
 $= 12U = 1T + 2U$
 $1T + 1T + 1T + 1T + (1T)$
 $= 4T + 1T = 5T$
 $2H + 2H + 2H + 2H$
 $= 8H$

Let's write the addition in a shorter way, then write it as a multiplication.
T writes (with Ps' help) or explains pointing to copy master.

BB:

H	T	U
2	1	3
2	1	3
2	1	3
2	1	3

H	T	U
2	1	3
8	5	2

$\times 4$ $\begin{array}{|c|c|c|} \hline 2 & 1 & 3 \\ \hline 8 & 5 & 2 \\ \hline \end{array} \times 4$

Check: £852 > £800
Answer: 4 air tickets cost £852.

36 min

Notes

Ps come to BB to explain with T's or other Ps' help.

Drawn on BB or use enlarged copy master or OHP (or build up the tables gradually with Ps sticking model money on table drawn on BB, then filling in the numbers and explaining the total.)

Ps dictate additions using place values.

Either fill in blank grids or T explains using completed copy master.

Ps copy in *Ex. Bks.*

Ps suggest how to check result.

Ps say answer as a sentence
Praising only!

8

PbY3b, page 134

Q.3 Read: *Three classes have each raised £321 for charity.*

How much have they raised altogether?

Estimate in your head, then complete the drawing and calculations.

Deal with one step at a time. Review at BB with whole class.
Ps come to BB to explain their solution. Class agrees/disagrees.

Solution:

Hundreds	Tens	Units
100 100 100	10 10	1
100 100 100	10 10	1
100 100 100	10 10	1

H	T	U
3	2	1
3	2	1
3	2	1
9	6	3

$\times 3$ $\begin{array}{|c|c|c|} \hline 3 & 2 & 1 \\ \hline 9 & 6 & 3 \\ \hline \end{array} \times 3$

Answer: They have raised ££963 altogether.

41 min

Individual work, monitored, helped

Drawn on BB or use enlarged copy master or OHP (or model money stuck on BB)

Discussion, reasoning, agreement, self-correction, praising

Details of calculations written on BB with place values:

$3 \times 1U = 3U$

$2 \times 2T = 6T$

$3 \times 3H = 9H$

[Without crossing tens]

Y3

Lesson Plan 134

Activity

9

PbY3b, page 134

Q.4 Read: *Think about what the diagram means.*
Fill in the missing numbers.

Review at BB with whole class. Ps explain reasoning. Class agrees/disagrees. Mistakes discussed and corrected.

Let's write it vertically as we did before. Ps come to BB to try, with help of class. Ps write it this way at bottom of page in *Pbs* or in *Ex. Bks.*

Solution:

45 min

Notes

Individual work, monitored, helped

Drawn on BB or use enlarged copy master or OHP (or strips of card stuck on BB)

Discussion, reasoning, agreement, self-correction, praising

BB:

	7	3	×	3
2	1	9		

Y3		<i>Lesson Plan</i> 135
<i>Activity</i>	Tables practice, revision, activities, consolidation <i>PbY3b, page 135</i>	<i>Notes</i>

Y3		<i>Lesson Plan 136</i>
Activity 3	<p>(Continued)</p> <p>b) <i>Paul has 27 50 p coins. About how much money does Paul have?</i> BB: $27 \times 50 \text{ p} \approx$ ($30 \times 50 \text{ p} = 1500 \text{ p}$) or ($= 15 \times \text{£}1 = \text{£}15$) <i>Answer:</i> Paul has about £15. Agreement that exact amount would be less than £15. (£13.50)</p> <p>c) <i>1 box of apples weighs 28 kg. Approximately how much do 60 boxes of apples weigh?</i> BB: $60 \times 28 \text{ kg} \approx$ ($60 \times 30 \text{ kg} = 6 \times 300 \text{ kg} = 1800 \text{ kg}$) <i>Answer:</i> 60 boxes of apples weigh approximately 1800 kg Agreement that exact amount would be less than 1800 kg. (1680 kg)</p> <p>d) <i>How much will 8 kg of plums cost if 1 kg costs £1.92?</i> Elicit first that $\text{£}1.92 = 192 \text{ p}$ (BB) e.g. BB: $8 \times 192 \text{ p} =$ ($8 \times 100 \text{ p} + 8 \times 90 \text{ p} + 8 \times 2 \text{ p}$ $= 800 + 720 \text{ p} + 16 \text{ p} = 1520 \text{ p} + 16 \text{ p}$ $= 1536 \text{ p} = \text{£}15.36$ <i>Answer:</i> 8 kg of plums will cost £15.36.</p> <p style="text-align: right;"><i>16 min</i></p>	<p style="text-align: center;">Notes</p> <p>Exact amount: e.g. $27 \times 50 \text{ p} = \text{£}15 - 3 \times 50 \text{ p}$ $= \text{£}15 - \text{£}1.50$ $= \text{£}13.50$</p> <p>Exact amount: e.g. $60 \times 28 \text{ kg}$ $= 60 \times 20 \text{ kg} + 60 \times 8 \text{ kg}$ $= 1200 \text{ kg} + 480 \text{ kg}$ $= 1680 \text{ kg}$ or $(1800 - 120) \text{ kg}$</p> <p>Or $8 \times \text{£}1.92 = 8 \times \text{£}2 - 8 \times 8 \text{ p}$ $= \text{£}16 - 64 \text{ p}$ $= \text{£}15.36$</p> <p>Only problem d) requires the exact amount.</p>
4	<p><i>PbY3b, page 136</i></p> <p>Q.1 Read: <i>Fill in the missing products. Note how they change.</i> Deal with one row at a time. Review orally with whole class. Mistakes discussed and corrected Ps tell class of relationships they notice within each row. Agree that, e.g. if one factor is twice as much, then the product is twice as much; if one factor is twice as much and the other factor is half as much then the product is the same; etc. <i>Solution:</i> a) $60 \times 3 = 180$ $60 \times 6 = 360$ $60 \times 9 = 540$ $60 \times 12 = 720$ b) $40 \times 5 = 200$ $40 \times 10 = 400$ $40 \times 15 = 600$ $40 \times 25 = 1000$ c) $4 \times 2 = 8$ $40 \times 2 = 80$ $400 \times 2 = 800$ $40 \times 20 = 800$ d) $3 \times 5 = 15$ $30 \times 5 = 150$ $300 \times 5 = 1500$ $30 \times 50 = 1500$ e) $4 \times 24 = 96$ $8 \times 12 = 96$ $16 \times 6 = 96$ $2 \times 48 = 96$ $4 \times 240 = 960$ $8 \times 120 = 960$ $16 \times 60 = 960$ $2 \times 480 = 960$</p> <p style="text-align: right;"><i>22 min</i></p>	<p>Individual work, monitored, helped</p> <p>T could have solutions already prepared on BB or SB or OHP and uncover each as it is dealt with.</p> <p>Agreement, self-correction, praising</p> <p>Discussion on relationship between factors and products</p> <p>Involve several Ps</p> <p>Praising only</p> <p>Feedback for T</p>
5	<p><i>PbY3b, page 136</i></p> <p>Q.2 Read: <i>Fill in the missing products.</i> Deal with one column at a time. Review orally with whole class. Ps dictate results to T, explaining reasoning. Mistakes corrected. What do you notice about the columns? (e.g. in each column, one of the factors is always the same; the product in the bottom row is the sum of the 3 products above it.) BB: a) $5 \times 100 = 500$ b) $4 \times 3 = 12$ c) $7 \times 8 = 56$ $5 \times 20 = 100$ $30 \times 3 = 90$ $7 \times 30 = 210$ $5 \times 1 = 5$ $200 \times 3 = 600$ $7 \times 100 = 700$ $5 \times 121 = 605$ $234 \times 3 = 702$ $7 \times 138 = 966$</p> <p style="text-align: right;"><i>28 min</i></p>	<p>Individual work, monitored helped</p> <p>Written on BB or SB or OHT</p> <p>Reasoning agreement, self-correction, praising (or reasoning for bottom row: 234×3 $= 200 \times 3 + 30 \times 3 + 4 \times 3$ $= 600 + 90 + 12 = 702)$</p> <p>Discussion, checking, agreement, praising</p> <p>Feedback for T</p>

Y3*Lesson Plan 136***Activity****6***PbY3b, page 136*

Q.3 Read: *Estimate first, then calculate using addition and multiplication.*

Review at BB with whole class. Ps come to BB to fill in missing numbers, explaining reasoning. Mistakes corrected.

Solution:

a)

	2	0	2
	2	0	2
	2	0	2
+	2	0	2
	8	0	8

 E:

	8	0	0
--	---	---	---

 b)

	3	0	2
	3	0	2
+	3	0	2
	9	0	6

 E:

	9	0	0
--	---	---	---

	3	0	2	×		3
	9	0	6			

c)

	4	2	3
+	4	2	3
	8	4	6

 E:

	8	0	0
--	---	---	---

 d)

	2	0	1
	2	0	1
	2	0	1
+	2	0	1
	1	0	5

 E:

	1	0	0	0
--	---	---	---	---

	2	0	1	×		5
	1	0	5			

*34 min***Notes**

Individual work, monitored helped

Written on BB or use enlarged copy master or OHP

Ps decide whether to round to nearest 100 or nearest 10, do estimate mentally and write digits in correct columns.

Reasoning agreement, self-correction, praising

T asks P to explain the multiplications with place values:

e.g. '1U times 5 = 5 U,
2H times 5 = 10H = 1Th'

Feedback for T

7**Multiplication practice**

T chooses Ps to come to BB and calculate the products, asking them to explain their reasoning using place values. Class agrees/disagrees.

BB:

a)

H	T	U		
	8	2	×	4
	1	6	8	

 b)

H	T	U		
	9	1	×	7
	6	3	7	

 c)

H	T	U		
	6	2	×	3
	1	8	6	

d)

H	T	U		
	6	2	×	4
	2	4	8	

 e)

H	T	U		
	9	1	×	8
	7	2	8	

 f)

H	T	U			
	1	2	2	×	4
	4	8	8		

g)

Th	H	T	U		
	3	2	1	×	3
	9	6	3		

 h)

Th	H	T	U		
	3	2	1	×	4
	1	2	8	4	

 i)

Th	H	T	U		
	5	2	3	×	3
	1	5	6	9	

j)

Th	H	T	U		
	4	0	2	×	4
	1	6	0	8	

 k)

Th	H	T	U		
	4	0	3	×	4
	1	6	1	2	

 l)

Th	H	T	U		
	6	1	2	×	3
	1	8	3	6	

Ps might notice connections between some of the calculations, e.g.
 $62 \times 4 = 62 \times 3 + 62$, $91 \times 8 = 91 \times 7 + 91$, etc.

40 min

Whole class activity

Written on BB or use enlarged copy master or OHP

At a good pace

Ps also copy into *Ex. Bks* at same time.

Reasoning, agreement, praising

T helps with wording of reasoning if necessary, e.g.

i) 523×3 :

$3U$ times $3 = 9U$,

$2T$ times $3 = 6T$,

$5H$ times $3 = 15H = 1Th + 5H$

k) 403×4

$3U$ times $4 = 12U = 1T + 4U$,

$4H$ times $4 = 16H = 1Th + 6H$

Y3

Lesson Plan 136

Activity

8

PbY3b, page 136

Q.4 a) Read: *Kate bought 3 chocolate bars at 82 p each. How much did she pay altogether?*

Complete the calculation, then write the answer as a sentence. Remember to write the unit of money too !

Review at BB with whole class. Ps explain reasoning and class agrees/disagrees. Mistakes discussed and corrected

Solution:

Th	H	T	U		
		8	2	×	3
	2	4	6		

Answer: Kate paid 246 p (or £2.46) altogether.

b) Read: *A brick weighs 4 kg. How heavy are 412 bricks?*

Think carefully about where you will write the numbers! When you write the answer in a sentence remember to include the unit of measure too.

Review as above.

Solution:

Th	H	T	U		
	4	1	2	×	4
	1	6	4	8	

Answer: 412 bricks weigh 1648 kg.

Extension

c) This calculation is more difficult! BB: Who would like to try?

Th	H	T	U		
	3	1	3	×	5

Ps come to BB to try to solve it, but might run into difficulty.

Rest of class can try to help by working out the product in another way, e.g.

$$313 \times 5 = 300 \times 5 + 10 \times 5 + 3 \times 5 = 1500 + 50 + 15 = 1565$$

We know that the product is 1565, so let's think how we could get this answer using the other method.

T leads class through by reasoning using place values :

$$\text{BB: } 3\text{U} \times 5 = 15\text{U} = 1\text{T} + 5\text{U},$$

$$1\text{T} \times 5 = 5\text{T} (+ 1\text{T}) = 6\text{T}$$

$$3\text{H} \times 5 = 15\text{H} = 1\text{Th} + 5\text{H}$$

Th	H	T	U		
	3	1	3	×	5
	1	5	6	5	

Notes

Individual work, monitored, helped

(Ps could show final amount on scrap paper or 'slates' on command.)

Set a time limit for each part Reasoning, agreement, self-correction, praising

Reasoning, agreement, self-correcting, praising

Encourage Ps to explain using place values:

$$2\text{U times } 4 = 8\text{U.}$$

$$1\text{T times } 4 = 4\text{T,}$$

$$4\text{H times } 4 = 16\text{H} = 1\text{Th} + 6\text{T}$$

Whole class activity

Written on squared grid on BB or SB or OHT

Discussion, reasoning, agreement, praising

BB:

Th	H	T	U		
	3	1	3	×	5
		1	5		
		5	0		
1	5	0	0		
1	5	6	5		

45 min

<h1>Y3</h1>	R: Mental calculation C: Multiplication E: Vertical multiplication, crossing tens	<h2>Lesson Plan</h2> <h1>137</h1>																								
Activity 1	Missing numbers Study this table and think what the rule could be. Ask several Ps what they think. Agree on one form of the rule. (BB) e.g. $a \times b = c$ Let's fill in the missing numbers. Ps come to BB choose a column and fill in the missing numbers, explaining reasoning. Who agrees? Who thinks something else? etc. Who can think of other ways to write the rule? Let's choose a column and check that it is correct. BB: <table border="1" style="margin-left: 20px;"> <tr> <td><i>a</i></td> <td>423</td> <td>211</td> <td>322</td> <td>323</td> <td>514</td> <td>73</td> <td>441</td> </tr> <tr> <td><i>b</i></td> <td>2</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>3</td> <td>2</td> </tr> <tr> <td><i>c</i></td> <td>846</td> <td>1055</td> <td>1288</td> <td>969</td> <td>1028</td> <td>219</td> <td>882</td> </tr> </table> <i>Rule:</i> $a \times b = c$, $b \times a = c$, $c \div b = a$, $c \div a = b$ <div style="text-align: right;">5 min</div>	<i>a</i>	423	211	322	323	514	73	441	<i>b</i>	2	5	4	3	2	3	2	<i>c</i>	846	1055	1288	969	1028	219	882	Notes Whole class activity Written on BB, or use enlarged copy master or OHP Discussion, agreement on the rule. At a good pace Reasoning, agreement, praising Check other forms of rule: e.g. BB: $4 \times 322 = 1288$ $1028 \div 2 = 514$ $882 \div 441 = 2$
<i>a</i>	423	211	322	323	514	73	441																			
<i>b</i>	2	5	4	3	2	3	2																			
<i>c</i>	846	1055	1288	969	1028	219	882																			
2	Secret numbers I will think of a number and describe it. You must work it out in your <i>Ex. Bks</i> , then show me the number when I say. a) <i>I am thinking of a number. It is 270 less than 3 times 250. What is the number I am thinking of?</i> Show me . . . now! (480) A , tell us how you worked it out . Who did the same? Who did it a different way? etc. BB: e.g. $3 \times 250 = 3 \times 200 + 3 \times 50 = 600 + 150 = 750$ $750 - 270 = 750 - 250 - 20 \quad \text{or} \quad \begin{array}{r} 750 \\ - 270 \\ \hline 480 \end{array}$ $= 500 - 20 = 480$ b) <i>I am thinking of a number. 3 times this number is 270 more than 480. What is the number I am thinking of?</i> Show me . . . now! (250) B , tell us how you worked it out . Who did the same? Who did it a different way? etc. BB: e.g. $3 \times \square = 480 + 270 = 680 + 20 + 50$ or $\begin{array}{r} 480 \\ + 270 \\ \hline 750 \end{array}$ $\square = 750 \div 3 = 600 \div 3 + 150 \div 3$ $= 200 + 50 = 250$ <div style="text-align: right;">10 min</div>	Whole class activity, but individual work in calculating T repeats slowly Give Ps time to do calculations in <i>Ex. Bks</i> . Responses written on scrap paper or 'slates'. Reasoning, agreement, praising (Or all done as a whole class activity, with Ps dictating what T should write on BB) Extra praise if Ps might notice connection with, or use results from, part a), e.g. $(480 + 270) \div 3 = \underline{250}$ $\begin{array}{r} 480 \\ + 270 \\ \hline 750 \end{array}$ Feedback for T																								
3	Sequences T writes first 3 terms of a sequence on BB. Ps continue it and give the rule (by coming to BB or dictating to T) explaining reasoning. Class agrees/disagrees. a) 4, 12, 36 , [108, 324, 972, (2916, . . .)] <i>Rule:</i> $\times 3$ Reasoning: e.g. $36 \times 3 = 30 \times 3 + 6 \times 3 = 90 + 18 = 108$ b) 2, 8, 32 , [128, 512, (2048, . . .)] <i>Rule:</i> $\times 4$ Reasoning: e.g. $128 \times 4 = 400 + 80 + 32 = 480 + 20 + 12 = 512$ $512 \times 4 = 2000 + 40 + 8 = 2048$ c) 1536, 768, 384 , [192, 96, 48, 24, 12, 6, 3, (1 and a half, . . .)] <i>Rule:</i> $\div 2$ (or every following term is half of previous term). Reasoning: e.g. $384 \div 2 = 284 \div 2 + 100 \div 2 = 142 + 50 = 192$ <div style="text-align: right;">16 min</div>	Whole class activity Reasoning, agreement, praising. Details written on BB where needed. or $900 \times 3 = 2700$ $70 \times 3 = 210$ $2 \times 3 = 6$ $972 \times 3 = 2916$ In c) Ps might calculate the first two differences: $1536 - 768 = 768$ $768 - 384 = 384$ and realise the terms are halved.																								

Y3

Lesson Plan 137

Activity

4

Short form of writing multiplications

What do you notice about these additions? (In each part, the numbers being added are the same.) What other operation could we write instead of addition? (multiplication) e.g. $423 + 423 + 423 = 423 \times 3$

Let's do the calculations both ways. T chooses Ps to come to BB in pairs, one to do the addition and the other to do the the multiplication.

Encourage both Ps to explain their reasoning to class. Class estimates mentally (to nearest 100 or nearest 10) to check their results.

BB: a) E: $420 \times 3 = 1260$ b) E: $320 \times 4 = 1280$

	4	2	3
	4	2	3
+	4	2	3
1	2	6	9

	4	2	3	×	3
1	2	6	9		

	3	2	1
	3	2	1
	3	2	1
+	3	2	1
1	2	8	4

	3	2	1	×	4
1	2	8	4		

c) E: $310 \times 3 = 930$ d) E: $140 \times 7 = 980$

	3	0	9
	3	0	9
+	3	0	9
9	2	7	

	3	0	9	×	3
9	2	7			

	1	4	1
	1	4	1
	1	4	1
	1	4	1
	1	4	1
	1	4	1
+	1	4	1
9	8	7	

Th	H	T	U
	1	4	1
		7	
	2	8	0
+	7	0	0
9	8	7	

or d) $1 \times 7 = 7$
 $40 \times 7 = 280$
 $100 \times 7 = 700$
 $141 \times 7 = \underline{987}$

22 min

Notes

Whole class activity

Written on BB or use enlarged copy master or OHP

Ps can do calculations in Ex. Bks first if they wish.

Reasoning, agreement, praising

Encourage Ps to give reasoning in detail with place values, e.g.

c) '9U times 3 = 27U
 = 2T + 7U

so I write 7 in the units column and 2 in the tens column.

$3H \text{ times } 3 = 9H$.

so I write 3 in the hundreds column.'

Reasoning for d) can be given in different ways, e.g.

'1U times 7 = 7U

$4T \text{ times } 7 = 28T = 2H + 8T$

$1H \times 7 = 7H, 7H + 2H = 9H$

5

PbY3b, page137

Q.1 Read: *Estimate first, then complete the addition and multiplication.*

Set a time limit. Review at BB with whole class.

Ps come to BB to fill in missing numbers or dictate to T, explaining reasoning. Class agrees/disagrees. Mistakes discussed and corrected.

Solution:

a) $E: 70 \times 6 = 420$ b) $E: 200 \times 4 = 800$

	7	1
	7	1
	7	1
	7	1
	7	1
+	7	1
4	2	6

	7	1	×	6
4	2	6		

	2	0	1
	2	0	1
	2	0	1
	2	0	1
+	2	0	1
8	0	4	

	2	0	1	×	4
8	0	4			

c) $E: 530 \times 2 = 1060$ d) $E: 210 \times 5 = 1050$

	5	3	4
	5	3	4
+	5	3	4
1	0	6	8

	5	3	4	×	2
1	0	6	8		

	2	1	1
	2	1	1
	2	1	1
	2	1	1
	2	1	1
+	2	1	1
1	0	5	5

	2	1	1	×	5
1	0	5	5		

26 min

Individual work, monitored, helped

Written on BB or use enlarged copy master or OHP

Differentiation by time limit

Reasoning, agreement, self-correction, praising

If problems, write details of calculations on BB: e.g.

d) 1U times 5 = 5U

1T times 5 = 5T

2H times 5 = 10H = 1Th

Feedback for T

Y3

Lesson Plan 137

Activity

6

PbY3b, page137

Q.2 Read: *Estimate first, then do the multiplications.*

Set a time limit. Ps estimate using easiest rounding for them. Review at BB with whole class.

Ps dictate results to T, explaining reasoning. Class agrees or disagrees. Mistakes discussed and corrected. Details using place values given where needed.

Solution:

a) E: <table border="1"><tr><td>8</td><td>0</td><td>0</td></tr></table>	8	0	0	E: <table border="1"><tr><td>1</td><td>2</td><td>0</td><td>0</td></tr></table>	1	2	0	0	E: <table border="1"><tr><td>1</td><td>6</td><td>0</td><td>0</td></tr></table>	1	6	0	0																			
8	0	0																														
1	2	0	0																													
1	6	0	0																													
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4	2	2	×	2																												
8	4	4																														
4	2	2	×	3																												
1	2	6	6																													
4	2	2	×	4																												
1	6	8	8																													
b) E: <table border="1"><tr><td>9</td><td>0</td><td>0</td></tr></table>	9	0	0	E: <table border="1"><tr><td>1</td><td>2</td><td>0</td><td>0</td></tr></table>	1	2	0	0	E: <table border="1"><tr><td>1</td><td>8</td><td>0</td><td>0</td></tr></table>	1	8	0	0																			
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3	2	1	×	3																												
9	6	3																														
4	2	1	×	3																												
1	2	6	3																													
6	2	1	×	3																												
1	8	6	3																													
c) E: <table border="1"><tr><td>1</td><td>6</td><td>0</td></tr></table>	1	6	0	E: <table border="1"><tr><td>1</td><td>6</td><td>0</td><td>0</td></tr></table>	1	6	0	0	E: <table border="1"><tr><td>1</td><td>6</td><td>0</td><td>0</td></tr></table>	1	6	0	0																			
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8	4	×	2																													
1	6	8																														
8	0	4	×	2																												
1	6	0	8																													
4	0	2	×	4																												
1	6	0	8																													

What do you notice about the multiplications. Ps point out relationships to class.

What is: 422×1 (422); 61×3 (183); 201×4 (804)

35 min

Notes

Individual work, monitored, (helped)

Written on BB or use enlarged copy master or OHP

Differentiation by time limit

Reasoning, agreement, self-correction, praising

Discussion, agreement, praising

Ps calculate mentally and shout out in unison.

Extension

7

Multiplication with place values

T has BB already prepared. How much is in the first row? (T points) ($6H + 3T + 7U = 537$) Repeat for second row. (537)

How much is there altogether? What operations could we write? ($537 + 537$ or 537×2).

Let's estimate the result in our heads, then we will do the addition first.

Ps come to BB to stick/draw total amounts on bottom row of table and complete the addition place value table, explaining reasoning in detail.

Does this sum match your estimate? Agree that $537 + 537 = 1074$

Now let's do the multiplications. Ps come to BB to complete long and short calculations, explaining reasoning in detail. Class points out errors. (Possible details given below.)

BB:

Thousands	Hundreds	Tens	Units
+			

Th	H	T	U
	5	3	7
	5	3	7
1	0	7	4
			1

Th	H	T	U
	5	3	7
		1	4
		6	0
1	0	0	0
1	0	7	4

a) $2 \times 7 = 14$
 $2 \times 30 = 60$
 $2 \times 500 = 1000$
 $2 \times 537 = 1074$

	5	3	7	×	2
	1	0	7	4	
					1

a) '7U + 7U = 14U = 1T + 4U, so I write 4 in the units column and move the 1T to the tens column; 3T + 3T + 1T = 7T, so I write 7 in the tens column; 5H + 5H = 10H = 1Th, so I write 0 in the hundreds column and 1 in the thousands column.'

40 min

Whole class activity

T has model money stuck to, or drawn on, table on BB

(or use enlarged copy master or OHP)

Ps estimate result mentally first (rounding numbers to nearest 100 or 10 as they wish)

T has extra model money (if using) for Ps to stick on BB.

At a good pace

Checking against estimates, agreement, praising

T helps with details of reasoning if necessary, e.g.

b) $2 \times 7 = 14$
 $2 \times 30 = 60$
 $2 \times 500 = 1000$
 $2 \times 537 = 1074$

c) $2 \times 7U = 14U = 1T + 4U$
 $2 \times 3T = 6T, 6T + 1T = 7T$
 $2 \times 5H = 10H = 1Th$
 or in even more detail as in a)

Y3

Lesson Plan 137

Activity

8

PbY3b, page137

Q.3 a) Read: *Each flower on an apple tree has 5 petals. How many petals are on a branch with 243 flowers?*

Ps write the multiplicand and multiplier in the grid, then do the calculation (using their favourite method), then write the answer as a sentence.

Review at BB with whole class (or review each stage of solution if necessary). Ps explain reasoning of calculation in detail (with T's help) and class agrees/disagrees.

Deal with all methods used. Mistakes discussed/corrected

Solution:

Reasoning: e.g.

'5 times 3U = 15U = 1T + 5U, so I write 5 in the units column and move the 1T to the tens column;

5 times 4T = 20 T, 20T + 1T = 21T = 2H + 1T, so I write 1 in the tens column and move the 2H to the hundreds column.

5 times 2H = 10H, 10H + 2H = 12H = 1Th + 2H, so I write 2 in the hundreds column and 1 in the thousands column.'

Answer: There are 1215 petals on the branch.

b) Read: *Workmen laid 106 m of pavement a day from Monday to Friday. How many metres did they lay in a week?*

This time when you write the answer in a sentence remember to include the unit of measure too!

Review as above.

Solution:

Th	H	T	U	
	1	0	6	× 5
	5	3	0	

$$6U \times 5 = 30U = \underline{3}T$$

$$1H \times 5 = \underline{5}H$$

Answer: They laid 530 m in a week.

45 min

Notes

Individual work, monitored, helped

(or as whole class activity, with Ps coming to BB or dictating to T)

Set a time limit for each part

Ps can do calculations in *Ex. Bks* first if they wish.

Reasoning, agreement, self-correction, praising

Or in *Ex. Bks*:

$$5 \times 3 = 15$$

$$5 \times 40 = 200$$

$$5 \times 200 = 1000$$

$$5 \times 243 = \underline{1215}$$

$$\text{or } 5 \times 243 = 1000 + 200 + 15 = \underline{1215}$$

T reasons as opposite if no P has done it.

If short of time, Ps can choose only 1 of the problems, but review solutions to both with the whole class.

Or differentiation, with less able Ps doing only part b).

Accept any correct method of calculating.

Praising, encouragement only

Feedback for T

Y3

R: Mental calculation
 C: **Multiplication. Puzzles**
 E: *Problems involving crossing tens*

Lesson Plan 138

Activity**1****Mental practice**

Listen carefully and show me only the answer when I say. Try to work it out in your head but you can write it down if you need to.

T says operation and Ps show result on command. Ps who answered correctly explain to those who did not.

- a) What number is 20 times 15? Show me . . . now! (300)
 b) What number is 3 times 280? Show me . . . now! (840)
 c) What number is 1 fifth of 250? Show me . . . now! (50)

*3 min***Notes**

Whole class activity
 Rough work and results written on scrap paper or slates.
 BB: e.g.
 a) $20 \times 15 = 2 \times 150 = \underline{300}$
 b) $3 \times 280 = 600 + 240 = \underline{840}$
 c) $250 \div 5 = \underline{50}$
 Reasoning, agreement, praising

2**Puzzle**

The same shape stands for the same whole hundred. The sum of each row and column is 1000. What are the missing numbers?

BB:

\triangle	300	\circ	\frown	or	\triangle	200	\circ	\frown
\circ	300	300	\circ		\circ	200	200	\circ
300	300	\circ	\circ		\frown	200	300	\circ
\frown	\triangle	300	\circ		\frown	\triangle	200	\circ

Ps come to BB to explain reasoning. Class checks that they are correct. Accept trial and error but encourage logical reasoning, e.g.

C2: $3 \times \square < 1000$, so possible hundreds are 100, 200 or 300

C4: $3 \times \circ < 1000$, so possible hundreds are also 100, 200 or 300

R2: $2 \times \square + 2 \times \circ = 1000$, so $\square + \circ = 500$
 so possible hundreds for either are 200 or 300.

R1: If $\square + \circ = 500$, then $\triangle + \frown = 1000 - 500 = 500$.

They must be different from 200 and 300, so the only possible hundreds for either are 100 and 400.

There are two possible solutions, depending on how the pairs of possible numbers are allocated (as shown above)

7 min

Whole class discussion
 Drawn on BB or use enlarged copy master or OHP
 Give Ps a minute to think about how to solve it and to discuss with their neighbours.

Reasoning, agreement, checking, praising

If Ps do not know how to solve it, T gives hints.

[Using multiplication to solve a problem]

3**PbY3b, page 136**

Q.1 Read: *Complete the table. (Do the calculations in your exercise book if you need to.)*

Make sure that Ps understand what each column/row means.

Review at BB with whole class Ps dictate results to T, explaining reasoning where necessary. Class agrees/disagrees. Mistakes corrected.

Solution:

<i>a</i>	<i>b</i>	<i>c</i>	$a \times c$	$a \times b$	$b \times c$
400	5	3	1200	2000	15
450	6	4	1800	2700	24

11 min

Individual work, monitored, helped

Drawn on BB or use enlarged copy master or OHP

Discussion, agreement, self-correction, praising

Feedback for T

Details, e.g.

$$450 \times 6 = 2400 + 300 = 2700$$

Y3

Lesson Plan 138

Activity

4

PbY3b, page 136

Q. 2 Read: *Fill in the missing numbers.*

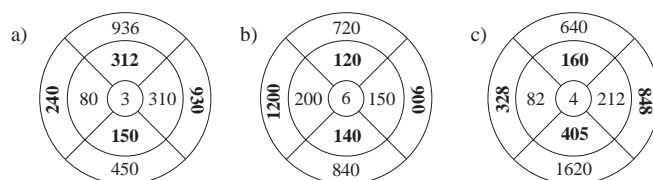
What is wrong with this puzzle? (No rule is given and it cannot be worked out as there is no completed section.)

What could the rule be? T asks several Ps what they think.

Let's use the rule that in each segment, the number in the outer ring is the product of the number in the inner ring multiplied by the number in the circle.

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

Solution:



18 min

Notes

Whole class discussion to start
Drawn on BB or use enlarged copy master or OHP

Ask several Ps what they think.
Praise all contributions

Individual work, monitored, helped

Reasoning, agreement, self-correction, praising

Details given if problems, e.g.

$$1620 \div 4 = 1600 \div 4 + 20 \div 4 = 400 + 5 = 405$$

5

Find the mistakes

This is how *Little Ass* did his multiplications. Let's check them by estimating first, then finding his mistakes and correcting them.

Ps come to BB to estimate by rounding to the nearest 10 or 100, as appropriate. (Some mistakes are obvious from the estimation, but some can only be found by doing the whole calculation.) Ps cross out mistakes and write correction below, explaining reasoning. Class agrees/disagrees.

BB:

a) $E: 60 \times 3 = 180$ <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td>6</td><td>4</td><td>\times</td><td>3</td><td> </td></tr><tr><td>1</td><td>8</td><td>1</td><td>2</td><td> </td><td> </td></tr><tr><td>1</td><td>9</td><td> </td><td> </td><td> </td><td> </td></tr></table> \times		6	4	\times	3		1	8	1	2			1	9					b) $E: 500 \times 3 = 1500$ <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>5</td><td>0</td><td>2</td><td>\times</td><td>3</td><td> </td></tr><tr><td>1</td><td>5</td><td>6</td><td> </td><td> </td><td> </td></tr><tr><td>1</td><td>5</td><td>0</td><td> </td><td> </td><td> </td></tr></table> \times	5	0	2	\times	3		1	5	6				1	5	0				c) $E: 460 \times 3 = 1380$ <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>4</td><td>6</td><td>4</td><td>\times</td><td>3</td><td> </td></tr><tr><td>1</td><td>3</td><td>9</td><td>2</td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr></table> \checkmark	4	6	4	\times	3		1	3	9	2								
	6	4	\times	3																																																				
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25 min

Whole class activity

Written on BB or use enlarged copy master or OHP

At a good pace

Reasoning, correcting, agreement, praising

Encourage Ps to explain using place values.

e.g. 316×4 :

$$4 \times 6U = 24U = 2T + 4U$$

$$4 \times 1T = 4T, 4T + 2T = 6T$$

$$4 \times 3H = 12H = 1Th + 2H$$

Agree that estimating can give only a rough idea of the answer. To check properly, the whole calculation should be done again.

6

Calculation practice

a) BB: 804 604 624 (824)

Which of these numbers is twice the sum of 273 and 139? (824)

Ps do calculations in any way they choose in *Ex. Bks*, then sit up with arms folded when ready.

T points to each number in turn and Ps stand up if they think it is correct (or Ps can show on 'slates' on command).

A, how did you work it out? Who did the same? Who did it a different way? etc. Mistakes discussed and corrected.

$$e.g. 2 \times (273 + 139) = 2 \times 412 = 824 \quad \text{or} \quad \begin{array}{r} 273 \\ + 139 \\ \hline 412 \end{array} \quad \begin{array}{r} 412 \times 2 \\ 824 \end{array}$$

Deal with a) and b) in a similar way.

Whole class activity but Ps do calculations in *Ex. Bks* (or on scrap paper, slates, etc.)

In unison. In good humour!

Reasoning, agreement, praising

Deal with all methods used. Class decides whether each method is valid.

<h1>Y3</h1>		<p>Lesson Plan 138</p>
<p>Activity</p> <p>6</p>	<p>(Continued)</p> <p>b) BB: 648 848 (858) 658</p> <p>Which of these numbers is 6 times half of 286? (858)</p> <p>BB: $6 \times (286 \div 2) = 6 \times 143 = 858$</p> <p>or $6 \times 286 \div 2 = 6 \div 2 \times 286 = 3 \times 286$</p> <p style="text-align: right;">$= 600 + 240 + 18 = 858$</p> <p>c) BB: 305 355 (325) 375</p> <p>Which of these numbers is 5 times the difference between 313 and 248? (325)</p> <p>BB: $5 \times (313 - 248) = 5 \times 65 = 300 + 25 = 325$</p> <p style="text-align: right;"><i>30 min</i></p>	<p>Notes</p> <p>BB: $\begin{array}{r} 143 \times 6 \\ 858 \\ \hline \end{array}$ or $\begin{array}{r} 143 \times 6 \\ 18 \\ 240 \\ \hline 600 \\ \hline \end{array}$</p> <p>or $3 \times 6 = 18$ $\begin{array}{r} 858 \\ \hline \end{array}$</p> <p>$3 \times 80 = 240$</p> <p>$3 \times 200 = 600$</p> <p>$3 \times 286 = 858$</p> <p>or $\begin{array}{r} 313 \\ - 248 \\ \hline 65 \end{array}$ $\begin{array}{r} 65 \times 5 \\ 325 \\ \hline \end{array}$</p>
<p>7</p>	<p>PbY3b, page 138</p> <p>Q.3 Read: <i>Calculate the products.</i></p> <p>Deal with one column at a time. Ps can check results using other methods in <i>Ex. Bks</i> if they are unsure about their answer.</p> <p>Review at BB with whole class. Ps dictate results, giving details of calculation. Mistakes discussed and corrected.</p> <p><i>Solution:</i></p> <p>a) $\begin{array}{r} 26 \times 5 \\ 130 \\ \hline \end{array}$ b) $\begin{array}{r} 442 \times 2 \\ 884 \\ \hline \end{array}$ c) $\begin{array}{r} 207 \times 9 \\ 1863 \\ \hline \end{array}$</p> <p>$\begin{array}{r} 52 \times 6 \\ 312 \\ \hline \end{array}$ $\begin{array}{r} 208 \times 7 \\ 1456 \\ \hline \end{array}$ $\begin{array}{r} 116 \times 6 \\ 696 \\ \hline \end{array}$</p> <p>$\begin{array}{r} 44 \times 4 \\ 176 \\ \hline \end{array}$ $\begin{array}{r} 407 \times 3 \\ 1221 \\ \hline \end{array}$ $\begin{array}{r} 275 \times 1 \\ 275 \\ \hline \end{array}$</p> <p>$\begin{array}{r} 106 \times 9 \\ 954 \\ \hline \end{array}$ $\begin{array}{r} 305 \times 0 \\ 0 \\ \hline \end{array}$ $\begin{array}{r} 307 \times 6 \\ 1842 \\ \hline \end{array}$</p> <p style="text-align: right;"><i>35 min</i></p>	<p>Individual work, monitored (helped)</p> <p>Written on BB or use enlarged copy master or OHP</p> <p>Reasoning, agreement, self-correction, praising only</p> <p>Details of longer form given if problems, e.g.</p> <p>BB: $\begin{array}{r} 116 \times 6 \\ 36 \\ 60 \\ \hline 600 \\ \hline 696 \\ \hline \end{array}$</p> <p>Feedback for T</p>
<p>8</p>	<p>PbY3b, page 138</p> <p>Q.4 Read: <i>Fill in the missing factors.</i></p> <p>Deal with one row at a time. Set a time limit. Ps check their results by doing calculation mentally or in <i>Ex.Bks.</i> or on slates.</p> <p>Review at BB with whole class. Ps come to BB or dictate results to T, explaining how they worked out the missing factor (using division or deduction). Mistakes discussed and corrected.</p> <p><i>Solution:</i></p> <p>a) $\begin{array}{r} 413 \times 2 \\ 826 \\ \hline \end{array}$ $\begin{array}{r} 321 \times 3 \\ 963 \\ \hline \end{array}$ $\begin{array}{r} 234 \times 2 \\ 468 \\ \hline \end{array}$ $\begin{array}{r} 106 \times 6 \\ 636 \\ \hline \end{array}$</p> <p>b) $\begin{array}{r} 204 \times 3 \\ 612 \\ \hline \end{array}$ $\begin{array}{r} 216 \times 4 \\ 864 \\ \hline \end{array}$ $\begin{array}{r} 135 \times 2 \\ 270 \\ \hline \end{array}$ $\begin{array}{r} 217 \times 4 \\ 868 \\ \hline \end{array}$</p> <p>c) $\begin{array}{r} 152 \times 4 \\ 608 \\ \hline \end{array}$ $\begin{array}{r} 171 \times 5 \\ 855 \\ \hline \end{array}$ $\begin{array}{r} 151 \times 6 \\ 906 \\ \hline \end{array}$ $\begin{array}{r} 183 \times 3 \\ 549 \\ \hline \end{array}$</p> <p style="text-align: right;"><i>40 min</i></p>	<p>Individual work, monitored, <u>helped</u></p> <p>Written on BB or use enlarged copy master or OHP</p> <p>Can be differentiated (only the more able Ps could do part c)</p> <p>Reasoning, agreement, self-correction, praising only</p> <p>Details of longer form given for more difficult problems, e.g. BB: $\begin{array}{r} 183 \times 3 \\ 9 \\ 240 \\ \hline 300 \\ \hline 549 \\ \hline \end{array}$</p> <p>Feedback for T</p>

Y3*Lesson Plan 138***Activity****9****Missing digits**

Let's see if you are clever enough to work out which digits are missing from these multiplications!

Ps come to BB or dictate to T, explaining reasoning. Class checks that they are correct. (RH problem in b) could have other solutions.)

BB:

a)

$$\begin{array}{r} 230 \\ 460 \\ \hline \end{array} \times 2$$

$$\begin{array}{r} 322 \\ 966 \\ \hline \end{array} \times 3$$

b)

$$\begin{array}{r} 223 \\ 892 \\ \hline \end{array} \times \boxed{4}$$

e.g.

$$\begin{array}{r} 162 \\ 810 \\ \hline \end{array} \times 5$$

c)

$$\begin{array}{r} 314 \\ 942 \\ \hline \end{array} \times 3$$

$$\begin{array}{r} \quad 83 \\ 498 \\ \hline \end{array} \times 6$$

d)

$$\begin{array}{r} 109 \\ 981 \\ \hline \end{array} \times \boxed{9}$$

$$\begin{array}{r} \quad 83 \\ 664 \\ \hline \end{array} \times \boxed{8}$$

45 min

Notes

Whole class activity

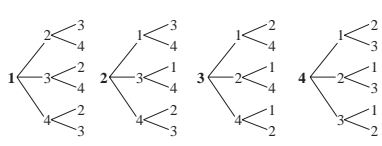
Written on BB or use enlarged copy master or OHP


Discussion, reasoning, checking, agreement, praising

Or could be done as a competition, e.g. between boys and girls.

(Or differentiated: less able solve LHS and more able solve RHS of each part)

Team which solves most in a set time limit is the winner.

<h1>Y3</h1>	<p>R: Mental calculation C: Problems in context using multiplication E: <i>Direct proportion. Multiplication, crossing tens</i></p>	<h2>Lesson Plan 139</h2>									
<p>Activity</p> <p>1</p>	<p>Making numbers</p> <p>T sticks 4 number cards on BB: 2 3 1 4</p> <p>How many 3-digit numbers can we make from these numbers? How could we do it? (e.g. start at smallest possible number and list in increasing order.) T writes what Ps dictate.</p> <p>BB: 123 213 312 412 124 214 314 413 132 231 321 421 134 234 324 423 142 241 341 431 143 243 342 432</p> <p style="text-align: center;"><u>Tree Diagrams</u></p>  <p>Elicit that there are 4 possible hundreds digits, that for every hundreds digit there are 3 possible tens digits, and that for every tens digit there are 2 possible units digits, i.e. there are $4 \times 3 \times 2 = 24$ possible 3-digit numbers.</p> <p>We could show the possibilities for each hundred like this. It is called a <u>tree diagram</u>. T starts off drawing the diagrams, then Ps help.</p> <p style="text-align: right;">8 min</p>	<p style="text-align: center;">Notes</p> <p>Whole class activity</p> <p>Discussion on strategy for solution. Ps might remember similar activity in <i>Lesson 119</i>.</p> <p>Encourage logical listing, as this makes sure than no numbers are repeated or left out.</p> <p>At a good pace</p> <p>Discussion, agreement, praising</p> <p>When diagrams are drawn, T could point to a number in list and Ps find it on the diagram.</p>									
<p>2</p>	<p>Problems 1</p> <p>Listen carefully and think how you would solve these problems. Which operation should we write?</p> <p>(Ps can write data and operations in <i>Ex. Bks</i> first before dictating to T.)</p> <p>A, what do you think we should write? Who agrees? Who knows another way to do it? etc. Let's say the answer as a sentence.</p> <p>a) <i>Lisa has collected 148 stamps and Emma has collected 4 times that amount. How many stamps does Emma have?</i></p> <p>BB: Plan: Lisa: 148 (stamps) $\frac{148}{1} \times 4$ $\frac{148}{1} \times 4$ Emma: 148×4 (stamps) $\frac{592}{13}$ $\frac{32}{160}$ $\frac{400}{592}$</p> <p>Answer: Emma has 592 stamps.</p> <p>b) <i>Andrew has 148 marbles and Vicky has 4 times that amount. How many marbles do they have altogether?</i></p> <p>BB: Plan: A: 148 (marbles) V: 4×148 V+A: $148 + 4 \times 148 = 148 + 592$ (or $= 5 \times 148$)</p> <p>Answer: They have 740 marbles altogether.</p> <p style="text-align: right;">14 min</p>	<p>Whole class activity</p> <p>T repeats slowly while Ps think.</p> <p>Ps suggest plan and method of calculation.</p> <p>Ps work at BB or dictate to T.</p> <p>Reasoning, agreement, praising</p> <p>Class says answer in unison.</p> <p>Reasoning, agreement, praising</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right; padding-right: 10px;">$\frac{148}{+592}$</td> <td style="text-align: right; padding-right: 10px;">$\frac{148}{740} \times 5$</td> <td style="text-align: right;">$\frac{148}{40} \times 5$</td> </tr> <tr> <td style="text-align: right;">$\frac{740}{11}$</td> <td style="text-align: right;">$\frac{24}{24}$</td> <td style="text-align: right;">$\frac{200}{500}$</td> </tr> <tr> <td></td> <td></td> <td style="text-align: right;">$\frac{740}{740}$</td> </tr> </table> <p>In unison</p>	$\frac{148}{+592}$	$\frac{148}{740} \times 5$	$\frac{148}{40} \times 5$	$\frac{740}{11}$	$\frac{24}{24}$	$\frac{200}{500}$			$\frac{740}{740}$
$\frac{148}{+592}$	$\frac{148}{740} \times 5$	$\frac{148}{40} \times 5$									
$\frac{740}{11}$	$\frac{24}{24}$	$\frac{200}{500}$									
		$\frac{740}{740}$									
<p>3</p>	<p>Problems 2</p> <p>Listen carefully, write the data and do the calculation in your <i>Ex. Bks</i>. Show me your result when I say (on scrap paper or on 'slates').</p> <p>a) <i>A farmer is putting his wheat into sacks. Each sack can hold 70 kg of wheat. How much wheat does the farmer have if he fills 21 sacks?</i></p> <p>Show me . . . now! (1470 kg)</p> <p>B, explain how you worked it out. Who did the same? Who did it a different way? etc. BB: e.g. $21 \times 70 \text{ kg} = 210 \times 7 \text{ kg} = 1470 \text{ kg}$</p> <p>Answer: He has 1470 kg of wheat.</p>	<p>Individual work, monitored, helped</p> <p>Give Ps time to think and do the calculation.</p> <p>In unison</p> <p>Reasoning, agreement, praising. Discuss all methods used and mistakes.</p>									

<p>Y3</p>		<p><i>Lesson Plan 139</i></p>
<p>Activity</p> <p>3</p>	<p>(Continued)</p> <p>b) <i>A spider has 8 legs. How many legs do 205 spiders have?</i> Show me . . . now! (1640) C, explain to us how you worked it out. Who did the same? etc. BB: $205 \times 8 = 200 \times 8 + 5 \times 8 = 1600 + 40 = 1640$ or $\begin{array}{r} 205 \\ \times 8 \\ \hline 1640 \end{array}$ <i>Answer:</i> 205 spiders have 1640 legs.</p> <p>c) <i>A fish has no legs. How many legs do 978 fish have?</i> Show me . . . now! (0) D, what calculation did you write? e.g. BB: $978 \times 0 = 0$ <i>Answer:</i> 978 fish have no legs. How many tails would 978 fish have? (978)</p> <p style="text-align: right;"><i>19 min</i></p>	<p>Notes</p> <p>In unison Reasoning, agreement, praising Ps give answer in a sentence.</p> <p>In unison Reasoning, agreement, praising Ps give answer in a sentence. Ps shout out in unison.</p>
<p>4</p> <p>Problems 3</p> <p>Listen carefully and think how you would solve these problems. If you think the answer is 'Yes', clap your hands; if 'No', put your hands on your heads when I say.</p> <p>a) <i>Joe had 1200 cabbage plants. He planted them in rows of 193. Did Joe have enough cabbage plants for 6 rows?</i> Show me . . . now! (Yes) Ps who answered correctly explain. BB: $1200 \div 6 = 200 > 193$; $\begin{array}{r} 193 \\ \times 6 \\ \hline 1158 \end{array}$ $\begin{array}{r} 193 \\ \times 6 \\ \hline 118 \\ 540 \\ \hline 1158 \end{array}$ or $193 \times 6 = 1158 < 2000$ So Joe had enough cabbage plants. How many would he have left over? (42)</p> <p>b) <i>Sammy Snail can move 4 cm in 1 minute. Is it possible that he could move 630 cm in 156 minutes?</i> Show me . . . now! (No) Ps who answered correctly explain. BB: $156 \times 4 \text{ cm} = 400 + 200 + 24 \text{ (cm)}$ (or as shown opposite) $= 624 \text{ cm} < 630 \text{ cm}$ So <i>Sammy Snail</i> could <u>not</u> move 630 cm in 156 minutes. How many more minutes would he need? (1 and a half to move 6 cm)</p> <p style="text-align: right;"><i>24 min</i></p>	<p>Extension</p>	<p>Whole class activity, but Ps try out problems first in <i>Ex. Bks.</i></p> <p>T repeats slowly.</p> <p>Ps respond in unison. Reasoning, agreement, praising Show long form if problems. Ps shout out in unison.</p> <p>T repeats slowly Ps respond in unison.</p> <p>$\begin{array}{r} 156 \\ \times 4 \\ \hline 624 \end{array} \text{ cm}$ $\begin{array}{r} 156 \\ \times 4 \\ \hline 24 \\ 200 \\ \hline 624 \end{array} \text{ cm}$ Reasoning, agreement, praising</p>
<p>5</p>	<p>PbY3b, page 139</p> <p>Q.1 a) Read: <i>How many triangles can you see in this diagram?</i> T asks several Ps what they think. P points to them. Agree that there are <u>5</u> triangles (4 small + 1 large). </p> <p>b) Read: <i>How many triangles would you see in</i> i) <i>51 of these diagrams</i> ii) <i>102 of these diagrams?</i> Ps do calculations in grids in <i>Pbs</i>, then write the answer. Review with whole class. Mistakes corrected.</p> <p><i>Solution:</i> a) $\begin{array}{ c c c c } \hline 5 & 1 & \times & 5 \\ \hline 2 & 5 & 5 & \\ \hline \end{array}$ b) $\begin{array}{ c c c c } \hline 1 & 0 & 2 & \times & 5 \\ \hline 5 & 1 & 0 & & \\ \hline \end{array}$ or $\begin{array}{ c c c c } \hline 2 & 5 & 5 & \times & 2 \\ \hline 5 & 1 & 0 & & \\ \hline \end{array}$</p> <p><i>Answer:</i> 255 triangles 510 triangles</p> <p style="text-align: right;"><i>28 min</i></p>	<p>Whole class activity Diagram drawn on BB Discussion, agreement Individual work, monitored Encourage Ps to use rulers to draw the horizontal lines. Reasoning, agreement, self-correction, praising Extra praise if Ps notice that $102 = 2 \times 51$</p>

Y3

Lesson Plan 139

Activity

6

PbY3b, page 139Q.2 a) Read: *How many circles make this teddy bear's head?*

Clap your hands the same number of times. (6)

b) Read: *How many circles would you need to draw to make*
i) 72 teddy bear heads ii) 105 teddy bear heads?Ps do calculations in grids in *Pbs*, then write the answer.

Review with whole class. Mistakes corrected.

Solution:

$$\begin{array}{r} 72 \times 6 \\ \underline{432} \\ 432 \end{array}$$

$$\begin{array}{r} 105 \times 6 \\ \underline{630} \\ 630 \end{array}$$

Answer: $\overset{1}{432}$ circles

630 circles

32 min

Notes

Whole class activity

Diagram drawn on BB

In unison. Praising

Individual work, monitored

Encourage Ps to use rulers to draw the horizontal lines.

Reasoning, agreement, self-correction, praising

7

PbY3b, page 139Q.3 Read: *There are 24 hours in 1 day. How many hours are there in: a) 1 week b) 4 weeks?*Ps do calculations in grids in *Pbs*, then fill in the missing values in the equations.

Review at BB with whole class. Ps explain reasoning in detail. Who did it a different way? etc. Mistakes corrected.

Solution:

$$\begin{array}{r} 24 \times 7 \\ \underline{168} \\ 168 \end{array}$$

$$\begin{array}{r} 168 \times 4 \\ \underline{672} \\ 672 \end{array}$$

1 week = $\underline{7}$ days = $\underline{168}$ hours, 4 weeks = $\underline{28}$ days = $\underline{672}$ hours

37 min

Individual work, monitored, helped

Encourage Ps to use rulers to draw the horizontal lines.

Reasoning, agreement, self-correction, praising

Accept any correct calculation. e.g.

$$\begin{aligned} \text{b) } 24 \times 7 \times 4 &= 24 \times 28 \\ &= 12 \times 56 = 6 \times 112 \end{aligned}$$

$$\begin{array}{r} 112 \times 6 \\ \underline{672} \\ 672 \end{array}$$

8

PbY3b, page 139, Q.4Read: *Is it possible to answer the questions with the data given?*T explains that Ps do not need to work out the answer to each problem, just to decide whether they could answer it with the information given.

Deal with one question at a time. T chooses a P to read out the question. Give Ps a minute to think about it. Then Ps write YES or NO on scrap paper or slates and show on command (or use pre-agreed actions).

Ps who think that they can work out the answer come to BB to do it, thus confirming whether the problem can or can't be solved.

Solutions:

a) *A car goes at a steady speed and covers 125 m in 1 minute. What distance does it cover in 8 minutes?* [YES]b) *Jenny weighed herself and her weight was 29 kg. What is the total weight of 9 children?* [NO]c) *Uncle Andrew put fence posts an equal distance apart. He used 9 fence posts. How long was the fence?* [NO]d) *A centipede has 478 legs. How many legs do 3 centipedes have?* [YES]

N.B. Accept any correct method of calculation in a) and d).

42 min

Whole class activity

(Or individual work, reviewed with whole class)

Responses shown in unison.

Discussion, reasoning, agreement, praising

In good humour!

$$\begin{array}{r} 125 \times 8 \\ \underline{1000} \\ 1000 \end{array} \quad \underline{1000 \text{ m}}$$

b) Each child might not weigh the same as Jenny.

c) We need to know how far apart the fence posts were.

$$\begin{array}{r} 478 \times 3 \\ \underline{1434} \\ 1434 \end{array}$$

 $\underline{1434}$ legs

Y3		<i>Lesson Plan 139</i>														
<p>Activity</p> <p>9</p>	<p><i>PbY3b, page 139</i></p> <p>Q.5 Read: <i>A bee flies steadily at 217 mm per second.</i> <i>Complete the table.</i></p> <p>Discuss what each row of the table means. Ps can do calculations in <i>Ex Bks</i> if necessary.</p> <p>Let's see how much of the table you can complete in 2 minutes!</p> <p>Review at BB with whole class. Ps come to BB to write in missing values or dictate to T, explaining reasoning.</p> <p>Mistakes discussed and corrected.</p> <p><i>Solution:</i></p> <table border="1" data-bbox="478 689 1013 810"> <tr> <td>Time (seconds)</td> <td>1</td> <td>2</td> <td>5</td> <td>0</td> <td>4</td> <td>10</td> </tr> <tr> <td>Distance (mm)</td> <td>217</td> <td>434</td> <td>1085</td> <td>0</td> <td>868</td> <td>2170</td> </tr> </table> <p style="text-align: right;"><i>45 min</i></p>	Time (seconds)	1	2	5	0	4	10	Distance (mm)	217	434	1085	0	868	2170	<p>Notes</p> <p>Individual work, monitored, helped (or whole class activity if short of time)</p> <p>Table drawn on BB or use enlarged copy master or OHP</p> <p>Reasoning, agreement, self-correcting, praising</p> <p>Extra praise if Ps notice relationships between columns</p>
Time (seconds)	1	2	5	0	4	10										
Distance (mm)	217	434	1085	0	868	2170										

Y3		<i>Lesson Plan</i> 140
<i>Activity</i>	Tables practice, revision, activities, consolidation <i>PbY3b, page 140</i>	<i>Notes</i>