Mill Hill Primary School



**Progression in Subtraction**

**Using the CPA Approach**

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Mill Hill’s Progression in Subtraction – using the CPA Approach

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| ***STRATEGY*** | ***CONCRETE*** | ***PICTORIAL*** | ***ABSTRACT*** |
| **SUBTRACTION:**  **Taking Away**  ***Reception / Year 1***  When this is first introduced, the concrete representation should be based upon the diagram.  Real objects should be placed on top of the images as one-to-one correspondence so that children can take them away, progressing to representing the group of ten with a tens rod and ones with ones cubes.  Children MUST be able to read the number sentence correctly.  How many different ways can the same number sentence be read? | Use physical objects, counters, cubes etc. to show how objects can be taken away.  **Step1**: Count the objects in lines (touch count). Discuss why it is important to do this.    **6 – 2 = 4**    **Step2**:  Take away 2 by moving them out of the way.    **6 – 2 = 4**    IMG_4598  IMG_4601  Use related facts (little numbers to work out BIG numbers).  If 7-3 = 4, then ...  37-3=24 | **Cross out** drawn objects to show what has been taken away.  **Take 2 from 4 4 – 2 = 2**      **Take 3 from 8 8 – 3 = 5**  **Take 3 from 15** | 6 - 2 = 4  Scaffold children to record their knowledge through number sentences with empty boxes.  **– =**    Solve missing box questions:    **– 2 = 4**  **8 – = 5**  **15 – = 12**    **– 3 = 12** |

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| ***STRATEGY*** | ***CONCRETE*** | ***PICTORIAL*** | ***ABSTRACT*** |
| **SUBTRACTION:**  **Counting Back TU - U**  Subtracting 1, 2, or 3 etc by counting back.  Children should be encouraged to **rely on number bonds** knowledge as time goes on, rather than using counting back as their main strategy.  **We aim for children to be able to calculate, not count back!**  Teach children **which** fingers to use when counting back – some children’s fine motor isn’t as good and can hinder accurate counting back. | Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones.    **13 – 4 = 9**  Use counters and move them away from the group as you take them away counting backwards as you go.  IMG_4604  IMG_4606    9 counters left.  Use a number line – full, partial or empty.  IMG_4612  IMG_4613 | Draw Dienes or shapes to help *‘see’* what happens when counting back on a number line -partial or empty- or number track.  When subtracting using a number line:   * ALWAYS BEGIN from the right. Why? * Use valleys – NOT hills. What’s a valley?   **13 – 4 = 9**  IMG_4609  IMG_4610  Start at the bigger number and count back the smaller number showing the jumps on the number line.  This can progress all the way to counting back using two 2 digit numbers.  **12** | Put 13 in your head, count back 4. What number are you at? 13 – 4 = □    Abstract notation of number sentences. Include the use of missing boxes and the missing box in different places:  26 – 13 = □  □ – 16 = 12  18 - □ = 7  Missing box calculation s will also provide an additional scaffold for pupils to begin their abstract recording. |

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| ***STRATEGY*** | ***CONCRETE*** | ***PICTORIAL*** | ***ABSTRACT*** |
| **SUBTRACTION:**  **Counting Back TU – TU**  **(No Regrouping)**  **Using a**  **Number Line**  ***Year 1/2***  **Start with tens.** | Use Bundles of straws and Dienes whilst using any number line – fully labelled, partially labelled or empty.  IMG_4615 | When subtracting using a number line:   * ALWAYS BEGIN from the right. Invite children to suggest WHY. (counting back – numbers get smaller) * Use valleys – NOT hills. What’s a valley? | **46 – 24 = 22**  **22 = 46 – 24**  Abstract notation of number sentences. Include the use of missing boxes and the missing box in different places:  46 – 24 = □  □ – 24 = 22  46 - □ = 22  Missing box calculation s will also provide an additional scaffold for pupils to begin their abstract recording |

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| ***STRATEGY*** | ***CONCRETE*** | ***PICTORIAL*** | ***ABSTRACT*** | |
| **SUBTRACTION:**  **Counting Back TU – TU**  **(With Regrouping)**  **Using a**  **Number Line**  ***Year 2***  **Approximate / estimate the answer first.**  **Start with tens.** | Use Bundles of straws and Dienes whilst using any number line – fully labelled, partially labelled or empty.  IMG_4684  Partition 32 into 3 *‘groups of ten*’ and 2 ones / units.  IMG_4680  IMG_4685    **Step 2**  **Step 1**  **Step 2** - Make clear that 5 ‘ones’ CANNOT yet be subtracted.  WHY? Invite children to **DO IT TO PROVE IT!**  (This will address the misconception that 2 – 5 **cannot** become 5 – 2).  **Regroup one** ‘***group of ten’*** for **ten ‘ones/units’**.  IMG_4683  **Subtract 5 ‘ones’** by counting back five.    **Step 3**  IMG_4682  We aim for children to **calculate** rather than count back.  Children need to understand the importance of **partitioning 5 into 2 and 3** to aid calcuating and fluency.  .  **Step 4** | When subtracting using a number line:   * ALWAYS BEGIN from the right. Invite children to suggest WHY. (counting back – numbers get smaller etc) * Use valleys – NOT hills. What’s a valley?   IMG_4688    IMG_4692IMG_4691IMG_4690IMG_4689 |  |

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| **SUBTRACTION:**  **Finding**  **the**  **Difference**  **Use**  **< = >**  205552AFF346699B3BE45605850AAF13  **to compare numbers.** | Compare amounts and objects to find the difference.  Image result for two towers of cubes  Use cubes to build towers or make bars to find the difference. Use questions such as, ***how many more/greater and less/fewer?***  Use basic ***BAR MODELS*** with ***CONCRETE*** equipment to find the difference. Link the concrete/pictorial to the abstract notation, including the use of missing boxes to represent, i.e. 5 – 3 = □  Using fingers to count on from a small number.    Numicon to model how  many more to add. | | Count on to find the difference.  Draw bars to find the difference between 2 numbers.  http://image.slidesharecdn.com/intro-to-sm-1220840292402057-8/95/intro-to-singapore-math-13-728.jpg?cb=1345557040  Link the pictorial representation to the abstract notation, including the use of missing boxes to represent, i.e.  22 – 13 = □. | | Abstract notation of number sentences. Include the use of missing boxes and the missing box in different places:  26 – 13 = □  □ – 16 = 12  18 - □ = 7  Missing box calculation s will also provide an additional scaffold for pupils to begin their abstract recording. | |
| ***STRATEGY*** | ***CONCRETE*** | | | ***PICTORIAL*** | | ***ABSTRACT*** |
| **Finding**  **One more / greater**  **and**  **One less / fewer**  **of**  **whole numbers.**  **Use**  **< = >**  205552AFF346699B3BE45605850AAF13  **to compare numbers.**  **Finding**  **One More / Greater**  **and**  **One Less / Fewer**  **of**  **Decimal numbers.** | One less / fewer than 9 – show taking away / subtracting. one.    9 – 1 = 8  One less / fewer than 4 – show taking away/subtracting one.    Subtracting one on a bead string.    countUpToBackHands  Subtracting one, counting back  on fingers. Ensure children know  which finger to begin counting.  (dexterity).  Progress to Decimals.  IMG_4623IMG_4622 | | | Use similar models to finding one more to then demonstrate one less.  Any pictorial representations to model concept.  Children to record their thinking using pictorial representations.  Use pictures of Dienes for whole numbers and decimals. | | 6 + 1 = □  6 – 1 = □  I less / more tenth  \_\_\_ 0.6 \_\_\_    I less / more hundredth  \_\_\_ 0.60 \_\_\_ |
| ***STRATEGY*** | | ***CONCRETE*** | | ***PICTORIAL*** | | ***ABSTRACT*** |
| **SUBTRACTION**  **Part- Part Whole**  Teach **both** addition and subtraction alongside each other, as the pupils will use this model to identify the link between them.  Children start with ten cubes placed on the whole.  They then remove what is being taken away from the whole and place it on one of the parts.  The remaining cubes are the other part and also the answer. These can be moved into the second part space. | | Link to addition through the use of the ***PART-WHOLE*** model to help explain the inverse between addition and subtraction.    10 – 6 = □  If 10 is the ***WHOLE*** and 6 is one of the ***PARTS***, what is the other ***PART***?  **Link to decimals to one place using ten frames. Then hundredths (2 decimal places).**  IMG_4625  A ten frame  =  1 Unit / 1 Whole  IMG_4626  One Unit  =  One tenth  1.0 – 0.6 = 0.4  1.0 = 0.6 + 0.4  IMG_4627  **If** **ten tenths (10/10)** is the **WHOLE** and 2/10’s is one of the **PARTS,** then what is the other **PART?** | | Use a pictorial representation of objects to show the ***PART-PART-WHOLE*** model.  If 6 is the ***WHOLE*** and 2 is one of the ***PARTS***, what is the other ***PART***?  **Use tenth grids and hundredth grids**.    **Use Percentage, Fraction and Decimal Interactive Grids.**      www.visnos.com/demos/percentage-fraction-**decimals**-grid  **If** **hundred hundredths (100/100)** is the **WHOLE** and 12/100’s is one of the **PARTS,** then what is the other **PART?** | | 10  5  Move to using numbers within the part whole model.  Abstract notation of number sentences. Include the use of missing boxes and the missing box in different places:  1.0 – 0.7 = □  □ – 10.5 = 12  1.00 - □ = 0.88 |

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| ***STRATEGY*** | ***CONCRETE*** | | ***PICTORIAL*** | | | ***ABSTRACT*** |
| **SUBTRACTION:**  **Making 10**  **With**  **Whole Numbers**  Single digit number from a  2-digit number.  Children identify how many need to be taken away to make ten first.  Then they take away the rest to reach the answer.  **Making 1 Whole**  **With**  **Decimals to 1 place (Tenths)**  **Use Hundredth Grids with**  **Decimals to 2 place (Hundredths)** | 14 – 5 = □    Step 1 Step 2 Step 3  1. Make 14 on the ten frame.  2. Take away the four first to make 10.  3. Then take away one more so you have taken away 5. You are left with the answer of **9**.  **Subtracting Tenths**  1.4 – 0.5 = □ Make links to fractions.    1. Make 1.4 on the ten frame. (Remember ten tenths makes 1 whole)  2. Take away the four tenths first to make one whole unit.  3. Then take away one more tenth so you have taken away 5 tenths. You are left with the answer of **9 tenths. (9/10 or 0.9)** | | When subtracting using a number line:   * ALWAYS BEGIN from the right. Invite children to suggest WHY. (counting back – numbers get smaller) * Use valleys – NOT hills. What’s a valley?   15 – 7 = 8    2  5       1. Start at 15. 2. Take away / subtract 5 to reach 10.   (If children count back 5 then show how to calculate using Dienes / straws)   1. Then take away / subtract the remaining 2 so you have taken away 7 altogether.   You have reached your answer.  1.5 – 0.7 =0. 8    0.2  0.5  **Subtracting Tenths** | | | 16 – 8 = □  How many do we take off to reach the next 10?  How many do we have left to take off?  Abstract notation of number sentences. Include the use of missing boxes and the missing box in different places:  26 – 13 = □  □ – 16 = 12  18 - □ = 7  Missing box calculations will also provide an additional scaffold for pupils to begin their abstract recording.  1.5 - \_\_\_ = 0.8  \_\_\_ - 0.7 = 0.8 |
| ***STRATEGY*** | | ***CONCRETE*** | | ***PICTORIAL*** | ***ABSTRACT*** | |
| **SUBTRACTION**  **Subtracting Multiples of Ten**  Using the vocabulary of 1 ‘***group of ten’***,  2 ‘***groups of ten’***,  3 ***groups of ten’*** etc. alongside 10, 20, 30 is important as children need to understand that it is a ‘ten’ not a ‘one’ that is being taken away.   |  | | --- | |  | | | **60 – 20 = 40**  **Subtract 20 from 60**  **Use bundles of straws (groups of ten)**     * **- 20 =**       **or Dienes**    **- 20 =** | | A simple pictorial representation of ‘sticks’ to represent ‘tens’ and ‘dots’ to represent ‘ones will provide a scaffold for children making a clear link from the ***CONCRETE*** representation to the ***ABSTRACT*** notation. | 6 tens – 4 tens = □ tens  Including missing box questions:  60 – 40 = □  60 – □ = 40  □ – 40 = 20 | |

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| ***STRATEGY*** | ***CONCRETE*** | | ***PICTORIAL*** | ***ABSTRACT*** |
| **SUBTRACTION**  **Multiples**  **of**  **Ten**  **to any number**  **Using Knowledge of Place Value**  ***Invite children to read the number sentence.***  ***What is the same and what’s different about these numbers?***  ***Find the difference.***  **Use**  **< = >**  205552AFF346699B3BE45605850AAF13  **to compare numbers.** | Use bundles of straw before progressing to using Dienes equipment.  ***11 = 31 - 20***  ***Partition 31 into 3 groups of ten and one.***  10 10 10 1  ***IMG_2000IMG_2000IMG_2000IMG_2000***  - 20 = 11  Use place value grids.   |  |  | | --- | --- | | Tens | Ones | | ***IMG_2000IMG_2000IMG_2000*** | ***IMG_2000*** |   Subtract – take away one group of ten then another group of ten. Children need to understand two groups of ten make 20.  **Compare** numbers using < = >.  205552AFF346699B3BE45605850AAF13  205552AFF346699B3BE45605850AAF13Ensure children read the number sentence correctly using vocabulary. | Using images or drawing own images before moving to the abstract*.*  ***11 = 31 - 20***  ***Partition 31 into 3 groups of ten and one.***    - 20 = 11          205552AFF346699B3BE45605850AAF13205552AFF346699B3BE45605850AAF13 | | 31 - 20 = 11  11 = 31 - 20  3 tens and 1 unit – 2 tens = □ ten and □ unit  Including missing box questions:  31 – 20 = □  31 – □ = 11  □ – 20 = 11 |

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| ***STRATEGY*** | ***CONCRETE*** | | ***PICTORIAL*** | ***ABSTRACT*** |
| **SUBTRACTION**  **Multiples**  **of**  **Ten**  **to any number**  ***Invite children to read the number sentence as they subtract on the number line.***  ***What is the same and what’s different about these numbers?*** | Use bundles of straw before progressing to using Dienes equipment.  **- 10**  **- 10**  **- 10**  **- 10**  Use full, partial or empty number lines – depending on ability.  ***11 = 31 - 20 Subtract 20 from 31***  ***Partition 31 into 3 groups of ten and one.***  ***IMG_2000IMG_2000IMG_2000IMG_2000***        **- 10**        **- 10**  **- 10** | Using images or drawing own images before moving to the abstract*.*  ***11 = 31 - 20 Subtract 20 from 31***  ***Partition 31 into 3 groups of ten and one.***              **- 10**    **- 10**  **- 10** | | 31 - 20 = 11  11 = 31 - 20  3 tens and 1 unit – 2 tens = □ ten and □ unit  Including missing box questions:  31 – 20 = □  31 – □ = 11  □ – 20 = 11    Use 100 Square: |

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| **SUBTRACTION:**  **Subtracting 9, 19 29 etc**  **Invite children to think of a quicker way than subtracting nine.**  **Can they come up with an idea?**  **Do children understand why they are subtracting ten?**  **Can they explain?** | Use bundles of straws before progressing to using Dienes equipment.  **Take 9 from 53. 53 – 9 =**  ***Say.... nine less / fewer than 53 is......***  ***53 - 10*** (ten is one more than 9)  ***53 - 10 = 43***  ***43 + 1 = 44***  ***Say......***nine is one less than 10 – we only wanted to subtract nine – not ten so........ what do you do?    ***‘If’* Questions!**  **If 9 less than 53 is 44, what is:**  53 -19,  53- 29,  53 -39, etc | Using images or drawing own images before moving to the abstract*.*  **Take 9 from 53. 53 – 9 =**  ***Say.... nine less / fewer than 53 is......***    Progress to subtracting 19, 29, 39, etc | | **53 – 9 = 44**  53 - 10 = 43  43 + 1 = 44 |

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| ***STRATEGY*** | ***CONCRETE*** | ***PICTORIAL*** | ***ABSTRACT*** |
| **SUBTRACTION:**  **TU - U**  **Regroup a Ten into**  **tens and ones (units)**  After the initial introduction, the Dienes equipment should be placed on a place value chart to support place value understanding.  This will support children when they later use the column method within Y3.  Children must be able to read number sentences using different language associated with subtraction. | Use straws / and or Dienes.   1. – 4 = Take 4 from 20     - 4 =    One ‘ten’ is regrouped into ‘ones’ to enable 4 to be subtracted.  - 4 =        20 - 4 = 16 | Draw pictures or shapes.    Subtract 4 from 20  20 – 4 = 16 16 = 20 - 4      Draw Dienes showing regrouping / exchanging. IMG_4629  IMG_4630  Draw sticks and dots to represent Dienes. | Abstract notation including missing boxes:  20 – 4 = □  Abstract notation of number sentences. Include the use of missing boxes and the missing box in different places:  24 – 13 = □  □ – 16 = 12  17 - □ = 9  Missing box calculation s will also provide an additional scaffold for pupils to begin their abstract recording.  Use = sign at the start of some sentences. |

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| ***STRATEGY*** | ***CONCRETE*** | | ***PICTORIAL*** | ***ABSTRACT*** |
| **SUBTRACTION:**  **Regroup a Unit into**  **Ten Tenths**  **Link to money –** use Dienes / place value counters and money alongside each other. | Use Dienes or place value counters.  1.5 – 0.6 = Subtract 0.6 from 1.5  IMG_4632  One ‘unit’ is regrouped into ‘ten tenths’ (10/10) to enable six tenths (6/10) to be subtracted.  Reinforce 15 tenths equals 1.5.  IMG_4633  IMG_4634  Reinforce the decimal point separates the whole numbers from the tenths.  Notice the decimal point stays in the same position and the remaining tenths are moved into the tenths column. | Draw Dienes or sticks and dots to show regrouping / exchanging.  **1 ten stick becomes the value ... 1 unit.**  IMG_4631**1 unit now becomes the value ...1 tenth.**  IMG_4637IMG_4636IMG_4635  1.5 – 0.6 = 0.9 | | Abstract notation including the equal sign at the beginning:  0.9 = 1.5 – 0.6  **Ensure children can read the number sentence correctly.**  Abstract notation of number sentences. Include the use of missing boxes and the missing box in different places:  2.6 – 1.7 = □  1.6 - □ = 0.7  Missing box calculations will also provide an additional scaffold for pupils to begin their abstract recording.  IMG_4637 |

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| ***STRATEGY*** | ***CONCRETE*** | ***PICTORIAL*** | ***ABSTRACT*** |
| **SUBTRACTION:**  **TU - U**  **Taking Away from the**  **Tens**  Children should identify that they can also take away from the tens and get the same answer.  This reinforces their knowledge of number bonds to 10 and develops their application of number bonds for mental strategies. | **9 = 15 – 6**  The **‘ten’** is **regrouped** into ‘**ones / units**’.  IMG_4638IMG_4639  Then **6** is **subtracted** from the ‘**ten ones’** leaving **4.**  IMG_4641  Then **add** the **4** and then **5** to make **9**.  IMG_4643 | **9 = 15 – 6**  Draw shapes.      +  4 + 5 = 9 | Abstract nototion including missing boxes:  15 - □ = 9  □ - 6 = 9 |

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| ***STRATEGY*** | ***CONCRETE*** | ***PICTORIAL*** | ***ABSTRACT*** |
| **SUBTRACTION:**  **TU – TU**  **Introduce Column Subtraction**  **Partitioning to Subtract**  **Without Regrouping**  ***Year 3***  Bundles of straw (Y1/Y2) or Dienes equipment on a place value chart (developing into using images on the chart) should be used, as when adding 2-digit numbers, reinforcing the main concept of place value for Year 1/2.  **Approximate / estimate the answer first.**  **Start with units / ones.**  When not regrouping, partitioning is a **mental** strategy and **does not** **need** formal recording in columns.  This representation prepares them for using column subtraction with formal recording in Y3. | **34 − 13 = 21 Subtract 13 from 34**    **Partition**  **34**    **Step 1 - Start with the ones (units).**  Subtract 3 ‘ones / units’ and move them down the grid so they are still visible.  **Say:** *‘subtract 3 from 4.’*  4 – 3 = 1  **Step 2 - Subtract the tens).**  Subtract one ‘ten’ – moving it down the grid so it is still visible.  **Say:** *‘subtract 1 group of ten from 3 groups of ten.’*  30 – 10 = 20  The answer is now visible at the top of the grid – this shows what is left. What has been subtracted is at the bottom of the chart.  The inverse operation can now be used quickly to link addition and subtraction:  21 + 13 = 34  Place value counters could also be used (Y2🡪). | Pictorially representing ‘tens’ and ‘ones with ‘sticks and ‘dots.  **34 − 13 = 21**  **Subtract 13 from 34**        Pictorially representing ‘tens’ and ‘ones’ with bundles of straws. | 34 – 13 =  34 – 3 = 31  31 – 10 = 21  Including missing box questions:  34 - □ = 21  □ – 13 = 21  34 – 13 = □  21 = □ – 13 |

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| **STRATEGY** | **CONCRETE** | **PICTORIAL** | | **ABSTRACT** | |
| **SUBTRACTION**  **Introduce Column**  **Subtraction**  **TU - TU**  ***Year 2 / 3***  **Partitioning to Subtract**  **with**  **Regrouping**  **Approximate / estimate the answer by rounding to the nearest ten.**  **Start with units / ones.**  **Dienes equipment and place value grids should be used.**  Even when working pictorially, children should have access to Dienes equipment if they require further scaffolding.  **SUBTRACTION**  **Introduce Column**  **Subtraction**  **TU - TU**  ***Year 2/3***  **Partitioning to Subtract**  **with**  **Regrouping**  ***continued***  Dienes equipment and place value grids should be used.  Even when working pictorially, children should have access to Dienes equipment if they require further scaffolding  **SUBTRACTION**  **Introduce**  **Column**  **Subtraction**  **TU – TU**  ***Year 3***  **No**  **Regrouping**  **Approximate / estimate the answer by rounding to the nearest ten.**  **Start with units / ones.**  **Dienes equipment and place value grids should be used.**  **The answer is now visible at the top of the chart – this shows what is left.**  **What has been subtracted is at the bottom of the chart.**  **Check answer using the inverse.**  **SUBTRACTION**  **Column**  **Subtraction**  **TU – TU**  ***Year 3***  **With**  **Regrouping**  **Approximate / estimate the answer by rounding to the nearest ten.**  **Start with units / ones.**  Dienes equipment and place value grids should be used.  The **answer** is now visible at the **top** of the grid – this shows **what is left.**  What has been **subtracted** is at the **bottom** of the grid.  **Check answer using the inverse.** | **52 – 25 = 27** **Subtract 25 from 52**    **Partition**  **52**  **Step 1 – Subtract the units / ones**  Make clear that 5 ‘ones’ CANNOT yet be subtracted. WHY? Invite children to **DO IT TO PROVE IT!** (This will address the misconception that 2 – 5 cannot become  5 – 2).  **Regroup one** ‘***group of ten’*** for **ten ‘ones/units’** – leave intially in the ‘tens’ column. Establish we still have 50 (5 groups of ten – count in tens pointing to each ten stick) in the ‘tens’ column.  **Move** the **ten ‘ones/units’** across to the **‘ones/units’ column**. Establish that the number represented is still 52: ‘forty and twelve or 40 + 12’. Children should be secure with this element of place value before working on this concept.  **Subtract 5 ‘ones’** and move them down to the bottom of the grid so they are still visible. **7 ‘ones’** have been left at the top. Therefore, children need to be secure with partitioning numbers in different ways: 12 = 7 + 5 and IMG_4654linking this to number bonds.  IMG_4656  IMG_4654  **Step 2 – Subtract the tens**  IMG_4654**Subtract two ‘groups of ten’** and move then down to the bottom of the grid so they are still visible. **2 ‘groups of** **ten**’ have been left at the top.  **The answer is now visible at the top of the grid – this shows what is left.**  **What has been subtracted is at the bottom of the grid.**  The inverse operation can now be used quickly to link addition and subtraction:  27 + 25 = 52  Place value counters could also be used.  Use Dienes or place value counters.  **56 – 22 = 34 Subtract 22 from 56**  IMG_4665  **Partition 56**  **Step 1 - Start with the ones (units).**  Subtract 2 ‘ones / units’ and move them down  the grid so they are still visible.  IMG_4666  Say:  “*Subtract 2 from 6”.*  Record vertically  in columns.    **Step 2 – Subtract the tens.**  **Subtract two ‘groups of ten’** and move then down to the bottom of the grid so they are still visible. **3 ‘groups of** **ten**’ have been left at the top.  IMG_4667    Say:  “*Subtract 2 tens from 5 tens”.*  Say:  “*Subtract 20 from 50”.*  Record vertically  in columns.  IMG_4667  Progress to using place value counters.  **62 – 26 = Subtract 26 from 62**  **Partition 62 Step 1 – Subtract the units / ones.**  Make clear that 6 ‘ones’ CANNOT yet be subtracted.  WHY? Invite children to **DO IT TO PROVE IT!**  (This will address the misconception that 2 – 6  cannot become 6 – 2).  IMG_4672**Regroup one** ‘***group of ten’*** for **ten ‘ones/units’** – leave intially in the ‘tens’ column.  IMG_4671    IMG_4674**Move** the **ten ‘ones/units’** across to the **‘ones/units’ column**. Establish that the number represented is still 62: ‘fifty and twelve or 50 + 12’. Children should be secure with this element of place value before working on this concept.    IMG_4673    **Subtract 6 ‘ones’** and move them down to the bottom of the grid so they are still visible. **6 ‘ones’** have been left at the top.  **Step 2 – Subtract the tens**  **Subtract two ‘groups of ten’** and move then down to the bottom of the grid so they are still visible.  **3 ‘groups of** **ten**’ have been left at the top.  50 – 20 = 30  IMG_4675  IMG_4675IMG_4675 | Pictorially representing ‘tens’ and ‘ones’ with rectangles and squares or lines and dots.  IMG_4652IMG_4653IMG_4651  **Subtract 25 from 52**  Pictorially representing ‘tens’ and ‘ones’ with rectangles and squares or lines and dots.  See example on previous pages.  Pictorially representing ‘tens’ and ‘ones’ with rectangles and squares or lines and dots.  See previous pages for examples.  . | | 52 – 25 =  52 – 5 = 47  47 – 20 = 27  Including missing box questions  52 – 25 = □  □ = 52 – 27  52 - □ = 27  □ – 25 = 27  52 – 25 =  52 – 5 = 47  47 – 20 = 27  Including missing box questions  52 – 25 = □  □ = 52 – 27  52 - □ = 27  □ – 25 = 27  56 – 22 = 34  34 = 56 – 22    Including missing box questions  56 – 22 = □  □ = 56 – 22  56 - □ = 34  □ – 22 = 34  Begin to solve missing box questions in columns:    c  Including missing box questions  62 – 26 = □  □ = 62 – 26  62 - □ = 36  □ – 26 = 36  Begin to solve missing box questions in columns: | |
| **CONCRETE** | **PICTORIAL** | **ABSTRACT** | |  | |
| **SUBTRACTION**  ***Year 4***  **Column**  **Subtraction**  **HTU – HTU**  **Partitioning**  **to**  **Subtract**  **without**  **Regrouping**  **Approximate / estimate the answer first.**  **250 – 120 = 130**  ***If 25 - 12 is 13 then ....***  **Place Value grids to be used.**  **Start with units / ones.**  **Use the inverse to check answer.**  **123 + 122 = 245**  **What has been subtracted is at the bottom of the grid.** | Use Dienes or place value counters and place value grids.  245 – 123 = Subtract 123 from 245 **H T U**  **IMG_4657 2 4 5**   * - **1** **2**  **3**   **Partition 245**  \_\_\_\_\_\_  **1 2 2**    **Step 1 – Subtract the Units / Ones**  **Subtract 3 ‘ones’** and move them down to the bottom of the grid so they are still visible. **2 ‘ones’** have been left at the top.  Say: “*Subtract 3 from 5”.*  IMG_4658  IMG_4659  **Step 2 – Subtract theTens**  **Subtract 2 ‘groups of ten’** and move them down to the bottom of the grid so they are still visible. **2 ‘groups of ten’** have been left at the top.  Say: “*Take 20 from 40”.*  IMG_4660  IMG_4660  **Step 3 – Subtract the Hundreds**  **Subtract 1 hundred** and move it down to the bottom of the chart.  **The answer is now visible at the top of the grid – this shows what is left.** | \_\_\_\_ = 245 – 123   |  |  |  | | --- | --- | --- | | **Hundreds** | **Tens** | **Ones** | |  |  |  |      |  |  |  | | --- | --- | --- | | **Hundreds** | **Tens** | **Ones** | |  |  |  |  |  |  |  | | --- | --- | --- | | **Hundreds** | **Tens** | **Ones** | |  |  |  |  |  |  |  | | --- | --- | --- | | **Hundreds** | **Tens** | **Ones** | |  |  |  | | | | 122 = 245 – 123  Solve missing box questions: |
| **STRATEGY** | **CONCRETE** | **PICTORIAL** | | | **ABSTRACT** |
| **SUBTRACTION**  ***Year 4***  **Column**  **Subtraction**  **HTU – HTU**  **Partitioning**  **to**  **Subtract**  **with**  **Regrouping**  **Place Value grids to be used.**  **Approximate / estimate the answer first by rounding to nearest multiple of ten.**  **340 – 190=**  ***If 34 – 19 is 15 then...***  **340 – 190=150**  **Start with units / ones.**  **SUBTRACTION**  ***Year 4***  **Column**  **Subtraction**  **HTU – HTU**  **Partitioning**  **to**  **Subtract**  **with**  **Regrouping**  ***continued***  **Approximate / estimate the answer first.**  **Start with units / ones.**  **Use the inverse to check answer.**  **157 + 187 = 344** | Use Dienes equipment and then progress to using place value counters. **\_\_\_\_ = 344 - 187**  **Partition 344**   **H T U**  **2 1 3 1**  **3 4 4**  - **1 8 7**  \_\_\_\_\_\_\_\_\_  **1 5 7**  **\_\_\_\_\_\_\_\_**  **Step 1 - Subtract the ones / units.**  Make clear that 7 ‘ones’ CANNOT yet be subtracted. WHY? Invite children to **DO IT TO PROVE IT!** (This will address the misconception that 4 – 7 cannot become  7 – 4).  **Regroup one** ‘***group of ten’*** for **ten ‘ones/units’.**    Establish we still have 344 – we have just created three hundred and thirty and fourteen. Children should be secure with this element of place value.        Subtract seven from fourteen.  14 – 7 = 7    **\_\_\_\_ = 344 - 187**  **Step 2 - Now subtract the tens.**  Make clear that 8 ‘groups of ten’ (80) CANNOT yet be subtracted. WHY? Invite children to **DO IT TO PROVE IT!** (This will address the misconception that 40 – 80 cannot become 80 – 40).  **Regroup *one hundred for ‘ten groups of ten’.***    Now we have created two hundred, thirteen tens and seven units.  Establish that 13 ‘groups of ten’ is the same as 130.    Now subtract 8 tens from 13 tens.  Take away the 80.  130 – 80 = 50  **Step 3 - Now subtract the hundreds.**    Now take one hundred away from two hundred.  **The counters left show the answer: 157**  **What has been subtracted is not shown on these photos.** | **\_\_\_\_ = 344 - 187**   |  |  |  | | --- | --- | --- | | **Hundreds** | **Tens** | **Ones** | |  |  |  |  |  |  |  | | --- | --- | --- | | **Hundreds** | **Tens** | **Ones** | |  |  |  |  |  |  |  | | --- | --- | --- | | **Hundreds** | **Tens** | **Ones** | |  |  |  |     **\_\_\_\_ = 344 - 187**   |  |  |  | | --- | --- | --- | | **Hundreds** | **Tens** | **Ones** | |  |  |  |  |  |  |  | | --- | --- | --- | | **Hundreds** | **Tens** | **Ones** | |  |  |  |  |  |  |  | | --- | --- | --- | | **Hundreds** | **Tens** | **Ones** | |  |  |  | | | | Solve missing box questions:    **H T U**  **3 4 4**  - **1 8 7**  \_\_\_\_\_\_\_\_\_  **1 5 7**  Solve missing box questions:    **H T U**  **3 4 4**  - **1 8 7**  \_\_\_\_\_\_\_\_\_  **1 5 7** |
| **STRATEGY** | **CONCRETE** | **PICTORIAL** | | | **ABSTRACT** |
| **SUBTRACTION**  ***Year 5 / 6***  **Column**  **Subtraction**  **ThHTU – ThHTU**  **Without**  **Regrouping**  **Then progress**  **to**  **Regrouping**  **Estimate first**  **by**  **rounding and using related facts.**  **3,000–1,000=2,000**  **3,300 - 1,400=**  ***If....33-14 is 19 then 3,300 – 1,400 is 1,900***  **Place value grids to be used.**  **SUBTRACTION**  ***Year 5***  **Column**  **Subtraction**  **ThHTU – ThHTU**  **Without**  **Regrouping**  **Then progress**  **to**  **Regrouping**  ***continued***  **SUBTRACTION**  ***Year 5***  **Column**  **Subtraction**  **ThHTU – ThHTU**  **Without**  **Regrouping**  **Then progress**  **to**  **Regrouping**  ***continued***  **Compare the answer to the estimate.**  **Use the inverse to check answer.**  **1,877 + 1,374 =**  **Does it equal 3,251?** | Place value counters 1,000’s, 100’s, 10’s and 1’s to develop and consolidate understanding and aid fluency.  **\_\_\_\_ = 3,251 - 1,374 Subtract 1,374 from 3,251**  IMG_4661  **Step 1 - Start by subtracting the ones / units.**  Make clear that 4 ‘ones’ CANNOT yet be subtracted. WHY? Invite children to **DO IT TO PROVE IT!** (This will address the misconception that 1 – 4 cannot become  4 – 1).  **Regroup one** ‘***group of ten’*** for **ten ‘ones / units’.**  IMG_4662  Now we have created three thousand, two hundred and forty AND eleven units / ones.  Reinforce we still have 3,251 – count to check!  IMG_4664  Now subtract seven from fourteen.  11 – 4 = 7    **\_\_\_\_ = 3,251 - 1,374 Subtract 1,374 from 3,251**  **Step 2 - Now subtract the tens.**  Make clear that 7 ‘groups of ten’ (70) CANNOT yet be subtracted. WHY? Invite children to **DO IT TO PROVE IT!** (This will address the misconception that 40 – 70 cannot become  70 – 40). **Regroup *one hundred for ‘ten groups of ten’.***  IMG_4665    Now we have created three thousand, one hundred, fourteen tens and seven units.  Establish that 14 ‘groups of ten’ is the same as 140.  IMG_4666    Now subtract 7 tens from 14 tens.  Say: ‘Subtract the 70 from 140.’  140 – 70 = 70  IMG_4668  **Step 3 - Now subtract the hundreds.**  **Regroup *one thousand for ‘ten groups of one hundred’.***  **Now subtract the tens.**    **\_\_\_\_ = 3,251 - 1,374 Subtract 1,374 from 3,251**  IMG_4670  Now subtract 3 *‘groups of one hundred*’ from 11 *‘groups of one hundred’.*  Say: ‘Subtract 300 from 1,100.’  1,100 – 300 = 800    IMG_4671  **Step 4 - Now subtract the thousands.**  Now take one thousand away from two thouasand.  **The counters left show the answer:**  **1, 877** | | Draw place value counters.  **\_\_\_\_ = 3,251 - 1,374**  Draw place value counters.  **\_\_\_\_ = 3,251 - 1,374**  Draw place value counters.  **\_\_\_\_ = 3,251 - 1,374** | | **Th H T U**  **2 11 14 1**  **3** **2 5 1**  - **1** **3 7 4**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_  **1**  **8 7 7**  Solve missing box questions:  **Th H T U**    **3** **2 5 1**  - **1** **3 7 4**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_  **1**  **8 7 7**  **Th H T U**  **2 11 14 1**  **3** **2 5 1**  - **1** **3 7 4**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_  **1**  **8 7 7**  Solve missing box questions:  **Th H T U**    **3** **2 5 1**  - **1** **3 7 4**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_  **1**  **8 7 7** |
| **STRATEGY** | **CONCRETE** | **PICTORIAL** | | | **ABSTRACT** |
| **SUBTRACTION**  **Column**  **Subtraction**  **with**  **Decimals**  **No**  **Regrouping**  **Estimate**  **by**  **rounding**  **to the**  **nearest whole**  **number.**  **6.0 – 2.0 = 4.0**  **Make connections with fractions and decimals.**  **Use place value grids.**  **Check answer using the inverse.** | Initially use a place value grid with **Dienes / Base Ten** to  add decimals to 1 place, then progress to using place  value counters.    5.6 – 2.2 = 3.4 Subtract 2.2 from 5.6  IMG_4693 **-**    **Step 1 - Start with the tenths**  Subtract 2 ‘tenths’ (0.2 or 2/10) from 6 ‘tenths’ (0.6 or 6/10) and move them down the grid so they are still visible.  IMG_4694IMG_4695  **Step 2 - Subtract two units / ones** and move then down to the bottom of the chart so they are still visible.  **3 units / ones** have been left at the top.  **The answer is now visible at the top of the grid – this shows what is left.**  **What has been subtracted is at the bottom of the grid.** | Pictorially representing ‘tens’ and ‘ones’ with rectangles and squares or lines and dots.  IMG_4699IMG_4698IMG_4697  Here’s another way of drawing. | | | 5.6 – 2.2 = 3.4  3.4 = 5.6 – 2.2    Including missing box questions  5.6 – 2.2 = □  □ = 5.6 – 2.2  5.6 - □ = 3.4  □ – 2.2 = 3.4  Begin to solve missing box questions in columns: |

|  |  |  |  |
| --- | --- | --- | --- |
| **STRATEGY** | **CONCRETE** | **PICTORIAL** | **ABSTRACT** |
| **SUBTRACTION**  **Column**  **Subtraction**  **with**  **Decimals**  **(Regrouping)**  **Estimate**  **by**  **rounding**  **to the**  **nearest whole**  **number.**  **6.0 – 2.0 = 4.0**  **Make connections with fractions and decimals.**  **Use place value grids.**  **Check answer using the inverse.**  The **answer** is now visible at the **top** of the grid – this **shows what is left.**  **What** has been **subtracted** is at the **bottom** of the grid. | 6.2 – 2.6 = Subtract 2.6 from 6.2  Make clear that 6 ‘tenths’ CANNOT yet be subtracted.  WHY? Invite children to **DO IT TO PROVE IT!**  (This will address the misconception that 0.2 – 0.6  cannot become 0.6 – 0.2).  **Regroup one** **unit** for **ten ‘tenths’** – leave intially in the ‘units/ ones’ column. **Ones / Units Tenths**  IMG_4672 **Ones / Units Tenths**  IMG_4671  **Move** the **ten ‘ones/units’** across to the **‘tenths’ column**. Establish that the number represented is still 6.2: ‘five and twelve tenths 5.0 + 12 tenths’. Children should be secure with this element of place value before working on this concept.  **Ones / Units Tenths Ones / Units Tenths**  IMG_4673IMG_4674    **Now subtract 6 ‘tenths’** from **12 ‘tenths’** and move them down to the bottom of the grid. **6 ‘tenths’** have been left at the top.  **Ones / Units Tenths**  IMG_4675  **Subtract 2 units / ones from 5 units / ones** and move then down to the bottom of the grid so they are still visible. **3 ‘units/ones**’ have been left at the top.  **0.6**  **3 units** | Pictorially representing ‘tens’ and ‘ones’ with rectangles and squares or lines and dots.  You may wish to draw each stage shown in the concrete section. | 6.2 – 2.6 = 3.6  3.6 = 6.2 – 2.6    Including missing box questions:  6.2 – 2.6 = □  □ = 6.2 – 2.6  6.2 - □ = 3.6  □ – 2.6 = 3.6  Begin to solve missing box questions in columns: |
| **STRATEGY** | **CONCRETE** | **PICTORIAL** | **ABSTRACT** |
| **SUBTRACTION**  **Column**  **Subtraction**  **with**  **Decimals to 2 places**  **(No Regrouping)**  **Make connections with fractions and money.**  ***Address misconceptions using practical apparatus.***  *0.2 is fewer than 0.20*  *Prove it!*  *0.1 does not equal 0.01. Prove it!*  *Order these decimals Prove it!*  *0.3 0.6 0.03 0.30*  *Use* ***< = >*** *to compare decimals and* ***find the difference.***  **SUBTRACTION**  **Column**  **Subtraction**  **with**  **Decimals**  **to**  **2 places**  **(No Regrouping)**  ***continued***  ***Check the answer with the estimate.***  ***Check the answer by using the inverse.***   * 1. **+ 1.57=**   **Does this equal**  **4.89?** | **Initially**, use a place value frame with **Dienes / Base Ten** to add decimals to **2 places**, then progress to using place value counters.  **U . Tth Hth**  **4 . 8 9**  **-** **1 . 5 7**  \_\_\_\_\_\_\_\_\_\_\_    Estimate the answer by rounding to the nearest whole number or tenth. 5.00 – 2.00= 3.00  **Step 1**  IMG_4702  **Partition 4.89 into:**  **4 units**  **8 tenths (8/10’s**  **or 0.8)**  **9 hundredths**  **(9/100’s or 0.09)**  **Step 2**  IMG_4703  **Start with the Hundredths**  Subtract 7 hundredths from 9 hundredths and move them down the grid so they are still visible.  0.09 – 0.07 = 0.02  9/100 – 7/100 = 2/100    **Step 3**  IMG_4705  **Now the Tenths**  Subtract 5 tenths from 8 tenths and move them down the grid so they are still visible.  0.8 – 0.5 = 0.3  8/10 – 5/10 = 3/10    **Step 4**  IMG_4706  **Now the Units**  Subtract 1 unit from 4 units and move them down the grid so they are still visible.  4.0 – 1.0 = 3.0  or  4 – 1 = 3    **0.3 left**  **3 units left**  **0.02 left**  The **answer** is now visible at the **top** of the grid – this **shows what is left.**  **What** has been **subtracted** is at the **bottom** of the grid. | **\_\_\_\_ = 4.89 - 1.57**     |  |  |  | | --- | --- | --- | | **Units** | **Tths** | **Hths** | |  |  |  |  |  |  |  | | --- | --- | --- | | **Units** | **Tths** | **Hths** | |  |  |  |   **\_\_\_\_ = 4.89 - 1.57**   |  |  |  | | --- | --- | --- | | **Units** | **Tths** | **Hths** | |  |  |  |  |  |  |  | | --- | --- | --- | | **Units** | **Tths** | **Hths** | |  |  |  | | **U . Tth Hth**  **4 . 8 9**  **-** **1 . 5 7**  \_\_\_\_\_\_\_\_\_\_\_  **3 . 3 2**  Including missing box questions:  4.89 – 1.57 = □  4.89 – □ = 3.32  □ = 4.89 – 1.57  □ – 3.32 = 1.57  Begin to solve missing box questions in columns:  **U . Tth Hth**  **4 . 8 9**  **-** **1 . 5 7**  \_\_\_\_\_\_\_\_\_\_\_  **3 . 3 2**    **U . Tth Hth**  **4 . 8 9**  **-** **1 . 5 7**  \_\_\_\_\_\_\_\_\_\_\_  **3 . 3 2** |
| **STRATEGY** | **CONCRETE** | **PICTORIAL** | **ABSTRACT** |
| **SUBTRACTION**  **Column**  **Subtraction**  **with**  **Decimals**  **to**  **2 places**  **(with regrouping)**    Estimate the answer by rounding to the nearest whole number or tenth.  5.00 – 2.00= 3.00  ***Use place value grids.***  **SUBTRACTION**  **Column**  **Subtraction**  **with**  **Decimals**  **to**  **2 places**  **(with regrouping)**  ***continued***  ***Use place value grids.***  **SUBTRACTION**  **Column**  **Subtraction**  **with**  **Decimals**  **to**  **2 places**  **(with regrouping)**    ***Check the answer with the estimate.***  ***Check the answer by using the inverse.***  **1.87+1.57=**  **Does this equal**  **3.44?** | Initially use a place value frame with **Dienes / Base Ten** to add decimals to 2 places, then progress to using place value counters.  **U . Tth Hth**  **3 . 4 4**  **-** **1 . 8 7**  \_\_\_\_\_\_\_\_\_\_\_    3.44 – 1.87 = Subtract 1.87 from 3.44  **Step 1 – Partition the number**  IMG_4707  **Partition 4.89 into:**  **3 units**  **4 tenths (4/10’s**  **or 0.4)**  **4 hundredths**  **(4/100’s or 0.04)**  **Step 2 – Start with the Hundredths (1/100’s)**  Make clear that 7 ‘hundredths’ CANNOT yet be subtracted.  WHY? Invite children to **DO IT TO PROVE IT!**  (This will address the misconception that 0.04 – 0.07  cannot become 0.04 – 0.07)  IMG_4708IMG_4708  **Regroup / exchange one** **tenth** for **ten ‘hundredths’** – leave intially in the ‘tenths’ column.  **Now move the 10 hundredths into the hundredths column.**  **(See next photo.)**  IMG_4719  **Now 10 hundredths are in the hundredths column.**  **Reinforce there’s still**  **3.44 =**  **3 units + 3 tenths + 14 hundredths.**  **Now subtract the Hundredths (1/100’s)**  IMG_4710  **Subtract 7 ‘hundredths’** from **14 ‘hundredths’** and move them down to the bottom of the grid. **7 ‘hundredths’** have been left at the top.  **Step 3 – Subtract the Tenths (1/10’s)**  IMG_4711  **Regroup / exchange one** **unit** for **ten tenths’** – leave intially in the ‘units/ ones’ column.  **Now move the 10 tenths into the tenths column.**  **(See next photo.)**  IMG_4711  **Now subtract the Tenths (1/10’s)**  IMG_4712  **Now it is possible to subtract.**  **Subtract 8 ‘tenths’** from **13 ‘tenths’**.  13/10 – 8/10 = 5/10  **Now subtract the Tenths (1/10’s)**  IMG_4714    **Subtract 8 ‘tenths’** from **13 ‘tenths’** and move them down to the bottom of the grid.  **5 ‘tenths’** have been left at the top.  **Step 4 – Subtract the Units / Ones (Whole numbers)**  IMG_4715  **Subtract 1 unit** from **2 units** and move the 1 units down to the bottom of the grid.  **1 unit** has been left at the top.    **1 unit left**  **0.07 left**  **0.5 left**  The **answer** is now visible at the **top** of the grid – this **shows what is left.**  **What** has been **subtracted** is at the **bottom** of the grid. | **\_\_\_\_ = 3.44 - 1.87**   |  |  |  | | --- | --- | --- | | **Units** | **Tths** | **Hths** | |  |  |  |  |  |  |  | | --- | --- | --- | | **Units** | **Tths** | **Hths** | |  |  |  |  |  |  |  | | --- | --- | --- | | **Units** | **Tths** | **Hths** | |  |  |  |  |  |  |  | | --- | --- | --- | | **Units** | **Tths** | **Hths** | |  |  |  |  |  |  |  | | --- | --- | --- | | **Units** | **Tths** | **Hths** | |  |  |  |  |  |  |  | | --- | --- | --- | | **Units** | **Tths** | **Hths** | |  |  |  |   **\_\_\_\_ = 3.44 - 1.87**   |  |  |  | | --- | --- | --- | | **Units** | **Tths** | **Hths** | |  |  |  |  |  |  |  | | --- | --- | --- | | **Units** | **Tths** | **Hths** | | **1 unit left** | **0.5 left** | **0.07 left** | | Including missing box questions:  3.44– 1.87 = □  3.44 – □ = 1.57  □ = 3.44 – 1.87  □ – 1.87 = 1.57  Begin to solve missing box questions in columns:    Including missing box questions:  3.44– 1.87 = □  3.44 – □ = 1.57  □ = 3.44 – 1.87  □ – 1.87 = 1.57  Begin to solve missing box questions in columns:      Including missing box questions:  3.44– 1.87 = □  3.44 – □ = 1.57  □ = 3.44 – 1.87  □ – 1.87 = 1.57  Begin to solve missing box questions in columns: |