Addition Model Progression

*Peter has five lollipops in a bowl and Jenny has three lollipops in a bowl. How many lollipops do they have altogether?*

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| Model 1 Model 2 | Guidance notes |
| Calculations  5+3=8 | *Start with a story and not a Learning Objective.*  *Make sure the objects are the REAL object in the story and not just concrete materials.*  *Always show the calculation alongside the models.* |
| Calculations  5+3=? | *Replace the objects with concrete material.* |
| ?  Calculations  5+3=?  Peter  ?    Jenny  Jenny’s lollipops  Peter’s lollipops  ? | *Move onto pictures of the items being added.*  *They may draw pictures of the actual object, in this case lollipops or use shapes like in the example shown.* |
| Peter   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  | | --- | --- | --- | |  |  |  |   Calculations  5+3=?    ?   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  | Jenny |   Peter’s lollipops  Jenny’s lollipops  ? | *The diagrams become increasingly abstract but the one to one correspondance is still there and the children can still count the sqaures if needs be.* |
| Calculations  5+3=?  Peter   |  | | --- | | 5 |  |  | | --- | | 3 |   ?   |  |  | | --- | --- | | 5 | 3  Jenny |   Peter’s lollypops  Jenny’s lollypops | *The diagrams become more efficient.*  *The children needs to understand the relative size of the part and whole.* |

Subtraction Model Progression

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| *Jenny has 8 lollipops to begin with. She eats 3 lollipops. How many lollipops does Jenny have left?* | *Peter has 8 lollipops. Jenny has 3 lollipops. How many more lollipops does Peter have than Jenny?* |  |
| Model 1 | Model 2 | Guidance notes |
| Calculations  8-3=5 | |  |
| Calculations  8-3=5 | | *Children use real objects to solve the problem.*  *They see one and two bar model representations in preperation for taking away and finding the difference.* |
| Calculations  8-3=? | | *The real objects are replaced by other concrete manipulatives.* |
| Jenny’s lollipops  Calculations  8-3=?  Peter    Jenny  Lollipops left  Lollipops eaten  ? | | *Children draw the problem using symbols. In the one bar method they cross out the ones that are taken away.* |
| ×  Calculations  8-3=?  Peter   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | |  |  |  |   Jenny’s Lollipops  ×  ×     |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  | ?  Jenny |   Lollipops left  Lollipops eaten | | *The diagrams become increasingly abstract but one to one correspondacnce remains. Children cross through the ones that are taken away in the one bar model.* |
| 8   |  | | --- | | 8 |  |  | | --- | | 3 |   Peter  Calculations  8-3=?   |  |  | | --- | --- | | ? | 3  ?  Jenny |   Lollipops Left  Lollipops eaten | | *The diagrams are more efficient and the children are confident in the one and two bar model for subtraction.* |

Multiplication Model Progression

*Lollypops come in packs of 3. Peter buys 5 packs of lollipops. How many lollipops does Peter buy altogether?*

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| Calculations  3+3+3+3+3=  5x3= | *Children make the calculation with the real object. They clearly see that multiplication is making groups/ lots of things.*  *They see the relationship between multiplication and repeated addition.* |
| Calculations  3+3+3+3+3=  5x3= | *Children move on to using other concrete manipulatives to represent the multiplication problem.*  *They consolidate their understanding of multiplication being the same as repeated addition.* |
| Calculations  5x3=   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  |  |  |  |  | | 3 | 3 | 3 | 3 | 3 |     ?  5x3= | *Children using drawings to show the multiplication calculations they are able to say that they have drawn ‘x’ lots of groups of ‘y’* |
| Calculations  5x3=   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **3** | **3** | **3** | **3** | **3** | | *Children’s drawings become more efficient as they are able to show the multiplication calculation numerically using the bar model.* |

Division Model Progression

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| **Partitive (splitting the number into equal groups)** | **Quotitive (counting how many groups of an amount going into a number)** |  |
| *Jenny has 20 lollipops. She wants to share them equally into 5 boxes. How many lollipops should go into each box?* | *Jenny has 20 lollipops. She wants to pack them into boxes with 5 lollipops in each box. How many boxes will she need to pack all the lollipops?* |  |
| Calculations  20÷5=  Calculations  20÷5= | | *Children use the actual objects to solve the problems seeing the difference between the two different styles.* |
| 20  20  Calculations  20÷5=  Calculations  20÷5= | | *Children move onto using other concrete manipulatives and consolidate their understanding of grouping equally or making into equal groups.* |
| |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  |   Calculations  20÷5=  Calculations  20÷5=   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  |  |  |  |  |   20  20 | | *Children use informal jottings and drawings to practise grouping and sharing into equal groups.* |
| |  | | --- | |  |  |  |  | | --- | --- | | 5 |  |  |  |  |  |  | | --- | --- | --- | --- | | 5 | 5 | 5 | 5 |   *Draw a bar to represent the total number of lollipops.*  *Place one box of 5 lollipops in the bar.*  *Work out how many boxes are needed by counting how many 5s go into twenty.*   |  | | --- | | *Draw a bar to represent the total number of lollipops.*  *Split the bar into 5 equal parts.*  *Share the lollipops equally between the 5 boxes and work out how many are in each box.* |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | ? | ? | ? | ? | ? |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | 4 | 4 | 4 | 4 | 4 | | | |