**Bar modelling**

In school this is used to solve addition, subtraction, multiplication and division questions. The children also use it to find a fraction of a number. ***\*Please note this shows a step by step of how the bar models are constructed, the children do not need to draw out each whole step again as they work through. For each question they should have 1 complete bar model.***

**Addition**

24 + 32 =

* Draw the bars out with the larger number having a bigger bar and write the numbers inside the boxes.

|  |  |
| --- | --- |
| **24** | **32** |

* Now draw tens and ones to represent the number in boxes underneath

|  |  |
| --- | --- |
| **24** | **32** |
|  |  |

* Draw one total bar at the bottom, running the length of the boxes. Count all the tens, then add on all the ones and write the total in the box.

|  |  |
| --- | --- |
| **24** | **32** |
|  |  |
| **56** | |

**Subtraction**

This method of subtraction uses counting on, instead of traditional taking away

47 – 23 =

* Children draw a full bar representing the first number as in subtraction this is the largest.

|  |
| --- |
| **47** |

* Underneath draw a bar representing the second number in the number sentence, in this example representing number 23. They write this number in the box. Then write a ? in the remaining box as this is what we are trying to find.

|  |  |
| --- | --- |
| **47** | |
| **23** | **?** |

* Children now draw the tens and ones for the number we know

|  |  |
| --- | --- |
| **47** | |
| **23** | **?** |
|  |  |

* Now children must make the number we know match the larger number, breaking it down into ones and tens. Starting with the ones, children should put the known number (23) into their head and draw out ones until the ones digit in both numbers is the same – in this case making 27.

|  |  |
| --- | --- |
| **47** | |
| **23** | **?** |
|  |  |

So far we have drawn 27.

* Repeat for the tens digit. Children count on from 27, drawing tens until they reach the larger number, in this example that is 47

|  |  |
| --- | --- |
| **47** | |
| **23** | **?** |
|  |  |

* Now children have drawn all the ones and tens, they can count them up (starting with the tens this time) and write the total in same box as the question mark.

|  |  |
| --- | --- |
| **47** | |
| **23** | **24** |
|  |  |

**Multiplication**

We refer to the x sign as ‘lots of’. In this example we would say 4 lots of 3.

4 x 3 =

* Draw 4 boxes joined together. This represents 4 lots

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| --- | --- | --- | --- |
|  |  |  |  |

* Now write the number 3 in each box. This shows 4 lots of 3

|  |  |  |  |
| --- | --- | --- | --- |
| **3** | **3** | **3** | **3** |

* Children now draw another row of 4 boxes underneath. Next draw circles in the boxes representing the number.

|  |  |  |  |
| --- | --- | --- | --- |
| **3** | **3** | **3** | **3** |
|  |  |  |  |

* Finally draw a total bar at the bottom. Count up **all** the dots and write the answer in the box.

|  |  |  |  |
| --- | --- | --- | --- |
| **3** | **3** | **3** | **3** |
|  |  |  |  |
| **12** | | | |

**Division**

We refer to ÷ sign as ‘shared between’ and often use people to help the children visualise division. In this example we would say 20 shared between 4 people.

20 ÷ 4 =

* 20 is the largest number and the total we are sharing so it needs its own bar.

|  |
| --- |
| **20** |

* Underneath the children now draw boxes representing the 4 people.

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| --- | --- | --- | --- |
| **20** | | | |
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* Children now share out 20 by drawing circles in the boxes. **It is important they share ‘one for you, one for you, one for you, one for you’** into each boxuntil they reach 20. The start of this process would look like this

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| --- | --- | --- | --- |
| **20** | | | |
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They have 16 more to share and should continue repeating sharing one at a time until they reach 20

* This would be the final shared bar model

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| --- | --- | --- | --- |
| **20** | | | |
|  |  |  |  |

* Finally, count up how many one person would receive – therefore they count up one box. This is written underneath **one** of the boxes.

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| --- | --- | --- | --- |
| **20** | | | |
|  |  |  |  |
| **5** |

**As the numbers become larger children may choose to use a V to represent 5. They do not have to do this however will choose to if confident!**

**Fractions**

Bar modelling provides a good way for children to work out a fraction of a number. The children are taught that the top number shows us how many parts we are looking at and the bottom number represents the amount of parts it’s shared into. We also use people when undertaking the sharing as this helps to visualise the question in an easier way.

¼ of 16 =

* We start with the total we are sharing, e.g. 16. Draw a bar and write this number in.

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| --- |
| **16** |

* Now look at the sharing number, in this example that is 4, therefore we are sharing between 4 parts/people. Draw the bars to show this.

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| --- | --- | --- | --- |
| **16** | | | |
|  |  |  |  |

* Then use circles, sharing **‘one for you, one for you…’ (like when dividing)** until you get to 16

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| --- | --- | --- | --- |
| **16** | | | |
|  |  |  |  |

* Now look at how many parts we are looking at, in this example that is 1 because the fraction is ¼ . Underneath 1 box, draw a bar. Count the dots and write the number in the box. This is the answer

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| --- | --- | --- | --- |
| **16** | | | |
|  |  |  |  |
| **4** |

**Fractions continued**

We can also use this to find larger fractions for example ¾ of 16. This method is exactly the same as explained before, until the last step.

* We start with the total we are sharing, e.g. 16. Draw a bar and write this number in.

|  |
| --- |
| **16** |

* Now use the sharing number. In this example that is 4, therefore we are sharing between 4 parts/people. Draw the bars to show this.

|  |  |  |  |
| --- | --- | --- | --- |
| **16** | | | |
|  |  |  |  |

* Then use circles, sharing **‘one for you, one for you…’** until you get to 16

|  |  |  |  |
| --- | --- | --- | --- |
| **16** | | | |
|  |  |  |  |

* Now look at how many parts we are looking at, unlike the example before, we are now looking at 3 parts instead of 1 because of the 3 at the top of ¾ . So this time draw a total bar under 3 of the boxes, count the circles and write the answer in the box.

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| **16** | | | |
|  |  |  |  |
| **12** | | |