

### Subtraction Prior Learning Assessment : Question 1 and Question 2

LO: I can subtract mentally by counting back in chunks

I can use rounding to help mentally subtract

NC : NAS2: add and subtract numbers mentally with increasingly large numbers

#### Teacher Input Ideas:

##### **Counting back: (Question 1 of the prior learning assessment)**

Look at question one with the children (subtract 13 from 276). Provide the children with time to discuss how they worked this out and invite the children to demonstrate the mental methods they used. Ask the children to identify how they knew that a written method would not be needed and that this could be worked out mentally. If the children have used written method, ask the children to now work it out mentally and suggest ways to approach this. For this question, you will find that the children will suggest different ways to work this out so provide the children with time to share ideas and model their strategies.

Some children may have used counting back to work out the answer. If the children have done this, encourage the children to suggest how use of number bonds and knowledge of taking away 10 or chunks of ten can help.

For example:

$$276 - 13$$

Take away 10 first = 266. I know that when you subtract 3 from 6 you get 3, so the answer is 263.

Discuss why counting back is efficient in this situation. Why is it not suitable to find the difference by counting on from 13 to 276?

Repeat with other amounts such as  $172 - 16$ ,  $432 - 12$  and  $67 - 28$

Ensure that children are not counting back in ones, but are chunking and partition amounts to take away at a time (using knowledge of taking away groups of 10 and number bonds).

Once the children have explored this, you may want the children to complete the purple activity. This provides opportunities for the children to secure counting back and encourages the children to count back in chunks rather than in ones.

## Rounding for subtraction (Question 2 of the Prior learning assessment)

Share with the children question 2 of the prior learning assessment. Place it on the board and ask the children to explore how they can find the answer mentally. Give the children 15 seconds to see how many different ways they can do this. They could place fingers in the air for each time they find a new way.

For example:  $345 - 9$

- $345 - 5 = 340$  ( I know that  $5+4$  make 9 so take the 4 away and it is 346)
- I counted back in ones to 346
- I know that  $345 - 10$  is 335. I have rounded this, so I took away one too many by taking away 10 so I need to give this back which is 336.

Once the children have explained their working out, model using rounding to take away amounts quickly. Ask the children to write down numbers that can be rounded to 10 easily. What about 100? Which ones are beneficial when calculating mentally?

Discuss that if we want to take away 9, 19, 99, 999 etc, they are close to a multiple of 10 and you are only ever 1 away from making this. Also look at how 11, 21, 101 etc is the same. Children should be able suggest that we can round the amounts as they may have developed this skill mentally for addition. Discuss why it is easy to subtract a multiple of ten or hundred easily. What do you know about place value?

A common error is made as often children have self-taught rules when rounding with addition such as :

$$63 - 9 =$$

some may say I'll round the 9 to 10 and take this away mentally.

So  $63 - 10 = 53$ . I added 1 to round it up so I must take the 1 away. The answer will be 52. Can the children spot why this is wrong? Where is the error?

Model to the children the error they are making, using objects that are grouped in 10. For example, sweets that come in a pack of ten or Base Ten. Show 63 by using 6 groups of ten and 3 ones. Take away a pack of ten to show that we can quickly take ten away mentally to make 53. Discuss that I only wanted to take away nine, so I have taken one too many away. I need to give this back, and open the sweets to show this by taking 9 away and giving one back. So, we are taking one too many away so I must + 1 more.

This could be explored with other sums

What would you do here ?

$$1489 - 399$$

- \*  $1489 - 400 = 1089$
- \* ( we've taken away 1 too many)
  
- \*  $1089 + 1 = 1090$

Also discuss that for 11, I have not taken enough so I must take one more. By showing this practically this will help children to fully understand how rounding works for addition and subtraction.

What would you do here ?

$$7983 - 2001$$

- \*  $7983 - 2000 =$
- \* ( we've taken 1 less away)
  
- \*  $5983 - 1 = 5982$

Some children will spot the error quickly and some may need to use the objects or Base Ten to help access the questions in the green activity.

### Practice Activities

**Purple Practice:** Most suited or children who either made errors in calculating the answer to Question 1 in the prior learning assessment or chose to use a written method.

The purple activity encourages the children to use the mental strategy of counting back as the children are required to take small amounts away each time they move down the tower of blocks. The children can select their own starting number from the purple blocks at the top of the task. They are then to subtract the amount on the each block, working their way to the bottom. The children will need to count back, but should be encouraged to do this in chunks by taking away 10 or 20 at a time and also looking for any shortcuts, such as using their knowledge of number bonds.

**Green Practice:** Most suited for children who made errors in Question 2 of the Prior learning assessment or chose to use a written strategy rather than a mental one.

Practical: place a variety of 2 digit, 3 digit and 4 digit numbers on large cards. These can be displayed outside, around the class or on the table. Children to select a block on the green task sheet and subtract this from the amounts you have provided. The children should round to take away amounts ending in 1 and 9. When showing confidence you can even challenge them to take away 8 or 12 applying knowledge of rounding.

Look out for any children who are demonstrating a misconception of adding a one back or taking it away when it should do the opposite. For example  $78 - 9 = 67$

**Yellow Practice** Most suited for children who are ready to select efficient mental strategies for subtraction calculations.

Practical game: On the yellow task sheets, the children are provided with 2 board game strips. The children should have the same strip as each other. These can be laminated so that the children can write their own starting numbers and then work along the board. There are 2 sheets so that the children can repeat the activity with other tracks.

In pairs, the children are to take it in turns to think of a starting number above 800. Both children are then to work their way along their track to see who finishes first by selecting efficient strategies to mentally takeaway the different amounts. The children should be able to count back by taking away chunks of a number or use rounding take away. Before the children try this task, ensure that they are confident with the types of sums provided in the green and purple activities.

**Mastery:** The children are presented with a problem to solve. Starting at the number 85, the children are required to take away only amounts of 9 and 11 until they reach zero. This task encourages the children to use mental strategies to take away 9 and 11 and also prompts the children to record their sums so that they can remember which combinations of 11 and 9 worked. The children may also suggest working in a systematic way to ensure they have found all ways.

Some children may also suggest using their knowledge of multiples to help. For example: children may record down their 11 times tables and their 9 times tables. The children may notice that 2 lots of 11 ( 22) and 7 lots of 9 (63) total 85. Whichever order they subtract the 11s and 9s will not influence the answer, but they must take away 2 lots of 11 and 7 lots of 9 to get to zero.

## Answers

Purple:

| Starting block | answer |
|----------------|--------|
| 345            | 261    |
| 719            | 635    |
| 205            | 121    |
| 1298           | 1214   |
| 2312           | 2228   |
| 1002           | 918    |

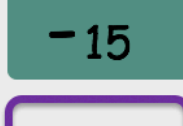
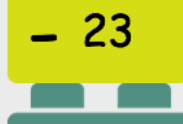
## **Mastery**

The children may notice that 2 lots of 11 ( 22) and 7 lots of 9 (63) total 85. So whichever order they subtract the 11s and 9s will not influence the answer, but they must take away 2 lots of 11 and 7 lots of 9 to get to zero.

### Purple Activity

LO: I can subtract mentally by counting back in chunks.

Select a purple block to place at the top of the tower. Work backwards, taking away a block each time, to find the answer at the bottom of the tower. Repeat with other purple blocks.



-9

-11

-19

-21

-99

-101

-199

-201

-999

-1001

-8

-12

Choose a partner to play the game below with.

- 1) Make sure both of you have a track each and that they are the same.
- 2) Partner A to pick a starting number over 800.
- 3) Both write this on your track in the starting box.
- 4) Start at the same time and work along the track, taking away each amount mentally.
- 5) The first to get the correct finishing number is the winner.
- 6) Repeat again with partner B selecting a starting number this time.

|                 |                  |
|-----------------|------------------|
| starting number | -12              |
| -99             | -7               |
| -201            | -23              |
| -19             | -21              |
| -50             | finishing number |

|                 |                  |
|-----------------|------------------|
| starting number | -12              |
| -99             | -7               |
| -201            | -23              |
| -19             | -21              |
| -50             | finishing number |



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|                 |                  |
|-----------------|------------------|
| starting number |                  |
| -7              |                  |
| -21             |                  |
|                 | -18              |
|                 | -299             |
| -4              | -11              |
| -15             |                  |
| -101            | finishing number |

|                 |                  |
|-----------------|------------------|
| starting number |                  |
| -7              |                  |
| -21             |                  |
|                 | -18              |
|                 | -299             |
| -4              | -11              |
| -15             |                  |
| -101            | finishing number |



Look at the starting number below .



85



You can only take away 9 or 11 each time. Can you keep taking away these amounts until you get to the answer 0?

Where will you start?

How will you keep a record of what you have taken away each time?

What methods can you use to mentally calculate?

Can you use any other knowledge to help you?