
Activity 4: Subtraction using the vertical algorithm

We need to be open to ideas and solutions presented by our learners. There is value in building confidence and self-esteem in learners when they are attempting to solve problems, even if the methods that they use for solving the problem are not necessarily the quickest or the 'best'.

However, if an algorithm is used incorrectly, it needs to be corrected. The calculation and the conceptual errors need to be corrected in the learner's existing knowledge, otherwise the learner will encounter major problems in the future. You as the teacher need to be on the lookout for errors and misconceptions which need to be addressed. These will become clear to you as you look closely at the learners work when you mark it. But even more importantly, you will find out about learners misconceptions in discussion with the learners, when you ask them to explain things that they have written or said.



Activity 4

Subtraction using the vertical algorithm

$$\begin{array}{r} 5 \quad 13 \\ 603 \\ - 257 \\ \hline 6 \end{array}$$

There is nothing left in this next column, so I'll borrow from the 6.

- 1 What calculation error did the learner make in subtraction?
- 2 What conceptual error did the learner make? (Think of place-value concepts).
- 3 Was the rule 'borrow from the next column' clearly understood by the learner? Explain your answer.
- 4 In many instances, the learner's existing knowledge is incomplete or inaccurate – so he/she invents an incorrect meaning. Explain the subtraction error in the light of the above statement.

Solutions to Activity 4: Subtraction using the vertical algorithm

1. The calculation error made is that the learner borrowed from the hundred's column and not the ten's column.
2. The conceptual error made is that the learner thinks that zero in the ten's column means there is nothing there. The learner does not realize that the zero has representation in this column as a tens place

holder. He/she does not realize that when taking one of the hundreds from the hundreds column, he/she has now got ten tens in the tens column.

3. The rule to “borrow from the next column” was not fully understood by the learner. If he/she understood he/she would not have made the error of borrowing from the hundred’s column and not from the ten’s when he/she is short of units in the units column. He/she has not realized that if there are no tens in the tens column (such as in this case) he/she does have to go to the hundreds column (which he/she did), but then that gives him/her ten tens in the tens column, from which he/she can borrow one ten to give him/her 13 units in the units column.
4. The learner's existing knowledge is incomplete or inaccurate in this case. He/she is trying to follow the subtraction algorithm without fully understanding it.

Suggested links for other alternative activities:

- <http://www.aaamath.com/fra57a-addfractld.html> (lesson ideas)
- <http://www.tullyschools.org/tfiles/folder204/Everyday%20Math%20Algorithms.pdf> (alternative algorithms)
- http://math.about.com/od/addingsubtracting/ss/3digsubre_7.htm (worksheets)
- http://www.softschools.com/math/games/subtraction_practice.jsp (online games)
- http://www.softschools.com/math/worksheets/subtraction_worksheets.jsp (worksheets that you can generate)