Help Students Overcome Subtraction with Regrouping

Summary: Most teachers have experienced the frustration students feel when they run into the thorny topic of subtraction with regrouping, even in older grades. In an article for *Teaching Children Mathematics*, veteran mathematics teacher Luann Voza discusses several strategies drawn from current research about ways to help students overcome these challenges.

Practical Applications

Voza lists many different possible strategies:

- *Start with number sense* – avoid absolute rules like "larger numbers can never be subtracted from smaller numbers" (confusing in later years!) and focus on what subtraction means
- *Work from concrete to abstract* – start with manipulatives and physical representations of numbers before shifting to straight numerical problems. Number lines are powerful here.
- *Use fact families* – to build students' understanding of how subtraction relates with addition (and to connect methods of solving different problems), use fact families such as 5 + 7 = 12; 12 – 7 = 5
- *Vary the unknown's placement* – use addition with a missing addend changes things up from students always thinking that subtraction means finding the term on the right side of the equal sign and builds early algebraic skills. So, instead of just asking 15 – 6 = ?, try 6 + ? = 15. Most students will quickly "know" the answer and then can be pressed to explain how they got it.
- *Reinforce place value concepts* – current research holds that "specific understanding of the base-ten system should be an instructional focus." This means showing students that regrouping does not change the value of the top number but is simply renaming it; Voza's example is that students should understand 63 can be named as 6 tens/3 ones or as 5 tens/13 ones, with the same value.
- *Money is motivating* – as a way of building students' investment and memory retention, "pair subtraction with spending, and you will have meaningful math lessons."
- *Regrouping? Help!* – to help students identify when regrouping is needed and when it is not, have students "become" a math problem (students hold signs in front of them with different digits) and have other students holding "help!" signs; let the class decide which digits need help through regrouping and which do not.
- *With instruction, timing is everything* – make sure there is a balance in the instructional timeline between teaching for conceptual understanding and drill practice.
- *Go beyond the book* – use technology to supplement textbook problems – Voza specifically mentions Math Playground (www.mathplayground.com) as a site with a good subtraction-with-regrouping video.
- *Identify common errors* – be especially cautious of students "(1) subtracting smaller from larger numbers regardless of placement, and (2) regrouping from a zero digit."

Conclusion and Citation

Subtraction with regrouping doesn't have to be such a challenge for students if teachers use a variety of strategies, such as the ones suggested here, that all told balance between building conceptual understanding of subtraction and mastering the skills involved.

Voza, L. *"Winning the 'Hundred Years' War."* Teaching Children Mathematics, 18.1 (2011), pp. 32-37. http://bit.ly/n1Y0XO (subscription only).