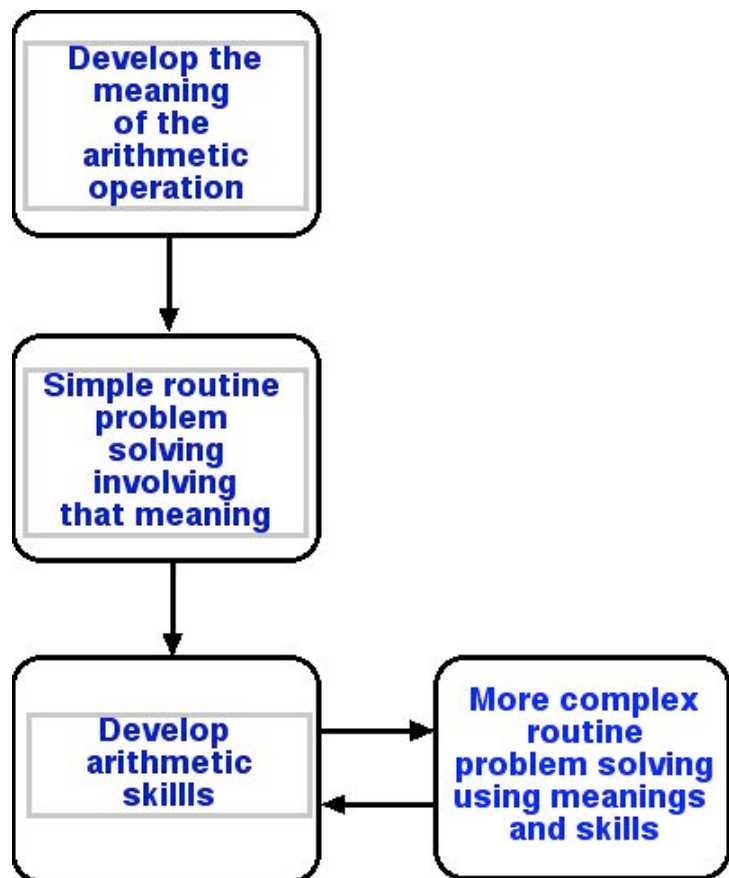


Sequencing meaning, routine problem solving, and arithmetic

The readings, 'Using arithmetic operation meanings to solve routine problem' and 'The meanings of the arithmetic operations' point out the importance of establishing meaning if the goal is to have students become proficient in routine problem solving. Appropriate sequencing also plays an important role in developing proficiency in routine problem solving. The flowchart indicates the recommended sequencing.



This flowchart illustrates a general approach for sequencing meaning, routine problem solving, and arithmetic.

- ◆ First comes meaning.
- ◆ Then comes simple problem solving using that meaning where children invent their own ways of calculating answers (in other words, they invent their own algorithms).
- ◆ Finally efficient algorithms are developed. At some point, other mathematical matters need to be incorporated. These could include: additional meanings of the arithmetic operation, non-routine problem solving, and increasing the numerical complexity of the arithmetic.

Think about the flowchart on page 1 in relation to learning addition.

Grade 1 children learn how to add, but they may not do so in the context of routine problem solving. Rather, they too often are first taught addition arithmetic (algorithms such as 'count on fingers' - yes, counting is an algorithm - and 'line the numbers up in columns, add the ones, etc.')

before they connect these arithmetic skills to routine problem solving.

This order of sequencing runs counter to children as learners. Children learn best when they are confronted with a meaningful problem. This order of sequencing also runs counter to the world of mathematics, where algorithms are often developed after problems have been uncovered. All of this suggests that learning to do addition arithmetic first is not wise because there is little reason for learning how to add unless that skill is used to obtain answers to problems.

The flowchart below provides detail on sequencing, using addition as the example.

