

to a Master's degree in mathematics for teachers. You are probably aware that in the United States a great many universities have set up special Master's degrees to enable teachers to improve their mathematical background. In addition, the federal government, through the National Science Foundation and more recently through the US Office of Education, has provided financial support on a most generous basis for both the teacher and the university. There has been no such development to parallel this in Canada, but there are rather faint signs that something of this sort may be done in the near future.

EVALUATION OF SEEING THROUGH ARITHMETIC, 2, by Mrs. L.D. Nelson

Editors' Note: Vi Nelson, formerly a Grade II teacher at Gold Bar School, is now teaching the same grade in the new Westbrook School in southwest Edmonton.

Mrs. Nelson reports the reactions of five Grade II teachers, of whom she is one, to the text and workbook which replace Numbers in Action. The new material was used in the classrooms of Gold Bar School in 1965-66.

The revision involves major changes and includes the introduction of geometry; extension of basic facts from sums and minuends to 10 to sums, minuends, products and dividends to 12; further extension of these facts to 18 for able pupils; money from 25¢ to a consideration of money to \$1.00; making change; numeration activities extended to include counting by 25's, relations "greater than", "less than" and "betweenness"; the properties of commutativity and associativity of addition; subtraction as the inverse of addition, and division as the inverse of multiplication; problem solving extended to include additive-subtraction and subtractive-addition; rate pairs to include the use of such expressions as "2 to 5" "2 out of 6".

The five teachers involved are in general agreement with respect to the following subjective judgments:

1. The guide for Seeing Through Arithmetic, 2 is much improved over those provided for Numbers in Action and the pupil exercise book Number Workshop. In the revision there is a single guide for both text and pupils' tablet. The pages are arranged much better and it is much easier to use the guide. Suggested activities in the guide and suggestions for charts and games to supplement workbook exercises are carefully organized and exceptionally easy to translate into classroom activities. Special attention is given to enrichment activities for able pupils, but perhaps a stronger feature is the way in which suggestions are organized in the guide to help teachers give adequate assistance to the slow learner. The improvements in the guide alone are attractive enough to make most teachers eager to adopt the revision.

2. The shape and size of the text and the pupils' tablet have been modified. The improvement in this is noteworthy.

3. Activities around certain topological aspects of geometry such as open and closed curves, interior and exterior, and betweenness are included. This consideration of topological features before moving into Euclidian geometry is in agreement with research findings of Piaget and other investigators. The interest of the children in the study of geometry was exceptionally high and the geometry material proved to be a very interesting unit to teach.

4. The operations of multiplication and division are apparently appropriately understood at this level. Most facts introduced were easily understood by the more able pupils.

5. It is questionable whether the two new problem types are appropriate for the slow-moving groups.

6. The extension section involving basic facts to 18 proved particularly useful, but care must be taken to prevent undue pressure in this section. Teachers found that although many students could take the extensions in stride, others would get into quite serious difficulty unless watched very carefully.

7. The exercises in text and tablet have been more carefully planned

and articulated than they were in the old text and workbook. Illustrations of action problems are excellent. The size of pictures has been increased. Devices and symbols for providing answers have been changed and are less confusing to pupils.

8. Test pages are extremely well placed and will be much more useful in evaluation of pupil learnings than those provided in the older material.

9. The mathematical expressions have been improved. For example, statements such as "2 rabbits + 3 rabbits = 5 rabbits" represent an unfortunate mixture of the mathematical and concrete and have been eliminated.

10. Suggestions for use of manipulative materials have been substantially improved.

While the course in Seeing Through Arithmetic, 2 may appear to be too heavy to some, it offers a new and exciting challenge to those children who in the past have become bored with repetition and to teachers who said that the Grade II courses do not offer enough.

SOME PUZZLES TO PONDER

1. The midpoints of each side of an equilateral triangle are joined, forming a smaller triangle; the midpoints of the sides of this smaller triangle are joined, forming a third triangle; etc. What is the total perimeter of all the triangles which can be formed in this way if the length of the side of the original triangle is 1?

(Answer: 6)

Bryant, Steven J., Graham, George E., and Wiley, Kenneth G., Non-routine Problems in Algebra, Geometry and Trigonometry. New York: McGraw-Hill Book Company, 1965, p.3.

2. If $(x - a)(x - 10) + 1$ can be written as $(x + n)^2$ where a and n are integers, what are possible replacements for a and n ?

Answer: $(8, - a)$; $(12, - 11)$