# CITY ARITHMETICS. THIRD YEAR: FIRST HALF

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## THIRD YEAR: FIRST HALF

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# PREFACE

One noticeable weakness in elementary education of to-day is the pupil's inability to use a textbook correctly. The City Arithmetic is an effort to remove this weakness. The appeal is first and foremost to the pupil. The language used is within his comprehension; the explanations are such as he can easily grasp. The work advances step by step. The drill is ample and sufficiently varied, and the problems are within the experience of the average child. These are books which the pupils can use at home as well as in school.

Business men complain that boys and girls whom they employ cannot perform correctly the four fundamental operations. Teachers in the upper grades state that the pupils come to them so weak in addition, subtraction, multiplication, and division of integers that the work in the last three years is seriously handicapped. The authors feel that this is in part due to lack of persistent drill. To offset this, a large number of examples and problems in these operations has been furnished for daily practice.

Overemphasis on the explanation of processes and excessive variety of appeal to the interest of pupils are other causes of weakness in arithmetic. The authors have striven to avoid refinements of explanation, to eliminate processes with little practical application, and to provide an intelligent but not excessive variety of drill work.

Every teacher knows how heavy a burden is the organization of material. These books lift the burden. A moderate spiral is used. In the third and fourth years, the work has been arranged by weeks and with the greatest care. In the fifth and sixth years, the work has been arranged by months; in the seventh and eighth years, the arrangement is topical. Easy examples have been selected for the beginning of each term and the matter is presented in a way that avoids the usual stumblings and discouragements.

Type problems for each grade have been given to illustrate how particular methods are to be carried out and to show with how much detail each subject is to be presented.

Ample material for oral drill has been furnished, and a great number of examples and problems has been introduced so that teachers may lay stress on any phase of the work that requires emphasis. How many of these examples and problems are to be worked by the class, the teacher herself may decide, according to the needs of the pupils.

# PLAN OF WORK

In the arithmetic work of the first half of the third year special emphasis is placed on multiplication and United States money. As a preliminary to multiplication, frequent drills in oral counting are given. The multiplication tables are carefully developed and adequate drill is given by means of charts, diagrams, and other devices. The abundance of exercises in the fundamental operations provides ample material for review, for individual seat work, and for continuing the work of the school at home when special conditions make it desirable.

The authors feel that the exact apportionment of both review and advance work by weeks gives the teacher a sense of security and confidence that makes for better results in the teaching of elementary arithmetic.

It is not necessary that the teacher follow the order of the exercises as they appear in the book. Indeed, it is not the authors' intention that everything should be taught exactly in the order in which it is set down. For instance, the teacher should not assign all the examples in written addition in any one week before the written subtraction is taken up. Some of the oral work may be repeated several times in the course of the week.

The plan of the book covers sixteen weeks. The remaining weeks of the term may be used by the teacher for review or for reënforcing any particular phase of the work in which the pupils have shown weakness.

The work of this half year includes the following:

*Reading and writing* Arabic numbers to 10,000, Roman numbers through XX, and dollars and cents in the decimal form.

*Counting* by 2's and 3's, beginning with any number and continuing to 100.

*Addition: oral*, adding numbers of one digit to all numbers less than 100; and *written*, adding numbers of five addends, the sum to be less than 10,000, including dollars and cents.

*Subtraction: oral*, subtracting numbers of one digit from numbers less than 100; and *written*, subtracting by the addition process, both minuend and subtrahend to be less than 10,000, including dollars and cents.

*Multiplication: oral*, the tables through $5 \times 12$, including factoring within the tables; and *written*, with multipliers of one digit within the tables, including carrying.

*Division: oral*, the tables through $5 \times 12$, including exercises in finding factors; and *written*, including division by one digit, each figure of the dividend to be a multiple of the divisor.

*Fractions:* oral and written exercises developing halves, fourths, thirds, sixths, and tenths of numbers within the tables already studied.

*Problems* involving simple work in the fundamental operations of the third grade.

*Finding time by the clock:* a series of graded practical questions.

# INTRODUCTION

## Counting Chart

For counting, the teacher will find it advisable to prepare a large cardboard chart on the following plan.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |

The teacher, pointing to any number as a starting point, calls on a pupil to count by 2, by 5, or by any other increment within the scope of the lesson. The pupil, pointer in hand, counts aloud, pointing to the numbers required.

As soon as the class is proficient in this method of counting, the exercise may be conducted without the chart. With each new increment, it would be wise to use the two methods alternately.

In the early work of the Third Grade, the teacher should appeal to the eye by writing the results. For example, in counting by 2 without the chart, the pupil, beginning at 1, gives the answer 3 (teacher writes 3), then 5 (teacher writes 5), etc. The pupil's answers will then appear on the blackboard thus: