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FOREWORD

THIS book, which is intended for use in the fifth and sixth years of school, has for its chief tasks the development of skill in the fundamental processes and a knowledge of common and decimal fractions with their applications to useful problems.

The aim of the work is practical; the plan followed is in accord with recent educational thought. Each new arithmetical topic is taught in relation to its everyday use. Each main subject is treated informally before rules and definitions are given. The emphasis is laid on common business fractions, on decimals of two and three places, and upon problems that are met with in life. No long unpsychological explanations are required of the pupils. No unusual processes are taught.

To bring the work close to the interests of the pupils, the problems have not only been taken directly from experience, but they have been grouped under large topics of vital interest to boys and girls. The authors believe that a mistake has been made in expecting pupils to jump rapidly from one situation to another of different character, involving difficulties in interpreting the language and in picturing the conditions, as well as in selecting the right number-processes. In life, we are usually confronted not by sets of miscellaneous problems, but by series of questions arising out of a single situation. This new grouping, it is believed, will prevent the scattering of the pupils' attention and lead to cumulative intelligence in handling problems.

Following the plan of the other books in the series, this book makes provision for the varying abilities of children. For the stronger pupils, the book provides difficult problems starred as optional work. For pupils who fall below the average of the class,

there is supplementary practice so that, by extra effort, these pupils may reach the required standard.

Besides taking into account the differences in ability of pupils, the authors have kept in mind the special needs of the unfortunately large numbers of boys and girls who are obliged to leave school at the end of the sixth grade. To equip these children for their work in life, this book not only covers the essential processes, but gives groups of problems in wage-earning, in the economical use of money, and in many other of the ordinary transactions of everyday life.

BRIEF SUGGESTIONS TO TEACHERS

Arouse the ambition of the pupils by teaching each new topic and reviewing each old one in connection with some practical application, so that the pupils see the advantage in mastering the work.

Follow the plan of the book by laying a careful foundation for each main topic of the year's work: (1) give many simple concrete problems in fractions before teaching any rules; (2) review United States money before taking up decimals; (3) see that pupils understand problems in comparison and on "the whole and the part" before giving work in percentages. (See pages 30–39; 90–96; 209–213.)

Teach new topics from the blackboard and then use the books to fix the new work in the minds of the pupils.

Explain processes carefully, but do not expect pupils to repeat your explanations. The pupils should be made intelligent in the use of number, but it should be remembered that the chief aim of the work of the fifth and sixth grades is not so much an understanding of principles as a thorough mastery of processes.

In all drill work lay the emphasis on fractions of small denominations, decimals of one, two, and three figures, and the more common per cents.

Train pupils to work rapidly, but at the same time carefully.

See that pupils write figures and arrange work neatly.

See that they acquire independence of the pencil in their work.

Hold pupils to a high standard of accuracy. For those pupils who are below the standard required, set aside for systematic practice one or two five-minute periods a day. (See tests and practice throughout the text.) A careful reccrd should be kept of the results of all tests so that each pupil may be given the work most needed by him individually.

In all problem work, lay the emphasis on oral rather than on written work.

See that all problems have meaning to pupils.

Vary the difficulty of the problem work so that pupils do not meet too many difficulties at one time. For example, the pupils should be led to solve two- and three-step problems in their work with integers and United States money, but in the addition of unlike fractions where the process used is involved, the problems should be kept simple.

In helping pupils to understand the solution of problems, give them much practice (a) in solving problems without the use of a pencil, (b) in finding approximate answers, (c) in giving orally the steps in the solution of problems without doing the work, and (d) in writing answers to test problems. (See footnotes, pages 25 and 88.)

Encourage pupils to work independently. Let them discover original methods of solving problems. Have them bring in local data and state and solve problems of their own.

In getting the standing of pupils for reports and promotions, the tests in the book may be varied by changing the numbers slightly. Also, in ranking pupils, the starred problems should be taken into consideration. Those pupils who are able to do such optional work should receive due credit for this work.

PART THREE

CHAPTER I. EVERYDAY BUSINESS PROBLEMS

1. Making Change

[Without pencil.]

1. What coins are commonly used in buying goods? Name them in the order of their value.

2. The coins given for a baseball were a silver half-dollar and a silver quarter. What was the price paid?

3. A pocket book contains a dollar bill, a half-dollar, a quarter, 2 dimes, and a five-cent piece. How much money does it contain?

4. In buying a box of candy, Margaret gave the clerk a dollar bill and received as change a half-dollar and two dimes. How much did the box of candy cost?

Find the value:

5. Of 1 quarter, 1 dime, and 3 nickels.

6. Of 1 half-dollar and 3 dimes.

7. Of 3 quarters, 1 dime, and 8 cents.

8. Of 1 half-dollar, 1 quarter, 1 dime, and 1 nickel.

9. Which would you rather have, 3 dimes and a nickel or 2 quarters? 6 quarters or 3 half-dollars?

10. How many nickels does it take to make 50¢?

11. How many dimes can you get for $1.00?   For $1.50?

12. A two-dollar bill is changed for quarters. How many quarters should be received?

13. What two silver coins equal 50¢? What four equal $2.00?

14. I buy a book for 35¢ and give the clerk a half-dollar. What coins might I receive as change?

Name one set of coins that might be received as change:

15. From a quarter in buying a pencil for 5¢.

16. From a half-dollar in buying a notebook for 15¢.

17. From a dollar in buying a knife for 45¢.

18. From a two-dollar bill in buying a book for $1.25.

19. From a dollar bill in buying a box of paints for 25¢ and a paint brush for 15¢.

20. A boy buys a notebook for 15¢ and hands the clerk a half-dollar. The clerk gives him as change a dime and a quarter. Tell how he might count out the change.

Use real coins, if possible, and count out change:

21. From a half-dollar for a box of paper bought for 20¢.

22. From a dollar bill for a pencil box bought for 35¢.

23. From a two-dollar bill for a fountain pen bought for $1.25.

24. From a ten-dollar bill for a camera bought for $4.25 and 2 rolls of films bought for 30¢ a roll.

25. Imagine that other purchases are made. Practice counting out the change for them.

2. Fitting out a Playground
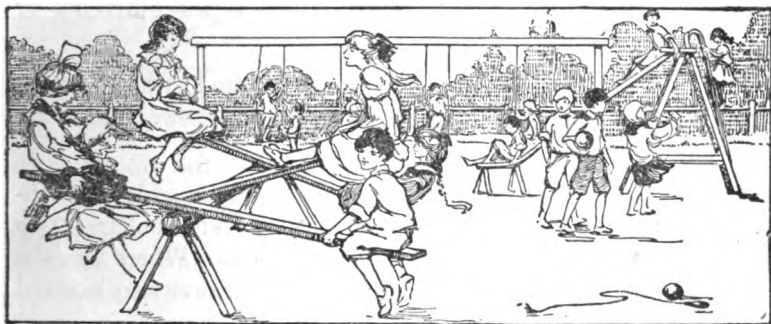
(1) A volley ball and a net are to be bought for a playground. How much must be paid for them if $5.75 is charged for the ball and $2.50 for the net?

(2) In paying for the ball and net, how much change should be received from a ten-dollar bill?

(1)

The amount to be paid for the ball and net is the sum of $5.75 and $2.50.

$$\$5.75 + \$2.50 = ?$$

$$\begin{array}{r} \$5.75 \\ 2.50 \\ \hline \$8.25 \end{array} \text{ Sum}$$

Am't to be paid for the ball and net = $8.25.

(2)

The change that should be received is the difference between $10.00 and $8.25.

$$\$10.00 - \$8.25 = ?$$

$10.00   Minuend
  8.25   Subtrahend
$1.75   Difference or Remainder

Am't of change = $1.75.

Test: $1.75 + $8.25 = $10.00.

[Without pencil]

1. Why, in solving the first problem about the playground (page 3), was it necessary to add?

2. What name is given to an answer found by addition?

3. In solving the second problem, why was it necessary to subtract?

4. What terms are used in subtraction? Which number is the minuend? Which is the subtrahend? Which is the difference or remainder?

5. An answer found by addition is usually tested by adding each column in the opposite direction. How is an answer found by subtraction tested?

6. Notice that, since only like quantities can be added or subtracted, care was taken in both problem (1) and problem (2) to place cents under cents and dollars under dollars. Where was the dollar sign written? How many places in each answer were pointed off for cents?

[With pencil.]

7. The children in a certain school fitted out their playground. First, in order to earn money, they gave a concert and a play and had a candy sale. At the concert they cleared $26.75; at the play, $48.20; at the candy sale, $32.40. How much money altogether did the children earn?

8. For the youngest children, sand boxes were bought for $6.25, a load of beach sand for $3.50, and a large rubber ball for $2.25. Find the cost.

9. In paying for the load of sand, how much change should have been received from a five-dollar bill?

10. For the children next in age, swings were put up for $29.90, and seesaws for $36.75. For the eldest children, a football was bought for $4.25, a basket ball for $4.00, and a volley ball with a net for $8.25. How much was paid for these things?

11. Find the total cost of all the articles bought for the playground. (See problems 8 and 10.)

*12. Find how much the children had left of the money earned at the three entertainments, after paying for the articles named in problems 8 and 10.[1]

*13. The children wished to buy also a slide costing $65.00. How much more money did they need in order to pay for it?

3. Practice in Addition and Subtraction

These exercises are to help you find out and overcome your difficulties in adding and subtracting. Write answers on the folds of a sheet of paper placed below the problems in the book.[2] Work rapidly but at the same time carefully.[3]

I. REVIEW OF FUNDAMENTAL FACTS

Test No. 1.   Addition.   Practice on each of these exercises until you can write the correct sums for each set of 11 problems in 30 seconds.   Add with only a few words in mind.   In adding 4, 5, 7, think *9, 16,* or merely *16.*

[Write answers only.]

Add:

1.	7	3	4	4	4	9	6	8	6	8	8
	5	4	2	4	5	2	4	4	4	2	1
	4	4	3	5	3	2	5	2	3	6	3

2.	8	5	5	7	9	7	8	9	8	7	9
	0	4	7	0	5	1	2	7	0	3	6
	7	2	2	4	2	4	5	0	5	4	3

[1] All problems starred are intended as optional work.   See Preface.

[2] Have each pupil fold his sheet of paper back about one inch for each row of answers; or, have pupil first flute his paper, as in making a paper fan, and then write a row of answers on each fold.

[3] For those pupils who are below the standards given, it will be found helpful to provide for practice one or two five-minute periods a day.   As soon as a pupil passes a test it should be checked off on the teacher's record.

[Without pencil]

1. Why, in solving the first problem about the playground (page 3), was it necessary to add?

2. What name is given to an answer found by addition?

3. In solving the second problem, why was it necessary to subtract?

4. What terms are used in subtraction? Which number is the minuend? Which is the subtrahend? Which is the difference or remainder?

5. An answer found by addition is usually tested by adding each column in the opposite direction. How is an answer found by subtraction tested?

6. Notice that, since only like quantities can be added or subtracted, care was taken in both problem (1) and problem (2) to place cents under cents and dollars under dollars. Where was the dollar sign written? How many places in each answer were pointed off for cents?

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[Write answers only.]

Add:

1.	7	3	4	4	4	9	6	8	6	8	8
	5	4	2	4	5	2	4	4	4	2	1
	4	4	3	5	3	2	5	2	3	6	3

2.	8	5	5	7	9	7	8	9	8	7	9
	0	4	7	0	5	1	2	7	0	3	6
	7	2	2	4	2	4	5	0	5	4	3

[1] All problems starred are intended as optional work. See Preface.

[2] Have each pupil fold his sheet of paper back about one inch for each row of answers; or, have pupil first flute his paper, as in making a paper fan, and then write a row of answers on each fold.

[3] For those pupils who are below the standards given, it will be found helpful to provide for practice one or two five-minute periods a day. As soon as a pupil passes a test it should be checked off on the teacher's record.

3. 5	5	9	8	6	9	7	9	9	8	9
1	6	3	1	3	7	3	0	8	3	2
7	2	0	7	5	1	3	5	0	6	4

Test No. 2. Subtraction. Practice on each set of nine problems
until you can write the correct answers in 20 seconds. Think
differences only. In taking 9 from 17, think *8*, not *9 from 17
is 8.*

1. 11	11	11	11	13	14	14	14	15
7	5	6	4	5	8	6	9	7

2. 12	12	13	13	12	15	15	15	16
7	5	7	5	4	6	9	8	7

3. 13	13	13	14	8	17	16	18	17
6	8	9	5	0	8	9	9	9

II. ACCURACY IN LONGER PROBLEMS

**If, within the time limit, you fail to get the correct answers to all
of the problems in a test, practice solving the problems in the set
having the same number, then try the test again.**

[With pencil.]

Test No. 3. Add. Time   Practice No. 3. Practice adding at a
    limit, 60 seconds.   steady rate.

7	6	9	1. 2	4	5	2. 2	5	3
4	4	4	5	5	6	6	5	5
4	5	3	8	7	7	9	6	9
8	7	6	6	4	3	8	7	9
6	6	6	7	8	8	7	7	7
2	4	5	4	6	8	3	5	2
5	2	8	4	5	3	6	8	7
8	8	8	7	7	7	9	9	9
7	5	9	5	6	9	4	3	5