Seat Exercise.

$5 + 5 =$
$6 + 5 =$
$7 + 5 =$
$8 + 5 =$
$9 + 5 =$

$1 + 5 =$	$6 + 5 =$	$6 + \ \ = 11$
$5 + 1 =$	$5 + 6 =$	$2 + \ \ = 7$
$2 + 5 =$	$7 + 5 =$	$8 + \ \ = 13$
$5 + 2 =$	$5 + 7 =$	$4 + \ \ = 9$
$3 + 5 =$	$8 + 5 =$	$1 + \ \ = 6$
$5 + 3 =$	$5 + 8 =$	$5 + \ \ = 10$
$4 + 5 =$	$9 + 5 =$	$3 + \ \ = 8$
$5 + 4 =$	$5 + 9 =$	$7 + \ \ = 12$
$5 + 5 =$	$0 + 5 =$	$9 + \ \ = 14$

1. Five and seven are how many?
2. Five and what make 12?
3. Seven and what make 12?
4. Nine and five are how many?
5. Eight and what make 13?
6. Five and what make 13?
7. Five and what make 14?
8. Five and what make 11?
9. Five and what make 10?
10. George has 6 nuts and John has 5. How many have both?
11. Mary has 7 flowers. How many more must she get to have 12?
12. Jane has learned five words. How many more must she learn to know 10?

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

Seat Exercise.

$6 + 6 =$
$7 + 6 =$
$8 + 6 =$
$9 + 6 =$

$1 + 6 =$	$5 + 6 =$	$6 + \ \ = 9$
$6 + 1 =$	$6 + 5 =$	$6 + \ \ = 12$
$2 + 6 =$	$7 + 6 =$	$6 + \ \ = 11$
$6 + 2 =$	$6 + 7 =$	$6 + \ \ = 7$
$3 + 6 =$	$8 + 6 =$	$6 + \ \ = 10$
$6 + 3 =$	$6 + 8 =$	$6 + \ \ = 8$
$4 + 6 =$	$9 + 6 =$	$6 + \ \ = 15$
$6 + 4 =$	$6 + 9 =$	$6 + \ \ = 13$
$6 + 6 =$	$0 + 6 =$	$6 + \ \ = 14$

1. Six and eight are how many?
2. Six and what make 14?
3. Eight and what make 14?
4. Six and seven are how many?
5. Six and what make 13?
6. Seven and what make 13?
7. Six and nine are how many?
8. Six and what make 15?
9. Nine and what make 15?

10. If John gives Mary eight flowers, how many must James give her so that she will have 14?

12. John gave Mary seven flowers and James gave her six. How many did she then have?

13. If John finds 9 eggs, how many must George find to make 15?

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

Seat Exercise.

$1 + 7 =$	$5 + 7 =$	$7 + = 13$
$7 + 1 =$	$7 + 5 =$	$7 + = 8$
$2 + 7 =$	$6 + 7 =$	$7 + = 10$
$7 + 2 =$	$7 + 6 =$	$7 + = 14$
$3 + 7 =$	$8 + 7 =$	$7 + = 16$
$7 + 3 =$	$7 + 8 =$	$7 + = 9$
$4 + 7 =$	$9 + 7 =$	$7 + = 11$
$7 + 4 =$	$7 + 9 =$	$7 + = 15$
$7 + 7 =$	$0 + 7 =$	$7 + = 12$

$7 + 7 =$
$8 + 7 =$
$9 + 7 =$

1. Eight and seven are how many?
2. Eight and what make 15?
3. Seven and what make 15?
4. Nine and seven are how many?
5. Nine and what make 16?
6. Seven and what make 16?
7. Seven and what make 14?
8. John has learned 7 words. How many more must he learn to know 14?
9. If Frank and Mary find 15 eggs, and Mary finds seven of them, how many does Frank find?

10. Peter and John have 16 apples, and Peter has 9 of them. How many has John?

Seat Exercise.

$1 + 8 =$	$5 + 8 =$	$8 + = 14$
$8 + 1 =$	$8 + 5 =$	$8 + = 10$
$2 + 8 =$	$6 + 8 =$	$8 + = 9$
$8 + 2 =$	$8 + 6 =$	$8 + = 12$
$3 + 8 =$	$7 + 8 =$	$8 + = 16$
$8 + 3 =$	$8 + 7 =$	$8 + = 11$
$4 + 8 =$	$9 + 8 =$	$8 + = 15$
$8 + 4 =$	$8 + 9 =$	$8 + = 13$
$8 + 8 =$	$0 + 8 =$	$8 + = 17$

$8 + 8 =$
$9 + 8 =$

1. Eight and eight are how many?
2. Eight and what make 16?
3. Eight and nine are how many?
4. Eight and what make 17?
5. Nine and what make 17?

6. If there are eight girls and nine boys in the yard, how many are there in all?

7. If there are 17 children in the yard and eight of them are girls, how many are boys?

8. If there are 17 children in the yard and nine of them are boys, how many are girls?

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

Seat Exercise.

$1+9=$	$5+9=$	$9+\quad=11$
$9+1=$	$9+5=$	$9+\quad=13$
$2+9=$	$6+9=$	$9+\quad=15$
$9+2=$	$9+6=$	$9+\quad=10$
$3+9=$	$7+9=$	$9+\quad=12$
$9+3=$	$9+7=$	$9+\quad=16$
$4+9=$	$8+9=$	$9+\quad=14$
$9+4=$	$9+8=$	$9+\quad=17$
$9+9=$ $9+9=$	$0+9=$	$9+\quad=18$

1. Nine and nine are how many?
2. Nine and what make 18?
3. How many nines make 18?
4. There are 8 red apples and 9 green apples in a dish. How many apples are there in the dish?
5. There are 17 apples in a dish. 9 of them are red and the others green. How many are green?

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

New Class Exercise.

Purpose.—*To teach to recognize instantly the two parts which make each of the numbers from 2 to 10.*

Method.—Begin with 5, as this gives more variety than 2, 3, or 4. Show that $4+1$ or $1+4$, $3+2$ or $2+3$, make 5. Drill upon it until the pupils can recognize *at sight* the two component parts of 5. So teach the component parts of each of the other numbers from 2 to 10; thus, of 6 they are $5+1$ or $1+5$, $4+2$ or $2+4$, and $3+3$. Of 7 they are $6+1$ or $1+6$, $5+2$ or $2+5$, $4+3$ or $3+4$; etc.

Write these combinations promiscuously on the blackboard, and require the pupils to give the sum of any couplet instantly as you point to the couplet. Remember that to recognize the sum *at sight* is quite as important as to do it when the numbers are given orally, and that the pupil may do one readily and not the other.

Having a large number of figures on the blackboard or on a chart before the class, point to one figure, as 4, and then to another, as 3, and train the pupils till they can give the sum "as quick as thought."

An exercise like this will be very useful both for its own sake and as a preparation for subtraction: *Teacher,* "I will give one of the parts of 8 and the class may give the other." T., "5;" C., "3;" T., "4;" C., "4;" T., "6;" C., "2," etc.

Seat Exercise.

1. Write each two numbers which make 2.
2. Write each two numbers which make 3.
3. Write each two numbers which make 4. Each two which make 5. Each two which make 6; 7; 8; 9; 10.

LESSON III.

Purpose.—*To teach how to add any number expressed by two figures, to any one expressed by one figure.*

Method.—The first four exercises are learned by a simple recognition of the meaning of the words thirteen, fourteen, etc.

Class Exercise.

Write 10 in one place on the board and 7 in another. "What is this?" (Ten.) "What is this?" (Seven.) "Ten and seven are how many?" "What do we call ten and seven?" Question them until they recall the fact that ten and seven are (or are called) seventeen. Thus proceed with 10 and 8, 10 and 4, 10 and 9, etc. This is a review of the process of counting from ten to twenty, but is now to be seen in a slightly different light.

Write $10 + 1 =$, $10 + 4 =$, $10 + 6 =$, etc., and teach them to fill the blanks, and perform the following seat exercise.


Seat Exercise.

$10 + 1 =$	*$10 + 4 =$	$10 + \quad = 19$
$10 + 2 =$	$10 + 9 =$	$10 + \quad = 15$
$10 + 3 =$	$10 + 1 =$	$10 + \quad = 16$
$10 + 4 =$	$10 + 3 =$	$10 + \quad = 17$
$10 + 5 =$	$10 + 5 =$	$10 + \quad = 18$
$10 + 6 =$	$10 + 2 =$	$10 + \quad = 12$
$10 + 7 =$	$10 + 8 =$	$10 + \quad = 13$
$10 + 8 =$	$10 + 6 =$	$10 + \quad = 14$

* It is not necessary that these be taken in the reverse order, as $4 + 10$, $9 + 10$, etc., as the combinations do not occur in this order in ordinary addition.

1. There were ten eggs in the nest, and the hen laid three more. How many were there then?

2. John has ten books and Frank gives him five. How many books has he then?
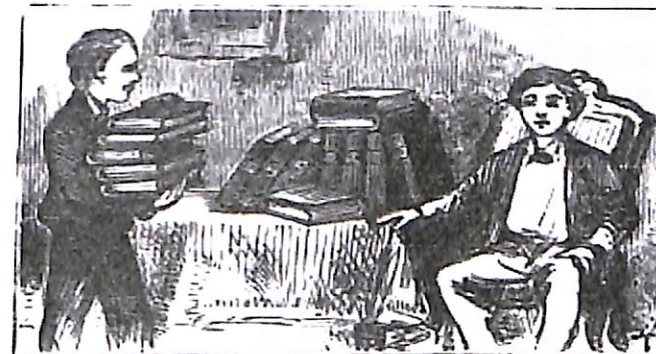
3. Mary has 10 flowers. How many more must she pick to have 16?

4. There are 10 birds in the barn. How many more must come to make 18?

5. Ten and how many make 13?

6. Ten and how many make 17?

5	8	7	6	4	1	0	9	3	9
10	10	10	10	10	10	10	10	10	10

Recitation and Class Exercises.

The recitations and class exercises in this lesson will be similar to those in the last. Many other exercises like those in the Seat Exercises will be given orally. In general, such recitation and class exercise will consist, *First*, in an examination of slates, to see if all has been done correctly and neatly; *Second*, with books in hand, the pupils will read the seat exercises and tell the answers, one pupil reading the problem and another giving the answer; *Third*, other exercises will be dictated by the teacher; *Fourth*, concert exercises on the Addition Table, and exercises in adding numbers written on the blackboard.

Seat Exercise.

20+3=	30+5=	40+2=	50+8=
20+6=	30+7=	40+0=	50+1=
20+5=	30+9=	40+9=	50+0=
20+8=	30+0=	40+7=	50+7=
20+1=	30+1=	40+1=	50+6=
20+4=	30+3=	40+3=	50+3=
20+2=	30+6=	40+5=	50+4=
20+9=	30+2=	40+8=	50+2=
20+7=	30+8=	40+6=	50+6=
20+0=	30+4=	40+4=	50+5=

1. James has found 20 eggs, and Frank has found 7 more than James. How many has Frank found?

2. There are thirty blackbirds in a tree, and on the ground seven more than in the tree. How many birds are there on the ground?

3. There were 50 birds on the ground under a tree and 9 more came. How many birds were there then?

4. Ann's father was 40 years old, and Mary's father is 6 years older. How old is Mary's father?

5. In Frank's garden are 40 flowers; but in George's garden there are 7 more than in Frank's. How many flowers are there in George's garden?

3	7	8	6	4	2	1	3	2	0
50	40	20	30	20	50	40	30	50	20

Seat Exercise.

60+6=	70+5=	80+8=	90+2=
60+2=	70+2=	80+2=	90+0=
60+5=	70+1=	80+7=	90+1=
60+8=	70+7=	80+1=	90+7=
60+9=	70+8=	80+4=	90+9=
60+1=	70+4=	80+6=	90+3=
60+0=	70+3=	80+0=	90+5=
60+4=	70+0=	80+9=	90+6=
60+3=	70+6=	80+3=	90+4=
60+7=	70+9=	80+5=	90+8=

1. James has 80 nuts and finds 6 more. How many has he then?

2. If Mary has 70 flowers and Ann gives her 6 more, how many has she in all?

3. If George saw 90 birds and Frank saw 8 more than George did, how many did Frank see?

4. John has 10 cents and his father gives him 7 more. How many has he then?

5. James has 70 cents in a box and 5 cents in his hand. How many cents has he in all?

5	4	7	3	2	1	4	3	6	7	8
80	90	70	50	80	70	10	20	40	60	60
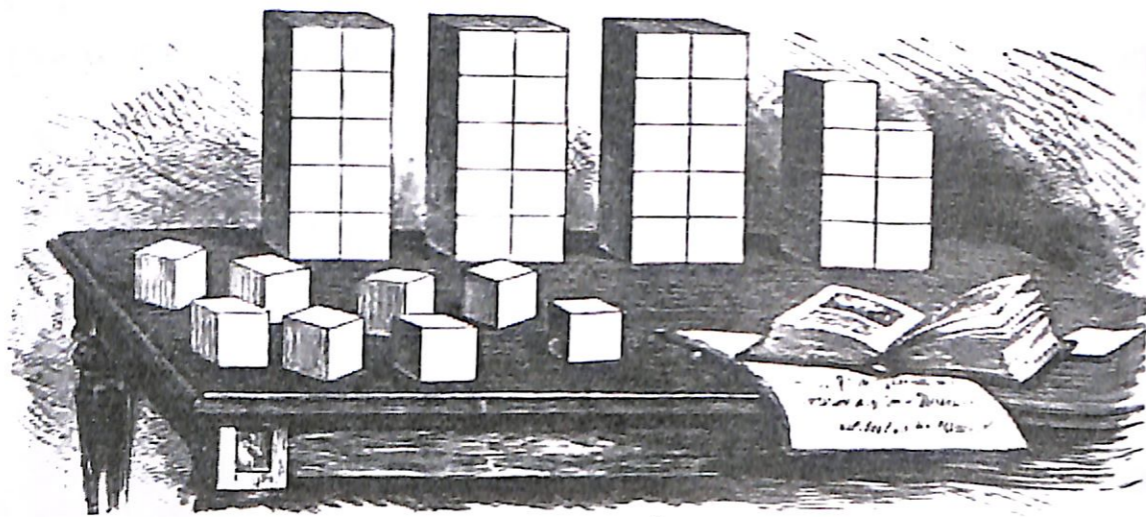
Second Class Exercise.

Purpose.—*To teach how to add any number represented by one digit to another represented by two digits, without counting.*

To teach how to find out how many 37 and 8 more make, write the numbers as in the margin. *First,* fix the attention upon the fact that 37 is 3 *tens* and 7. Use the picture or other objects. *Second,* 7 and 8 more make 15, which is 1 ten and 5. So we have 4 tens and 5, or 45. Use the picture or other objects. *There must be no counting.* The point is to show that *we have only to consider the sum of* TWO *digits, in any case.* In like manner illustrate the process with a variety of examples.

$$\begin{array}{r} 8 \\ 37 \\ \hline 45 \end{array}$$

This exercise need be continued only long enough to teach *how* the addition is effected. The two succeeding exercises exhibit the *expedients* by which *facility* is obtained.

Seat Exercise.

4	5	6	5	4	7	3	4	8	2
29	28	18	13	12	36	42	69	45	18

7	8	9	7	6	5	8	9	4	7
54	47	28	63	19	77	86	81	33	15

Third Class Exercise.

Purpose.—*To teach to recognize the sum of any digit added to any number represented by two digits, by remembering what digits when added give 0, 1, 2, 3, 4, 5, etc., in units place.*

Method.—Knowing that 9+1, 8+2, 6+4, and 5+5, each makes 10, the pupil is to be taught to recognize the sum in such cases as the following:

1	2	8		1	2	3	
19	18	17	etc. ;	29	28	27	etc. ;

Of these there will be 81. The pupils may be required to write them all.

So, again, by knowing that 9+2, 8+3, 7+4, and 6+5, each makes 11 (or 1 in units place), the pupil is to be taught to recognize the sum in such cases as the following:

2	3	4		2	3	4	
19	18	17	etc. ;	29	28	27	etc. ;

2	3	4		2	3	4	
39	88	37	etc. ;	49	48	47	etc. ;

Of these combinations there are 72 in all. The pupils may be required to write them all as a seat exercise.

Another seat exercise may be obtained by requiring all the similar combinations which give 2 in the units place of the sum, as,

3	4	5	5	7	8	9
19	18	17	16	15	14	13

3	4	5	6	7	8	9
29	28	27	26	25	24	23

etc., etc., etc.

Of these there are 63.

Proceed in like manner to teach the combinations which give 3, 4, 5, 6, 7, 8, and 9, respectively, in the units place.

Fourth Class Exercise.

Purpose.—*This exercise is but a modified form of the preceding, and has the same end in view.*

Method.—Write on the blackboard a line like the following:

3	3	3	3	3	3	3	3	3	3
4	14	24	34	44	54	64	74	84	94

Then call attention to the fact that as 4 and 3 make *seven*, 14 and 3 make *seven*-teen, 24 and 3 make twenty-*seven*, etc.; that is, that we have only to think what 4 and 3 make in any case. As a first exercise take only cases in which the tens are not changed, and give *several seat exercises* of this character.

Passing to the case in which the tens change, show the *reason* clearly as in the second exercise, but make it specially clear that the tens are only *one* more in any case, and that the important thing still is to recognize the sum of two figures. Finally, give seat and class exercises like the following till the idea is fixed.

2	2	2	2	2	2	2	2	2	2
3	13	23	33	43	53	63	73	83	93
5	5	5	5	5	5	5	5	5	5
4	14	24	34	44	54	64	74	84	94
5	5	5	5	5	5	5	5	5	5
6	16	26	36	46	56	66	76	86	96
8	8	8	8	8	8	8	8	8	8
4	14	24	34	44	54	64	74	84	94
7	7	7	7	7	7	7	7	7	7
6	16	26	36	46	56	66	76	86	96

There are 100 such combinations for each digit. Give thorough drill upon them, and conclude this lesson with miscellaneous exercises, continuing the lessons until the pupils can recognize the sum in any such case as readily as they can the sum of two digits.

New Class Exercise.

An excellent set of exercises can be supplied by the teacher thus:

Teach them to count *one hundred* by twos, as 2, 4, 6, 8, 10, etc., to 100. Then again, by beginning with *one*, count on by *twos*, as 1, 3, 5, 7, 9, 11, etc., to 99.

When this is learned, teach them to count by *threes*, first beginning with 3, then with 2, and then with 1. Thus they will count "3, 6, 9, 12, 15, etc., to 99;" or "2, 5, 8, 11, 14, etc.. to 98;" or "1, 4, 7, 10, 13, 16, etc., to 100."

Again, count by *fours*, first beginning with 4, then with 3, then with 2, and then with 1.

Again, count by *fives*, by *sixes*, etc., to *nines*, in each case starting with each lower number.

This will readily be seen to be a most important exercise, and one that should be kept up for days, and perhaps for weeks, though it need not prevent the pupils from going on in the book, but may be made a frequent oral or slate exercise, as thought best by the teacher.

For Seat Exercises of this kind, tell them to write the numbers up to 100 by twos, as 2, 4, 6, 8, 10, etc., and so of all the other combinations here suggested.

Seat Exercise.

1. How is Mary counting when she says "3, 9, 15, 21, etc."? Count thus to 99.

2. How is one counting who says "2, 10, 18, 26, etc."? Count thus to 98.

3. How is John counting when he says "7, 16, 25, 34, etc."? Count thus to 97.

4. By what is James counting when he says "5, 9, 13, 17, etc."? Count thus to 97.

LESSON IV.

Purpose.—*To teach how to add any number of numbers expressed by one figure each, whose entire sum does not exceed one hundred.*

First Exercise.*

1. Here is an old barn, and in the yard are 4 hens with chickens. One hen has 5 chickens, another has 8, another has 6, and the other has 7. How many chickens are there in all? How many are $5 + 8 + 6 + 7$?

---

* Hereafter, suggestions upon class exercises and recitations will be put in foot-notes. *Every new process should be introduced by a familiar class exercise which will prepare the pupils to perform the seat exercise intelligently.*

The *class exercise* to be given before this *seat exercise* is assigned, will consist in showing with the counters, numeral frame, pictures such as those on pages 10, 11, 19, or other objects, how to add several numbers expressed by one figure each. Thus, suppose we wish to add 5, 4, 8, 7, and 6. Have one pupil

2. Mary has 4 flowers and Jane gives her 3 more. How many has she then? She then finds 2 more. How many has she then? When she brings them in, her mother gives her 1 more. How many has she in all? How many are $4 + 3 + 2 + 1$?

3. How many are 4 and 8? How many are 12 and 5? How many are 17 and 6? Then how many are $4 + 8 + 5 + 6$?

4. Here is a beautiful plant. On one stem are 5 flowers, on another 7, on another 6, and on another 8. How many flowers are there in all? How many are 5 and 7? How many are 12 and 6? How many are 18 and 8? Thus, how many are $5 + 7 + 6 + 8$?

5. Eight apples in a dish, 4 on the table, 7 on the floor, and 9 in the chair, make how many apples?

$6 + 4 + 8 + 5 + 3 =$ how many?

$7 + 6 + 4 + 3 + 2 + 1 + 5 =$ how many?

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

---

put 5 counters in a pile, another pupil 4 in another pile near the first, another pupil 8, another 7, and another 6. Then let them see clearly what the purpose is, viz.: to find how many there are in all *without counting them one by one.*

Second Exercise.

1. Frank bought a top for 8 cents, some nuts for 5 cents, a kite for 9 cents, a hoop for 7 cents, and a little book for 6 cents. How many cents did he pay for all? $8 + 5 + 9 + 7 + 6 =$ how many?

2. Mary bought a doll for 54 cents, a little book for 8 cents, and a hoop for 7 cents. How much did she pay for all? $54 + 8 + 7 =$ how many?

3. George bought a sled for 85 cents, a rope for 8 cents, an apple for 1 cent, and some nuts for 3 cents. How much did he pay for all?

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

$3 + 4 + 5 + 8 + 7 + 5 + 4 + 9 =$ how many?
$5 + 8 + 2 + 1 + 1 + 3 + 3 + 4 =$ how many?

Put the 4 with the 5 and ask, "How many in this pile?" (9.) Then the 3, asking as before; then the 7, then the 6. Show also how to add the numbers when written in a column, and when written $5 + 4 + 3 + 7 + 6$.

When the pupil hesitates in adding, as when he has 29 and the next figure is 7, ask, "9 and 7 give what figures?" thus teaching him to use the knowledge already gained. Pupils must be trained in this manner so that *they will not think of counting.*

These exercises are by no means sufficient to secure facility in adding. *Weeks of drill* are necessary. This may be kept up as a daily exercise while the pupil proceeds with other lessons.

LESSON V.

Definition Exercises.

Purpose.—*To teach the Meaning of the words Number, Add, Addition, Sum, and Amount, so that the pupil can understand them when used, and can use them.*

Method.—Ask questions involving the word, and if the child does not catch the meaning, put the question in a familiar form, and repeat the process till the purpose is accomplished.*

First Exercise.†

1. What number of boys do you see in the picture? What number of men? What number of trees?

---

* Formal definitions are out of place here, and all such questions as "What is number?" "What is Addition?" etc. To teach to *perceive* and to *conceive* constitute the purpose now; to formulate thought is a later process, and to obtain ideas from formal statements and definitions a still later one.

† This must be preceded by an oral class exercise. 1. Print the word N u m b e r on the board, and teach it, if necessary. Then ask, "What *number*

2. How many ducks do you see in the picture? Ask the same question and use the word number. Ask the same question about the barrels and use the word number.

3. If you add the number of men in the picture to the number of boys, what number does it make? If you add the number of barrels to the number of ducks, what is the sum?

4. If you add the number of trees, barrels, and ducks, what is the sum? What other word can you use for sum?

5. Ask a question like the last about the trees, men, and boys.

6. What will be the sum if you add the number of boys and the number of ducks? Ask the same question about the trees and ducks. About the boys and trees.

7. If you add the number of your eyes, the number of your hands, and the number of your feet, what is the sum?

---

of hands have you, John?" "What *number* of fingers have you, Mary?" etc. If they do not answer readily, put the question thus: "*How many* hands have you?" Then put it as before. Then of objects out of sight. "What number of legs has a kitten?" etc. Again, put figures, as 5, 3, 10, 32, 87, etc., on the board, and ask, "What number is this?" "What number is this?" etc. Number means *how many*, is the child form of the thought.

2. "If I *add* the *numbers* 5 and 3, what *number* does it make?" So of other numbers. If they do not catch the meaning, ask "If I *put together* the numbers 5 and 3, how many does it make?" or, "What number does it make?"

3. "If I add 3 and 4, what is the *sum?*" or, "If I add 3 and 4, how many does it make?" etc. "If I add the *numbers* 7 and 8, what *number* is the *sum?*" etc. Use the word *amount* in the same manner. Sum or amount means *how many it makes*, will be the child thought.

4. "In all your lessons for some time you have been putting numbers together to find out how many they make. (Turn back and show them this.) This is called *Addition*. What have you been studying? What is putting numbers together to find how many they make called?"

Second Exercise.

1. What is the sum of 5, 8, 4, 7, and 6?
2. What is the sum of 27 and 8?
3. What is the amount of 15, 4, and 7?
4. What is the amount of 7, 9, 8, and 4?
5. What is the sum of 63 and 5?
6. What is the amount of 81 and 9?
7. What do you call finding the sum of several numbers?
8. Add the numbers 8, 4, 7, 6, 5.
9. Add the numbers 10, 4, 8, 7, 9.
10. What number added to 5 makes 9?
11. What number added to 3 makes 7?
12. What number added to 7 makes 15?
13. What number added to 9 makes 13?
14. Find the sum of 8, 7, 6, 4, and 3.
15. Find the amount of 20, 6, 8, 4, and 2.
16. When you put several numbers together, what do you call the number which they make?

SUBTRACTION.

Purpose.—*To teach how to recognize the remainder when any number less than 10 is taken from any number which is composed of that number and any number less than 10.*

Method.—*Consider what it takes with the given number to make the one from which it is to be taken.*

Illustrate with *Counters*, and with the *Numeral Frame*, that as 5 and 4 make 9, 4 from 9 leaves 5, and also that 5 from 9 leaves 4. Be sure that both facts are recognized.

First Exercise.

1. There are 3 pinks on a stock. How many will be left if you pick one ? The one picked and the 2 left are how many ? 1 and what make 3? 1 from 3 leaves how many ? 3 less 1 is how many?
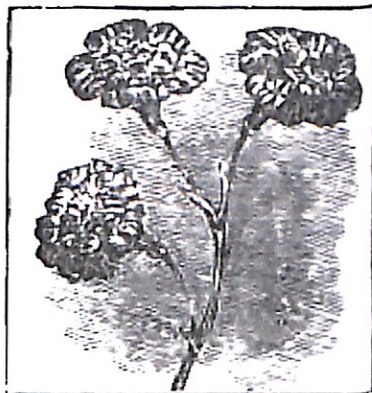
2. If you were to pick two of the pinks, how many would be left ? The 2 picked and the 1 left are how many ? 2 and what make 3? 2 from 3 leaves how many ? 3 less 2 is how many ?

3. If you have 7 apples in two piles, and there are 3 in one pile, how many are there in the other ? 3 and what make 7 ? 3 from 7 leaves how many ?
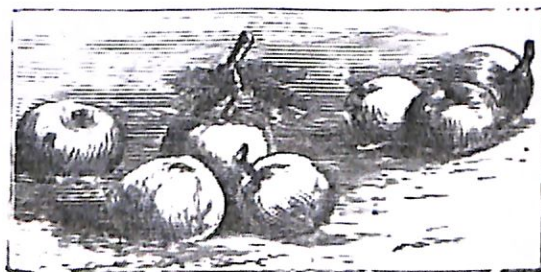
4. If you take 4 apples from a pile of 7 apples, how many will be left ? Why ? (Because 4 and 3 make 7.) 7 less 4 is how many ? 7 less 3 is how many ?

5. Two and 5 make how many ? 2 from 7 leaves how many ? Why? 5 from 7 leaves how many ? Why?

6. A boy has 6 cents in one pocket and 3 cents in the other. How many has he in all ? What do 6 and 3 make ? If the boy loses the 3 cents out of one pocket, how many has he left ? How many had he at first ? How many did he lose ? How many has he left ? 3 from 9 leaves how many ? Why ?

$1 + \quad = 1$	1 from 1 leaves how many ?	$1-1=$ *
$1 + \quad = 2$	1 from 2 leaves how many ?	$2-1=$
$1 + \quad = 3$	1 from 3 leaves how many ?	$3-1=$
$1 + \quad = 4$	1 from 4 leaves how many ?	$4-1=$
$1 + \quad = 5$	1 from 5 leaves how many ?	$5-1=$
$1 + \quad = 6$	1 from 6 leaves how many ?	$6-1=$
$1 + \quad = 7$	1 from 7 leaves how many ?	$7-1=$
$1 + \quad = 8$	1 from 8 leaves how many ?	$8-1=$
$1 + \quad = 9$	1 from 9 leaves how many ?	$9-1=$
$1 + \quad = 10$	1 from 10 leaves how many ?	$10-1=$

1	2	3	4	5	6	7	8	9	10	1	2
1	1	1	1	1	1	1	1	1	1	0	0

7. Count backward from 10 to 0, by 1 ; thus, 10, 9, 8, etc. From 9 to 0. From 8 to 0.

8. Count backward from 7 to 0, by 1 ; thus, 7, 6, 5, etc. From 6 to 0. From 5 to 0. From 4 to 0. From 3 to 0.

This is an important *Drill Exercise*, and the teacher should be careful to have it thoroughly understood.

---

* Teach how to read this column. This and the corresponding columns in the subsequent exercises are to be thoroughly memorized.

Second Exercise.

1. There are 6 ducks in the pond. If 2 of them should come out, how many would remain? 2 and what are 6? 2 from 6 leaves how many? 6 less 2 is how many?

2. There are 5 eggs in the upper nest and 2 in the lower. How many more eggs are there in the upper than in the lower? 2 and how many more make 5? 2 from 5 leaves how many?

3. Mary has 7 cents and Frank has 2. How many more has Mary than Frank? 2 and how many more make 7? 2 from 7 leaves how many?

4. Henry is 2 years old. How many more years must he live to be 5 years old? 2 and how many make 5? 2 from 5 leaves how many?

5. Make 7 marks in a row on your slate. Then make two marks under them. How many marks have you in all? If you take away the 2 marks,
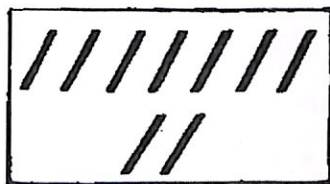
how many of the 9 marks will remain? 2 from 9 leaves how many? 2 and how many make 9? 9—2 is how many?

2+ = 2	2 from 2 leaves how many?	2—2=
2+ = 3	2 from 3 leaves how many?	3—2=
2+ = 4	2 from 4 leaves how many?	4—2=
2+ = 5	2 from 5 leaves how many?	5—2=
2+ = 6	2 from 6 leaves how many?	6—2=
2+ = 7	2 from 7 leaves how many?	7—2=
2+ = 8	2 from 8 leaves how many?	8—2=
2+ = 9	2 from 9 leaves how many?	9—2=
2+ =10	2 from 10 leaves how many?	10—2=
2+ =11	2 from 11 leaves how many?	11—2=

2	3	4	5	6	7	8	9	10	11	2	3
2	2	2	2	2	2	2	2	2	2	0	0

Drill Exercise.—*Conclude each of these lessons by drill exercises in counting backward ;* thus, here have the pupils count backward from 11 to 0, by 2; then from 10; then from 9, etc. Conclude the next exercise by counting backward from 12 to 0, by 3, etc.

Third Exercise.

1. Little May is but 3 years old, and her brother Frank is 7 years old. How many years older is Frank than May? 3 and how many make 7? 3 from 7 leaves how many?

2. Make 9 dots on your slate, putting 3 in one group and 6 in another. 3 and how many make 9? 3 from 9 leaves how many?

3. A man had lost 3 fingers from one hand. How many had he left on that hand, counting the thumb?

4. There are 8 books on the table. How many will be left when Frank has taken the 3 small ones away? 3 and what make 8? 3 from 8 leaves how many?
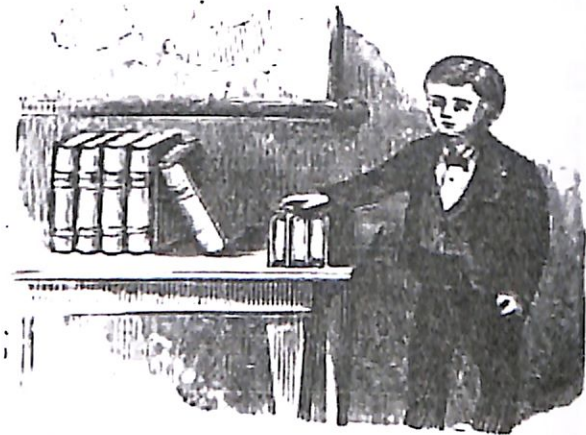
3+ = 3	3 from 3 leaves how many?	3—3=
3+ = 4	3 from 4 leaves how many?	4—3=
3+ = 5	3 from 5 leaves how many?	5—3=
3+ = 6	3 from 6 leaves how many?	6—3=
3+ = 7	3 from 7 leaves how many?	7—3=
3+ = 8	3 from 8 leaves how many?	8—3=
3+ = 9	3 from 9 leaves how many?	9—3=
3+ =10	3 from 10 leaves how many?	10—3=
3+ =11	3 from 11 leaves how many?	11—3=
3+ =12	3 from 12 leaves how many?	12—3=

3	4	5	6	7	8	9	10	11	12	3	5
3	3	3	3	3	3	3	3	3	3	0	0

Fourth Exercise.

1. John is now 10 years old, but he began going to school 4 years ago. How old was he when he began to go to school? 4 and what make 10? 4 from 10 leaves how many?
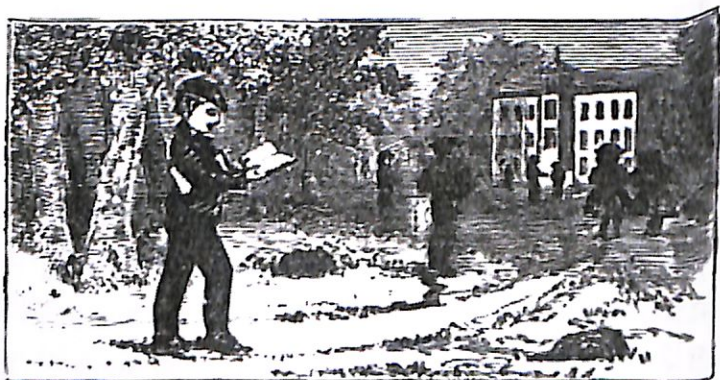
2. Little May is but 4 years old. How many years before she will be 11 years old? 4 and what make 11? 4 from 11 leaves how many?

3. Five tops and 4 tops are how many tops?

4. Nine tops are how many more than 5 tops?

5. Nine tops are how many more than 4 tops?

6. Mary has 13 cents and Carrie has 4. How many more has Mary than Carrie?

4+ = 7	4 from 4 leaves how many?	10—4=
4+ =10	4 from 5 leaves how many?	8—4=
4+ = 4	4 from 6 leaves how many?	4—4=
4+ =13	4 from 7 leaves how many?	6—4=
4+ = 9	4 from 8 leaves how many?	11—4=
4+ =11	4 from 9 leaves how many?	9—4=
4+ = 5	4 from 10 leaves how many?	5—4=
4+ = 8	4 from 11 leaves how many?	7—4=
4+ = 6	4 from 12 leaves how many?	13—4=
4+ =12	4 from 13 leaves how many?	12—4=

11	6	5	4	12	10	13	8	7	9	4	5
4	4	4	4	4	4	4	4	4	4	0	0

Fifth Exercise.

1. How many birds are in the tree? How many are flying to the tree? How many more are there in the tree than flying to it? If as many should fly off from the tree as are flying to it, how many would be left in the tree? 8 less 5 is how many? 8 is how many more than 5?

2. If you have 5 apples, how many more must you get to have 12? 12 is how many more than 5? 5 from 12 leaves how many?

3. How many days in one week? After 5 days of a week are gone, how many are left? $7 - 5 =$ how many?

5+ = 8	5 from 5 leaves how many?	11—5=
5+ = 6	5 from 6 leaves how many?	6—5=
5+ =11	5 from 7 leaves how many?	8—5=
5+ = 9	5 from 8 leaves how many?	10—5=
5+ = 5	5 from 9 leaves how many?	13—5=
5+ = 7	5 from 10 leaves how many?	12—5=
5+ =12	5 from 11 leaves how many?	7—5=
5+ =14	5 from 12 leaves how many?	5—5=
5+ =10	5 from 13 leaves how many?	9—5=
5+ =13	5 from 14 leaves how many?	14—5=

12	8	7	10	5	9	6	11	13	14	5	6
5	5	5	5	5	5	5	5	5	5	0	0

Sixth Exercise.

1. If I buy a book for 6 cents, and hand the bookseller a dime (ten cents), how much change must he give me? 6 and what are 10? 6 from 10 leaves how many?

2. If I owe the postmaster 6 cents, and hand him 15 cents, how much change must he give me? 6 and what make 15? 6 from 15 leaves how many?

3. There were 15 peaches on the tree. How many are there now? Jane picked the others. How many did she pick?

4. There were 15 peaches on the tree, and Jane picked 6 of them. How many are left?

6+ =10	6 from 6 leaves how many?	6—6=
6+ = 7	6 from 7 leaves how many?	10—6=
6+ = 9	6 from 8 leaves how many?	15—6=
6+ =11	6 from 9 leaves how many?	13—6=
6+ = 6	6 from 10 leaves how many?	12—6=
6+ =12	6 from 11 leaves how many?	8—6=
6+ =14	6 from 12 leaves how many?	9—6=
6+ = 8	6 from 13 leaves how many?	7—6=
6+ =13	6 from 14 leaves how many?	11—6=
6+ =15	6 from 15 leaves how many?	14—6=

12	6	8	7	11	13	15	14	9	10	6	3
6	6	6	6	6	6	6	6	6	6	0	0

Seventh Exercise.

1. John had 11 cents, and bought a slate for 7 cents. How many cents did he have left? 7 and what make 11? 7 from 11 leaves how many?

2. Frank has 7 cents. How many more must he earn to have 13 cents?

3. Mary has 15 flowers and her brother Henry has 7. How many more has Mary than Henry?

4. From a flock of 12 chickens a fox caught 7. How many were left?

5. Frank had a ball worth 16 cents, and James had a top worth 7 cents. How much more is the ball worth than the top? If they trade, how many cents ought James to give to Frank besides giving him his top?

6. If a spool of thread is worth 7 cents, and I hand the merchant 10 cents for one, how much change must he give me?

7+ = 9	7 from 7 leaves how many?	7—7=
7+ =15	7 from 8 leaves how many?	10—7=
7+ =10	7 from 9 leaves how many?	16—7=
7+ = 8	7 from 10 leaves how many?	8—7=
7+ =11	7 from 11 leaves how many?	11—7=
7+ =13	7 from 12 leaves how many?	15—7=
7+ =12	7 from 13 leaves how many?	12—7=
7+ =14	7 from 14 leaves how many?	9—8=
7+ = 7	7 from 15 leaves how many?	13—7=
7+ =16	7 from 16 leaves how many?	14—7=

16	12	7	8	10	11	13	14	9	15	7	4
7	7	7	7	7	7	7	7	7	7	0	0

Eighth Exercise.

1. Mary had 13 cents, and bought a ribbon for 8 cents. How many cents had she left? 8 and what make 13?

2. John bought a lead-pencil for 8 cents, and handed the merchant 15 cents. How much change must he receive? 8 and what make 15? 8 from 15 leaves how many?

3. When May had learned 17 words, her brother Frank had learned 8 less. How many had Frank learned?

4. 6 and 8 are how many? 6 from 14 leaves how many? 8 from 14 leaves how many? How would you illustrate this with the counters?

8+ =12	8 from 8 leaves how many?	11—8=
8+ =10	8 from 9 leaves how many?	15—8=
8+ = 8	8 from 10 leaves how many?	17—8=
8+ = 9	8 from 11 leaves how many?	8—8—
8+ =17	8 from 12 leaves how many?	10—8=
8+ =13	8 from 13 leaves how many?	12—8=
8+ =15	8 from 14 leaves how many?	14—8=
8+ =14	8 from 15 leaves how many?	9—8=
8+ =11	8 from 16 leaves how many?	13—8=
8+ =16	8 from 17 leaves how many?	16—8=

8	10	9	17	15	11	13	12	16	14	8	3
8	8	8	8	8	8	8	8	8	8	0	0

Ninth Exercise.

1. Make 17 marks on your slate in two rows, 9 in one row, and 8 in another row right under the first row. How many marks have you now in all? If you take the 9 away from the 17, how many will remain? If you take away the 8 from the 17, instead of the 9, how many will remain? 9 from 17 leaves how many? Why?

2. If you take 9 from 16, how many will remain? Why? How would you illustrate it with the counters?

3. James bought a book for 9 cents, which took all the money he had but 4 cents. How much did he have at first? 9 from 13 leave how many?

4. If John buys a ball for 9 cents, and hands the merchant 15 cents, how much change should he receive?

5. Mary is 18 years old, and her little sister Ann is but 9. How much older is Mary than Ann?

9+ =10	9 from 9 leaves how many?	12—9=
9+ =17	9 from 10 leaves how many?	9—9=
9+ =11	9 from 11 leaves how many?	11—9=
9+ =15	9 from 12 leaves how many?	18—9=
9+ =12	9 from 13 leaves how many?	16—9=
9+ = 9	9 from 14 leaves how many?	10—9=
9+ =13	9 from 15 leaves how many?	13—9=
9+ =18	9 from 16 leaves how many?	15—9=
9+ =16	9 from 17 leaves how many?	14—9=
9+ =14	9 from 18 leaves how many?	17—9=

17	9	10	15	18	12	14	16	11	13	9	5
9	9	9	9	9	9	9	9	9	9	0	0

Definition Exercise.*

1. There were 8 roses on the bush, and Mary has subtracted 3 of them. How many are there left? 3 subtracted from 8 leaves how many?

2. There are 7 eggs in the nest. If you subtract 3, how many will remain? If you subtract 4, how many will remain? If you subtract 3 from 7, what is the remainder? If you subtract 4 from 7, what is the remainder?

3. If you subtract 2 from 5, what is the remainder? If you subtract 3 from 5, what is the remainder?

4. If you subtract 5 from 9, what is the remainder? If you take 5 from 9, what number is left? (These questions mean the same thing.)

5. If you subtract 2 from 8, what is the remainder? If you take 2 from 8, what number is left?

6. If you subtract 3 from 9, what is the remainder? Ask this question without using the words subtract and remainder.

7. If you take 8 from 12, what number is left? Ask the same question and use the words subtract and remainder.

---

* For the general character and spirit of the oral exercise which precedes this, see foot-notes, pages 59, 60. *Subtract* and *remainder* are the words whose use is to be taught in this exercise.

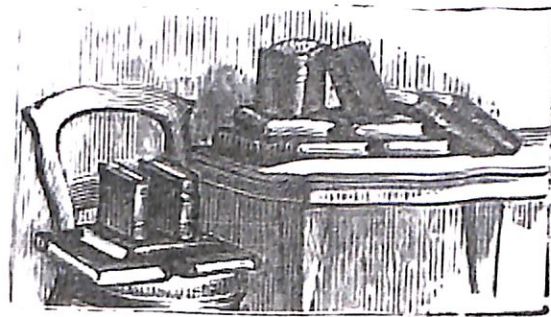8. Supply the proper words in the following:

If I —— 6 from 13, what is the ——?

What is the —— when you —— 7 from 11?

When you —— 8 from 17, what is the ——?

What is the —— when 9 is —— from 20?

Second Definition Exercise.

1. How many books are on the table? How many are on the chair? How many more books are there on the table than on the chair? What is the difference between 8 books and 5 books?

2. If an orange costs 7 cents and a lemon 5 cents, what is the difference between the price of an orange and the price of a lemon? What is the difference between 7 and 5?

3. What is the difference between 10 dollars and 6 dollars?

4. John worked 9 hours and Henry worked 5 hours. How many more hours did John work than Henry? What is the difference between 9 hours and 5 hours?

5. What is the —— between 11 and 6?

What is the —— when you take 6 from 11?

What is the —— between 8 and 3?

If you —— 7 from 15, what is the ——?

How do you find the —— between 10 and 7?

Ans. I —— 7 from 10.

6. What number does 4 + 7 make? What number does 3 + 2 make? What is the difference between 11 and 5?

7. From the sum of 4 and 3 subtract 5.

8. From the —— of 2, 5, and 6, subtract 8?

9. Add 3, 4, and 7, and from the amount subtract 9. What word could you use instead of amount in asking this question? What instead of subtract?

10. From 3 + 2 + 4 + 1 subtract 7. What number is 3 + 2 + 4 + 1?

11. What is the —— between the —— of 5, 2, and 1, and 3, 2, and 2? How much is 5+2+1? How much 3+2+2?

Drill Exercises.*

1. $4+3-2+6+1-8+5-2=$ how many?
2. $5-2+7-6-3+8-4+6=$ how many?
3. $1+2+3+4+5-9-2+7-6=$ how many?
4. $4+8+6-9-4-1+7-8+6=$ how many?
5. $13-6-4+7-5-8-3+7=$ how many?
6. $17-9-5+2+8-6+4-1=$ how many?
7. $7+8-9-2+6-7+2-3=$ how many?

----

* The teacher will need to explain fully, and illustrate by a number of examples, before the pupils are required to study these exercises. It is a most valuable exercise for class drill. Name numbers in this way, and let the pupils answer. Thus, *at first*, the teacher says, "4+2"—the pupils, in concert, "6;" the teacher, "plus 5"—the pupils, "11;" the teacher, "minus 4"—the pupils, "7," etc. After a little concert answering of this kind, *i. e.*, after each number, let all follow *silently*, as the teacher says, "2+3+4—6—1+8= how many?" Then all who know raise the hand. If their results do not agree, try it again and again. Such an exercise as this should be kept up for a week or two as the main exercise with the class, and should always be used with frequency as a general exercise for the school. For the more advanced, it may include multiplication and division.

8. 2+3+7—9+5—6+7—8=how many ?
9. 6+7+5—9+3—8—2+7=how many?
10. 15—8—4—2+6—4—2—1=how many ?
11. 16—7—6+4+2—6—3+9=how many?
12. 11+2—6—3+5+2—4+1=how many ?
13. 10—3—2+7—8—3+6—4=how many ?
14. 6+9+2—8—2+4—6+3=how many ?
15. 14—6—5+3+2—3+2+4=how many ?
16. 9+7—8—2+3—4—3+7=how many ?
17. 8+6+2—7—5+3—1+3=how many ?
18. 6+7+4—9—3+6—4+8=how many ?
19. 3+8+2—7—6+4+5—9=how many ?
20. 6—4+2+2+3+3—6—6=how many ?

Practical Exercises.*

1. John had 5 cents and 6 cents. He then spent 8 cents, and afterward earned 4 cents. How many had he then ?

2. Mary was very fond of flowers. She had 8 little plants, but 3 of them died. Then her cousin gave her 4 plants. How many had she at last

3. Henry had 15 cents, and spent 6 cents for an orange, 1 cent for a pencil, and 3 cents for some nuts. How many cents had he left ?

---

* The teacher should illustrate these examples by using the counters for cents. Thus, for the first, put out five counters and then 6. Take away 8; then add 4. Question the pupils as to what the number is each time.

4. Frank earned 6 cents Monday, spent 4 cents Tuesday, earned 7 cents Wednesday, 4 cents Thursday, spent 5 cents Friday, earned 8 cents Saturday, and put 7 cents in the missionary-box on Sunday. How much of his week's earnings had he left ?

5. There were 11 boys at play in the yard, when 5 of them went home, 2 went off to play with some other boys, and 4 new boys came. How many boys were there in the yard at last ?

6. Frank found a hen's nest with 9 eggs in it. He took out 3, and two days after found that the hens had laid 5 more eggs in the nest. He then took 6 out of the nest. How many did he leave in the nest at last ?

7. John has 17 cents. He lost 5, spent 4, earned 3, and gave away 6. How many had he then?

8. A man has agreed to work 9 hours. How many more hours has he to work after he has worked 5 hours ? 9 less 5 is how many ?

9. I bought an orange for 5 cents, and handed the grocer a piece of money worth 10 cents. How much change must he give me ?

10. I gave a boy one dime, and he gave me a glass of chestnuts worth 8 cents. How many cents should he give me in change ?   8 and how many make 10 ?

11. A man has 11 miles to ride. How many more has he to ride after he has ridden 6 ?

MULTIPLICATION.

Purpose.—*To teach how to find out the product of any number less than 11 multiplied by any number less than 11, and to fix the results in memory; i. e., to learn the multiplication table to 10 times 10.*

Method.—*Teach the pupil to find out the product by adding the number to itself the requisite number of times.*

First Exercise.*

1. If you pick a cherry and put it in your hand, and then pick another, how many cherries will you have? How many times have you picked 1 cherry? Two times 1 cherry are how many cherries?

2. $1 + 1 =$ how many? How many times 1 are $1 + 1$? Two times 1 are how many?

3. If you pick 1 cherry, then another, and then another, how many times will you have picked a cherry? How many cherries will you have? 3 times 1 cherry are how many cherries?

---

* Multiplication is to be taught as based on addition. *Counters* and the *Numeral Frame* will be of constant service. Explain the use of the sign ×, reading 3×4, "3 times 4," etc.

4. $1 + 1 + 1 =$ how many? How many times 1 are $1+1+1$? 3 times 1 are how many?

5. If your mother give you 1 cent each day for 4 days, how many times will she have given you 1 cent? How many cents will you have? 4 times 1 cent are how many cents?

6. $1+1+1+1 =$ how many? How many times 1 are $1+1+1+1$? 4 times 1 are how many?

7. If Jane breaks 1 needle each day, how many does she break in a week (6 days)? How many are 6 times 1?

8. The sign × means *times*, and we read 3×2, three times two.

9. Read 4×1, 3×1; 5×2, 6×4.*

10. Read 3×2, 4×7, 5×6, 8×9, 7×4.

*1 $=$	†$1 \times 1 =$
$1 + 1 =$	$2 \times 1 =$
$1 + 1 + 1 =$	$3 \times 1 =$
$1 + 1 + 1 + 1 =$	$4 \times 1 =$
$1 + 1 + 1 + 1 + 1 =$	$5 \times 1 =$
$1 + 1 + 1 + 1 + 1 + 1 =$	$6 \times 1 =$
$1 + 1 + 1 + 1 + 1 + 1 + 1 =$	$7 \times 1 =$
$1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 =$	$8 \times 1 =$
$1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 =$	$9 \times 1 =$
$1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 =$	$10 \times 1 =$

1	1	1	1	1	1	1	1	1	1	0	0
1	2	3	4	5	6	7	8	9	10	1	4

---

* These paragraphs will need careful explanation before the pupil is required to study them. Show by the *Numeral Frame* what is meant by "8 times 1," etc.

† This column is to be copied by the pupil, the results written, and the whole thoroughly committed to memory.

Second Exercise.

1. There are 2 cherries in each bunch, and 2 bunches. How many times 2 cherries are there on the twig? How many cherries are there? 2 times 2 cherries are how many cherries?

2. 2 + 2 = how many? How many times 2 is 2 + 2? 2 × 2 = how many?

3. John staid out of school 2 days to visit his uncle, 2 days because he was sick, and 2 days he played truant. How many times did he stay out 2 days? How many days did he stay out in all? 3 times 2 days are how many days?

4. *2 + 2 + 2 = how many? How many times 2 are 2 + 2 + 2? 3 × 2 are how many?

5. Jane found 2 eggs on Monday, 2 on Tuesday, 2 on Wednesday, and 2 on Thursday. How many times did she find 2 eggs? How many did she find in all? 4 times 2 eggs are how many eggs?

6. *2 + 2 + 2 + 2 = how many? How many times 2 is 2 + 2 + 2 + 2? 4 × 2 = how many?

7. 4 times 2 are how many? If 4 times 2 are 8, how many are 5 times 2? How many 2's must you take with 4 times 2, or 8, to make 5 times 2?

---

* The pupil is expected to perform the *addition*, thus keeping up a drill in adding.

8. 6 times 2 are 12. How many are 7 times 2? How many 2's must you put with 6 times 2, or 12, to make 7 times 2?
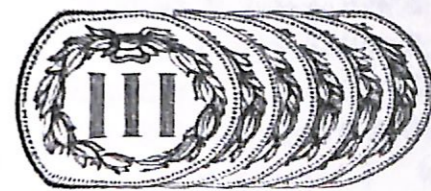
9. 8 times 2 are 16. How many are 9 times 2?*

2 + 2 =	2 × 2 =
2 + 2 + 2 =	3 × 2 =
2 + 2 + 2 + 2 =	4 × 2 =
2 + 2 + 2 + 2 + 2 =	5 × 2 =
2 + 2 + 2 + 2 + 2 + 2 =	6 × 2 =
2 + 2 + 2 + 2 + 2 + 2 + 2 =	7 × 2 =
2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 =	8 × 2 =
2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 =	9 × 2 =
2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 =	10 × 2 =

2	2	2	2	2	2	2	2	2	0	1	2
2	3	4	5	6	7	8	9	10	2	2	2

Third Exercise.

1. Frank spent 3 cents each day in the week except Sunday. How many times did he spend 3 cents? How many cents did he spend in all? 6 times 3 cents are how many cents?

2. 3 + 3 + 3 + 3 + 3 + 3 = how many? How many times 3 is 3 + 3 + 3 + 3 + 3 + 3? 6 × 3 are how many?

---

* Special pains should be taken to have the pupil see the process as successive additions of the same number, so that if he knows what 7 × 6 is, he can tell what 8 × 6 is, etc.

3. George reads 3 pages each day of the week. How many times 3 pages does he read? How many are 7×3?

4. $3+3+3+3+3+3+3=$ how many? How many times 3 are $3+3+3+3+3+3+3$? 7 times 3 are how many?

5. James goes a fishing each day for 4 days and catches 0 fish each day. How many does he catch in all? How many are 4 times 0? 5 times 0?

6. 4 times 3 are 12. How many more 3's are 5 times 3 than 4 times 3? How many are 5 times 3?

7. 6 times 3 are 18. How many are 7 times 3?

8. $8 \times 3 = 24$. How many are 9×3? 10×3?

9. If you know how many 5 times 3 are, how can you tell from this how many 6 times 3 are?

$3+3+3=$	$3 \times 3 =$
$3+3+3+3=$	$4 \times 3 =$
$3+3+3+3+3=$	$5 \times 3 =$
$3+3+3+3+3+3=$	$6 \times 3 =$
$3+3+3+3++33+3=$	$7 \times 3 =$
$3+3+3+3+3+3+3+3=$	$8 \times 3 =$
$3+3+3+3+3+3+3+3+3=$	$9 \times 3 =$
$3+3+3+3+3+3+3+3+3+3=$	$10 \times 3 =$

3	3	3	3	3	3	3	3	0	3	3
3	4	6	8	7	4	5	8	5	7	10

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

Fourth Exercise.

1. How many legs has 1 lamb? Five lambs have how many times as many legs as 1 lamb? How many legs have 5 lambs?

2. How many legs have 4 lambs? How many times as many legs as 1 lamb? How many are 4 times 4?

3. How many legs have 6 lambs? How many times as many legs as 1 lamb? Six times 4 are how many?

4. Seven lambs have how many times as many legs as 1 lamb? 7 lambs have how many legs? $7 \times 4 =$ how many?

5. James bought 8 oranges and gave 4 cents for each. How many times 4 cents did he give for all his oranges? How many are 8 times 4?

6. $4+4+4+4+4+4+4+4+4=$ how many? How many times 4 are $4+4+4+4+4+4+4+4+4$? $9 \times 4 =$ how many?

7. 3 times 4 are 12. How many more 4's are 4 times 4 than 3 times 4? How many are 4×4?

8. $5 \times 4 = 20$. How many are 6×4? 7×4? 8×4? 9×4? 10×4? How many more do you take each time?

4+4+4+4=

4+4+4+4+4=

4+4+4+4+4+4=

4+4+4+4+4+4+4=

4+4+4+4+4+4+4+4=

4+4+4+4+4+4+4+4+4=

4+4+4+4+4+4+4+4+4+4=

4×4=

5×4=

6×4=

7×4=

8×4=

9×4=

10×4=

4	4	4	4	4	4	4	3	3	3	2
5	7	4	6	8	10	9	3	7	4	7

1	3	2	3	1	3	0	1	2	3	4
8	6	8	5	5	8	4	4	4	1	1

Fifth Exercise.

☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆

1. How many points has one star? How many have 5 stars? How many have 6 stars? 7 stars? 8 stars? 9 stars? 10 stars?

2. Six stars have how many times as many points as 1 star? Seven stars have how many times as many points as 1 star? Eight stars have how many times as many points as 1 star?

3. 5+5+5+5+5+5 are how many times 5? 6 times 5 are how many?

4. 5+5+5+5+5+5+5+5 are how many times 5? 8 times 5 are how many?

5. If John earns 5 cents each day, how many cents can he earn in 6 days? How many times as many can he earn in 6 days as in 1 day? Six times 5 are how many?

6. How many cents can John earn in 10 days, if he can earn 5 cents in 1 day? How many times as many cents can he earn in 10 days as in 1 day?

7. 3 times 5 are how many? How many more are 4 times 5? How many are 4 times 5? 7 times 5? 8 times 5? 9 times 5? 10 times 5? How many more 5's do you take each time?

5+5+5+5+5=

5+5+5+5+5+5=

5+5+5+5+5+5+5=

5+5+5+5+5+5+5+5=

5+5+5+5+5+5+5+5+5=

5+5+5+5+5+5+5+5+5+5=

5×5=

6×5=

7×5=

8×5=

9×5=

10×5=

5	5	5	5	5	5	0	1	2	3	4	5
5	6	7	8	9	10	5	5	5	5	5	5

4	3	2	3	4	5	1	0	4	4	4	4
7	7	8	8	8	8	8	8	6	9	10	4

Sixth Exercise.

1. How many petals* has one lily? How many times as many have 7 lilies? How many petals have 7 lilies? 7 times 6 are how many?

2. If 1 lily has 6 petals, how many petals have 8 lilies? How many have 9 lilies? How many times 6 petals have 10 lilies? How many petals have 10 lilies?

3. If James buys 6 oranges for 6 cents apiece, how many cents must he pay for all?

4. How many times as much must James pay for 9 oranges as for 1? How much must he pay for 9 oranges if 1 orange is worth 6 cents?

5. $6+6+6+6+6+6$ are how many times 6? 6 times 6 are how many?

6. If each of 8 boys has 6 nuts, how many have they all? How many times 6 nuts have they? 8 times 6 nuts are how many nuts?

7. 2 times 6 are 12. How many more 6's must you take to make 3 times 6? How many are 3 times 6? How many more are 4 times 6? How many are 4 times 6?

* Teacher be careful to explain the meaning of this word, and teach the pupil how to pronounce it.

8. $5 \times 6 = 30$. How many are 6×6? 7×6?

9. $8 \times 6 = 48$. How many are 9×6? 10×6?

10. When you know how many 7 times 6 are, how do you find out how many 8 times 6 are?

$$6+6+6+6+6+6= \qquad 6 \times 6 =$$
$$6+6+6+6+6+6+6= \qquad 7 \times 6 =$$
$$6+6+6+6+6+6+6+6= \qquad 8 \times 6 =$$
$$6+6+6+6+6+6+6+6+6= \qquad 9 \times 6 =$$
$$6+6+6+6+6+6+6+6+6+6= \qquad 10 \times 6 =$$

6	6	6	6	6	0	1	2	3	4	5	6
9	10	7	6	8	6	6	6	6	6	6	6

Seventh Exercise.

1. There are 7 days in one week. How many times as many days are there in 4 weeks? How many days in 4 weeks? How many days in 2 weeks? How many in 6 weeks?

2. How many days are there in 8 weeks? Why?* How many days in 9 weeks? Why? How many days in 10 weeks? Why?

3. If Jane finds 7 eggs each day, how many will she find in 6 days? Why?

4. $7+7 =$ how many? $7+7$ are how many times 7? 2 times 7 are how many?

* The answer should be, "Because there are 8 times as many days in 8 weeks as there are in 1 week, and 8 times 7 are 56."

5. How many times 7 stars are there here? How many stars in a row from left to right? How many rows? How many times as many stars are there in 8 rows as there are in 1 row? 8 times 7 stars are how many stars?

6. How many stars are there in 7 of the rows from left to right? Why?

7. If 3 times 7 are 21, how many are 4 times 7?

8. If 5 times 7 are 35, how many are 6 times 7?

9. How many more are 8 times 7 than 7 times 7?

10. $4\times7=28$. How many are 5×7? 6×7? 7×7?

$$7+7+7+7+7+7+7=$$
$$7+7+7+7+7+7+7+7=$$
$$7+7+7+7+7+7+7+7+7=$$
$$7+7+7+7+7+7+7+7+7+7=$$

$7\times7=$
$8\times7=$
$9\times7=$
$10\times7=$

7	7	7	7	0	1	2	3	4	5	6	7
8	9	7	10	7	7	7	7	7	7	7	7

2	3	4	5	6	7	8	7	5	4	6	3
3	4	5	6	7	4	3	7	5	4	6	3

Eighth Exercise.

1. How many o's are there in a row? How many e's? How many b's? How many letters in each row? How many rows? How many times 8 letters are there? How many letters in all? 9 times 8 letters are how many letters?

2. If we write a row of 8 m's under the g's, how many rows of letters will there be? How many times 8 letters? 10 times 8 letters are how many letters?

3. If we cover up the row of g's, how many rows of letters will there be? How many times 8 letters? $8\times8=$ how many?

4. If there are 9 boys, and each boy has 8 cents, how many times 8 cents have they all? How many cents have they all? 9 times 8 are how many?

5. If there are 10 girls in the class, and each girl has 8 buttons on her dress, how many buttons are there on all their dresses? How many times 8 buttons are there? 10 times 8 are how many?

6. $2\times8=16$. How many are 3×8? 4×8? 5×8? 6×8? 7×8?

$$8+8+8+8+8+8+8+8=$$
$$8+8+8+8+8+8+8+8+8=$$
$$8+8+8+8+8+8+8+8+8+8=$$

$8\times8=$
$9\times8=$
$10\times8=$

8	8	8	0	1	2	3	4	5	6	7	8
10	8	9	8	8	8	8	8	8	8	8	8

Ninth Exercise.

1. How many branches has this plant? How many leaves on each branch? How many times 9 leaves are there on the plant? 10 times 9 leaves are how many leaves?

2. If you were to break off the lowest branch, how many branches would be left? How many leaves? $9 \times 9 =$ how many?

3. If you were to break off two of the lower branches, how many branches would remain? How many leaves? $8 \times 9 =$ how many?

4. If you were to break off 3 of the branches, how many branches would remain? How many leaves? 7 times 9 are how many?

5. How many fingers has a boy on both hands, with his thumbs? How many have 10 boys? 10 tens make what?

6. How many fingers have 8 boys? 7 boys? 6 boys? 9 boys?

7. If a boy earns 10 cents each day, how many cents does he earn in 2 days? 3 days? 6 days? 8 days? 10 days? $10 \times 10 =$ how many?
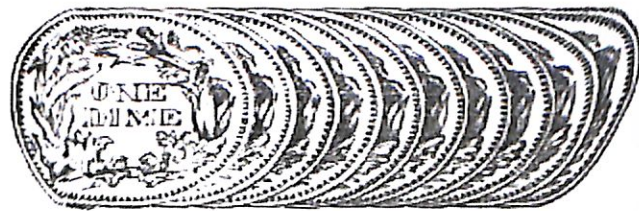
8. $2 \times 9 = 18.$ $3 \times 9 = ?$ $4 \times 9 = ?$ $5 \times 9 = 45.$ $6 \times 9 = ?$ $7 \times 9 = ?$ $8 \times 9 = ?$

$$9+9+9+9+9+9+9+9+9= \qquad 9 \times 9 =$$
$$9+9+9+9+9+9+9+9+9+9= \qquad 10 \times 9 =$$
$$10+10+10+10+10+10+10+10+10+10=$$
$$10 \times 10 =$$

9	9	0	1	2	3	4	5	6	7	8	9	10
9	10	9	9	9	9	9	9	9	9	9	9	9

10	0	1	2	3	4	5	6	7	8	9	10
10	10	10	10	10	10	10	10	10	10	10	10

Tenth Exercise.*

1. Here are two piles of money. In the upper there are 5 3-cent pieces. How many cents are in it? 5 times 3 are how many? In the lower are 3 5-cent pieces. How many cents in it? 3 times 5 are how many? In which pile is there the most money? 5 times 3 is the same as what?
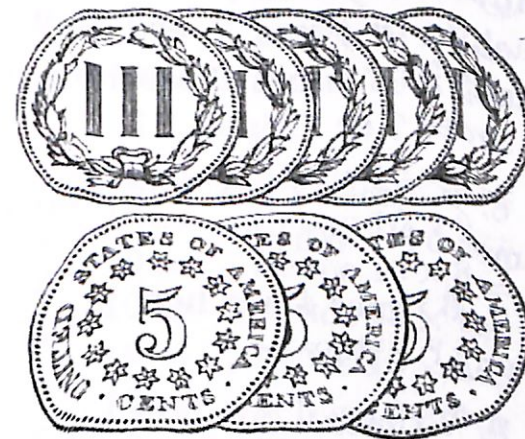
2. James earned 3 cents each day for 4 days. How many cents had he? John earned 4 cents each day for 3 days. How many cents had he? Which had the more?

* The purpose of this exercise is to teach that *the factors may be exchanged without affecting the product ;* i. e., that 4 times 3 is the same as 3 times 4, etc This truth should be amply illustrated by oral exercises akin to these here given, before the pupil is required to study these.

3. 4 times 3 are how many? 3 times 4 are how many? Which is the most, 3 times 4 or 4 times 3?

4. Mary has 10 5-cent pieces and Jane has 5 10-cent pieces. Which has the most? Why?

5. If you count the rows of stars from left to right, how many stars are there in a row? How many rows of 7 stars each? How many stars? If you count the rows of stars down the page, how many stars are there in a row? How many rows of 8 stars each? 8 times 7 are how many? 7 times 8 are how many? Which is the most, 8 times 7 or 7 times 8?
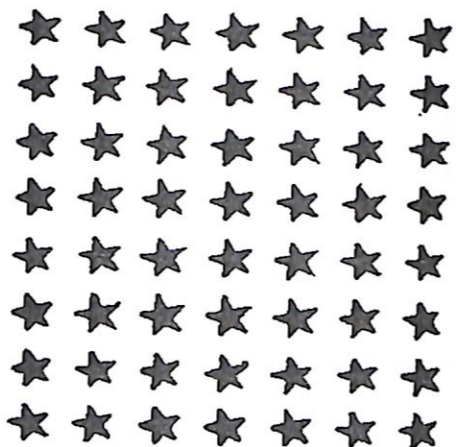
6. 5 times 3 are how many? Then how many are 3 times 5? Why?*

7. 6 times 4 are how many? Then 4 times 6 are how many? Why?

8. 7 times 6 are how many? Then 6 times 7 are how many? Why?

---

* In these exercises it is to be observed that the first product has been learned already, and from it the second is to be inferred. Thus, they have learned that 5 times 3 are 15, and are hence to infer that 3 times 5 are 15. The *form* of answer should be something like this: "Because 5 times 3 are 15, and 3 times 5 are just as many as 5 times 3." This important truth should be made perfectly familiar; it lessens the work of learning the multiplication just one-half.

$*1 \times 2 =$, hence $2 \times 1 =$

$2 \times 2 =$

$1 \times 3 =$, hence $3 \times 1 =$

$2 \times 3 =$, hence $3 \times 2 =$

$3 \times 3 =$

$1 \times 4 =$, hence $4 \times 1 =$

$2 \times 4 =$, hence $4 \times 2 =$

$3 \times 4 =$, hence $4 \times 3 =$

$4 \times 4 =$

$1 \times 5 =$, hence $5 \times 1 =$

$2 \times 5 =$, hence $5 \times 2 =$

$3 \times 5 =$, hence $5 \times 3 =$

$4 \times 5 =$, hence $5 \times 4 =$

$5 \times 5 =$

$1 \times 6 =$, hence $6 \times 1 =$

$2 \times 6 =$, hence $6 \times 2 =$

$3 \times 6 =$, hence $6 \times 3 =$

$4 \times 6 =$, hence $6 \times 4 =$

$5 \times 6 =$, hence $6 \times 5 =$

$6 \times 6 =$

$1 \times 7 =$, hence $7 \times 1 =$

$2 \times 7 =$, hence $7 \times 2 =$

$3 \times 7 =$, hence $7 \times 3 =$

$4 \times 7 =$, hence $7 \times 4 =$

$5 \times 7 =$, hence $7 \times 5 =$

$6 \times 7 =$, hence $7 \times 6 =$

$7 \times 7 =$

$1 \times 8 =$, hence $8 \times 1 =$

$2 \times 8 =$, hence $8 \times 2 =$

$3 \times 8 =$, hence $8 \times 3 =$

$4 \times 8 =$, hence $8 \times 4 =$

$5 \times 8 =$, hence $8 \times 5 =$

$6 \times 8 =$, hence $8 \times 6 =$

$7 \times 8 =$, hence $8 \times 7 =$

$8 \times 8 =$

$1 \times 9 =$, hence $9 \times 1 =$

$2 \times 9 =$, hence $9 \times 2 =$

$3 \times 9 =$, hence $9 \times 3 =$

$4 \times 9 =$, hence $9 \times 4 =$

$5 \times 9 =$, hence $9 \times 5 =$

$6 \times 9 =$, hence $9 \times 6 =$

$7 \times 9 =$, hence $9 \times 7 =$

$8 \times 9 =$, hence $9 \times 8 =$

$9 \times 9 =$

$1 \times 10 =$, hence $10 \times 1 =$

$2 \times 10 =$, hence $10 \times 2 =$

$3 \times 10 =$, hence $10 \times 3 =$

$4 \times 10 =$, hence $10 \times 4 =$

$5 \times 10 =$, hence $10 \times 5 =$

$6 \times 10 =$, hence $10 \times 6 =$

$7 \times 10 =$, hence $10 \times 7 =$

$8 \times 10 =$, hence $10 \times 8 =$

$9 \times 10 =$, hence $10 \times 9 =$

$10 \times 10 =$

---

* This table affords exercises like the preceding, and should be used to familiarize the idea that the order of the factors is indifferent, and also as an exercise to aid in fixing the products in mind. Pupils should copy it and fill it out; they should recite it individually and in concert.

Eleventh Exercise.

1. * $6+6+6+6$ are how many times 6? How many are 4 times 6?

2. $3+3+3+3+3+3+3+3$ are how many? How many times 3? 8 times 3 are how many?

$1+\ 1=$, hence $2\times\ 1=$	$6+\ 6=$, hence $2\times\ 6=$
$2+\ 2=$, hence $2\times\ 2=$	$7+\ 7=$, hence $2\times\ 7=$
$3+\ 3=$, hence $2\times\ 3=$	$8+\ 8=$, hence $2\times\ 8=$
$4+\ 4=$, hence $2\times\ 4=$	$9+\ 9=$, hence $2\times\ 9=$
$5+\ 5=$, hence $2\times\ 5=$	$10+10=$, hence $2\times10=$

$1+\ 1+\ 1=$, hence $3\times\ 1=$
$2+\ 2+\ 2=$, hence $3\times\ 2=$
$3+\ 3+\ 3=$, hence $3\times\ 3=$
$4+\ 4+\ 4=$, hence $3\times\ 4=$
$5+\ 5+\ 5=$, hence $3\times\ 5=$
$6+\ 6+\ 6=$, hence $3\times\ 6=$
$7+\ 7+\ 7=$, hence $3\times\ 7=$
$8+\ 8+\ 8=$, hence $3\times\ 8=$
$9+\ 9+\ 9=$, hence $3\times\ 9=$
$10+10+10=$, hence $3\times10=$

3. $1+1+1+1=$, hence $4\times1=$
$2+2+2+2=$, hence $4\times2=$
$3+3+3+3=$, hence $4\times3=$
$4+4+4+4=$, hence $4\times4=$

Let the pupil copy this on his slate and fill it out to 4 times 10, and write in all the results. So also of the following:

* The pupil is expected to *add* the 6's, and thus find out the answer. It is designed that exercise in addition as well as instruction in multiplication be secured.

4. $1+1+1+1+1=$, hence $5\times1=$
$2+2+2+2+2=$, hence $5\times2=$, etc.

5. $1+1+1+1+1+1=$, hence $6\times1=$
$2+2+2+2+2+2=$, hence $6\times2=$, etc.

6. $1+1+1+1+1+1+1=$, hence $7\times1=$
$2+2+2+2+2+2+2=$, hence $7\times2=$, etc.

7. $1+1+1+1+1+1+1+1=$, hence $8\times1=$
$2+2+2+2+2+2+2+2=$, hence $8\times2=$, etc.

8. $1+1+1+1+1+1+1+1+1=$, hence $9\times1=$
$2+2+2+2+2+2+2+2+2=$, hence $9\times2=$, etc.

9.
$1+1+1+1+1+1+1+1+1+1=$, hence $10\times1=$
$2+2+2+2+2+2+2+2+2+2=$, hence $10\times2=$, etc.

Twelfth Exercise.

1. Repeat the 2's of the multiplication table 5 times, thus: *
1 time 2 is ———.
2 times 2 are ———.
3 times 2 are ———, etc.

2. Repeat the 2's 5 times in this way:
2 times 1 are ———.
2 times 2 are ———.
2 times 3 are ———, etc.

* Teacher show the child how to keep his tally by marks as he says the exercise over, so as to know when he has been over it five times.

3. Repeat the 3's 5 times thus:

1 time 3 is   ——.
2 times 3 are ——.
3 times 3 are ——, etc.

4. Repeat the 3's 5 times thus:

3 times 1 are ——.
3 times 2 are ——.
3 times 3 are ——, etc.

5. Answer the following 5 times:

2×3? 4×2? 2×7? 7×2? 3×1? 6×3? 5×3?
3×5? 4×3? 3×4? 2×8? 8×2? 7×3? 2×7?
1×2? 1×3? 5×2? 3×5? 9×3? 9×2? 3×9?

6. If 1 orange costs 4 cents, how many cents will 3 oranges cost?

If 1 orange cost 4 cents, 3 oranges will cost 3 times 4 cents, or 12 cents.

7. If 1 pencil costs 5 cents, how many cents will 3 pencils cost?

8. If a boy learns 2 lessons each day, how many lessons does he learn in 6 days? In 9 days?

9. There are 7 days in one week. How many days are there in 2 weeks? In 3 weeks?

Thirteenth Exercise.

1. Repeat the 4's 5 times in each of the two ways, thus:

1 time 4 is ——.	4 times 1 are ——.
2 times 4 are ——.	4 times 2 are ——.
3 times 4 are ——.	4 times 3 are ——.
etc., etc.	etc., etc.

2. Repeat the 5's 5 times in each of the two ways, thus:

1 time 5 is ——.	5 times 1 are ——.
2 times 5 are ——.	5 times 2 are ——.
3 times 5 are ——.	5 times 3 are ——.
etc., etc.	etc., etc.

3. Repeat the 6's 5 times in each of the two ways, thus:

1 time 6 is ——.	6 times 1 are ——.
2 times 6 are ——.	6 times 2 are ——.
3 times 6 are ——.	6 times 3 are ——.
etc., etc.	etc., etc.

4. Copy the following on your slates, multiply, and write the results underneath:

6	4	7	8	9	6	7	8	5	4	6	9
4	7	5	6	6	7	6	5	8	9	9	6
7	5	9	6	6	4	5	10	2	6	6	5
6	7	4	10	8	10	10	5	4	2	6	5

5. James worked 7 hours for 5 cents an hour. How much did he earn?

6. John worked 6 hours for 4 cents an hour, and Henry worked 4 hours for 6 cents an hour. Which earned the most?

7. Jane bought 7 oranges for 6 cents each. How much did they cost?

8. Mary bought 4 spools of thread for 5 cents a spool, and gave the clerk 25 cents. How much change should he give her? How much did her thread cost? 25 is how much more than 20?

3. Repeat the 3's 5 times thus:

1 time 3 is ——.
2 times 3 are ——.
3 times 3 are ——, etc.

4. Repeat the 3's 5 times thus:

3 times 1 are ——.
3 times 2 are ——.
3 times 3 are ——, etc.

5. Answer the following 5 times:

2×3? 4×2? 2×7? 7×2? 3×1? 6×3? 5×3?
3×5? 4×3? 3×4? 2×8? 8×2? 7×3? 2×7?
1×2? 1×3? 5×2? 3×5? 9×3? 9×2? 3×9?

6. If 1 orange costs 4 cents, how many cents will 3 oranges cost?

If 1 orange cost 4 cents, 3 oranges will cost 3 times 4 cents, or 12 cents.

7. If 1 pencil costs 5 cents, how many cents will 3 pencils cost?

8. If a boy learns 2 lessons each day, how many lessons does he learn in 6 days? In 9 days?

9. There are 7 days in one week. How many days are there in 2 weeks? In 3 weeks?

———

Thirteenth Exercise.

1. Repeat the 4's 5 times in each of the two ways, thus:

1 time 4 is ——.   4 times 1 are ——.
2 times 4 are ——.   4 times 2 are ——.
3 times 4 are ——.   4 times 3 are ——.
etc., etc.   etc., etc.

2. Repeat the 5's 5 times in each of the two ways, thus:

1 time 5 is ——.   5 times 1 are ——.
2 times 5 are ——.   5 times 2 are ——.
3 times 5 are ——.   5 times 3 are ——.
etc., etc.   etc., etc.

3. Repeat the 6's 5 times in each of the two ways, thus:

1 time 6 is ——.   6 times 1 are ——.
2 times 6 are ——.   6 times 2 are ——.
3 times 6 are ——.   6 times 3 are ——.
etc., etc.   etc., etc.

4. Copy the following on your slates, multiply, and write the results underneath:

6	4	7	8	9	6	7	8	5	4	6	9
4	7	5	6	6	7	6	5	8	9	9	6
7	5	9	6	6	4	5	10	2	6	6	5
6	7	4	10	8	10	10	5	4	2	6	5

5. James worked 7 hours for 5 cents an hour. How much did he earn?

6. John worked 6 hours for 4 cents an hour, and Henry worked 4 hours for 6 cents an hour. Which earned the most?

7. Jane bought 7 oranges for 6 cents each. How much did they cost?

8. Mary bought 4 spools of thread for 5 cents a spool, and gave the clerk 25 cents. How much change should he give her? How much did her thread cost? 25 is how much more than 20?