BENBROOK, J.

Working with Numbers Teaching Aids.
First Grade
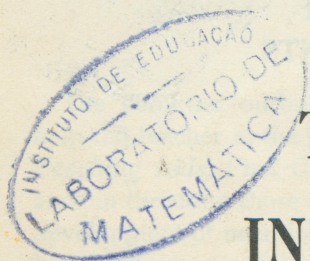Teacher's Instructions.
The Steck Co. - Texas - 1953
24 pgs.

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Working With Numbers Teaching Aids

FOR THE FIRST GRADE

TEACHER'S INSTRUCTIONS

By

JOYCE BENBROOK and **CECILE FOERSTER**

The Steck Company, *Publishers* Austin, Texas

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INTRODUCTION

The activities outlined in *Teacher's Instructions* are designed to help the teacher in the use of the materials in *Working With Numbers Teaching Aids, First Grade*. The directions provide invaluable guidance in directing those experiences of children which will result in the development of meaningful number concepts. The activities suggested here and many similar ones should be used.

The Readiness Test included in these materials is to guide the teacher at the beginning of the school year in adjusting her teaching to meet individual needs. Instructions for administering the test are simple and direct. The result of each child's achievement should be recorded on the Class Summary Sheet for the teacher's reference.

Instructions are given for using picture-symbol cards, group recognition cards, the one-more cards, and all of the other materials in the Teaching Aids.

A variety of materials and activities for developing basic number concepts is provided in *Working With Numbers Teaching Aids*. These aids also provide many opportunities for children to demonstrate their understandings of these concepts. At this stage of the child's growth and development, concepts and understandings are of utmost importance and can be adequately developed only under the careful guidance and supervision of the teacher.

READINESS TEST

The following test is an individual test, entirely manipulative, which should be given before any systematic instruction in arithmetic is begun. It should be given informally and should not be given to any one child in a continuous period.

I. It tests:

    A. Counting.

        1. Rote counting — the ability to call number names in proper sequence.

        2. Enumeration — the ability to count objects and sounds.

    B. Reproduction and Identification.

        1. By selecting — the ability to select a given number when the number name is given.

        2. By finding — the ability to find a given number without calling attention to the number name.

        3. By associating — the ability to recognize number symbols (printed on cards) and to get the correct number of objects.

    C. Group recognition — the ability to recognize a small group without counting.

    D. Comparison — the ability to select the largest or smallest group and to determine which group has more or less.
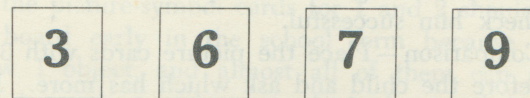
II. These materials will be needed:

    A. Blocks (1-inch cubes), spools, or any other objects easily handled.

    B. A triangle and beater, a ball to bounce, or a ruler to tap.

    C. Eight group recognition cards, 4 by 4 inches, like those shown below.

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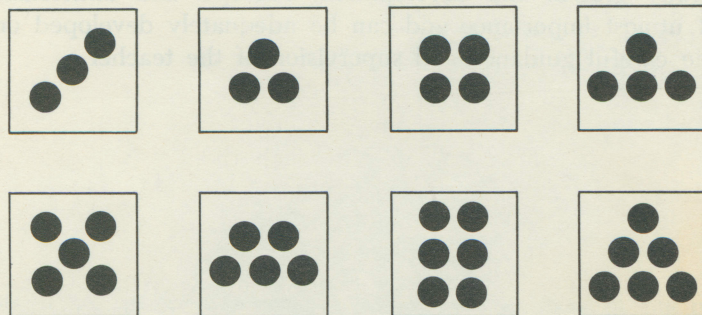
D. Seven picture cards, 5 by 5 inches, with groups of objects from 2 to 8, as:
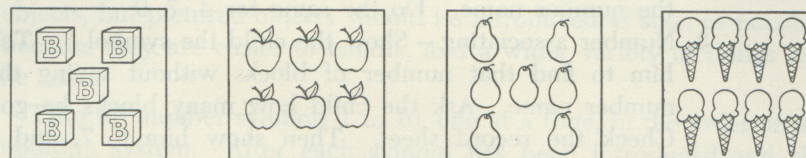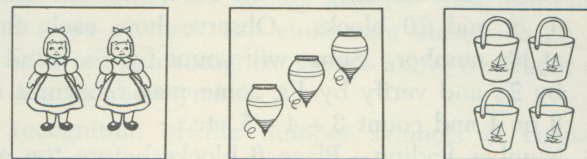
E. Number symbols cards, 3 inches square, for numbers 3, 6, 7, and 9.

III. Directions:

    A. Counting.

        1. Rote.

            a. Have the child begin at 1 and count as far as he can. If he hesitates, help him by saying, "1, 2, 3." Record the last number counted in proper sequence.

            b. Count by 10's and record the last 10 named in correct order.

        2. Enumeration.

            a. Objects — Have the child count as many blocks as he can. He should touch them as he counts. Record the number of the last object counted properly.

            b. Sounds — Count the taps of a triangle, the bounces of a ball, etc. Count silently the following taps: 4, 8, 6, 10. Pause after each number has been tapped and ask how many. Record the highest number successfully counted.

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B. Reproduction — Identification.
1. Number selecting — Ask the child to give you 5 blocks. Check the response on the record sheet. Then ask for 3, 8, and 10 blocks. Observe how each child arrives at his number. Some will count by 1's, some will count by 2's and verify by 1's; some may recognize a group of 3 or 4 and count 3 – 4 – 5 etc.
2. Number finding — Place 6 blocks before the child. Ask him to find for you the same number without mentioning the number name. Do the same for 4, 7, 9.
3. Number associating — Show the child the symbol 3. Tell him to find that number of blocks without saying the number name. Ask the child how many blocks he got. Check the record sheet. Then show him 6, 7, and 9 and check the record sheet.
C. Group recognition — Use the 8 pattern cards. Flash the cards quickly in irregular order. Do not keep a card exposed long enough for the child to count the dots. If he does not recognize both patterns for a number, do not check him successful.
D. Comparison — Place the picture cards with 3 and 7 objects before the child and ask which has more. Proceed in the same way with 5 and 8, 4 and 6, and 6 and 7. Observe closely to determine how the child decides which is more when the groups are nearly the same, as 4 and 6 and 6 and 7.

Do the same for finding out if the child can tell which card has less. To determine largest and smallest, use 3 or more cards at a time. Do not place cards in any regular order. Give the child at least four opportunities to make each comparison. Check the child successful if he gets 3 out of 4 correct.

PICTURE-SYMBOL CARDS

When children enter first grade, many of them can count by rote to 10, and some of them can enumerate objects to 10. Very few children, however, can recognize groups above 3 without counting or recognize the number symbols.

Teach recognition of the number symbols in connection with groups of objects so that the symbols will be associated with definite quantities. The first number experiences should be with concrete objects, but pictured objects should be introduced as soon as possible because they are easier to handle, and a wider variety of things can be used.

Take up number symbols 1 to 10, one at a time, in the order of the notation system. After each symbol has been introduced and the practice provided to build the desired association between the number symbol and a group of objects, the picture-symbol card for that number should be placed on the bulletin board and left for children's reference.

Of course, the picture-symbol cards for 1 and 2 should be put on the bulletin board early in the school term because six-year-old children know 1 object, and almost all of them can recognize 2 objects without counting and are ready to be taught to recognize the number symbols of 1 and 2. Before the picture-symbol card for 2 is put up for reference, however, the majority of the children in any class group should demonstrate that they know the meaning of 2. Use the number symbol 2 on the 3-inch square of tagboard, or write the number on the blackboard and ask them without saying the word *two* to do these and other like activities:
1. Get as many sticks as the number means.
2. Walk around a table as many times as the number says.
3. Bounce a ball as many times as the number tells you to.
4. Touch a friend as many times as this number says.
5. Draw as many balls, chairs, or blocks as the number says.

If the children can do these things the correct number of times in the initial instruction period when looking at the number symbol, they will be able to use a reference chart in the way it should be used — to aid recall.

The picture-symbol card for 3 will be added to the reference section of the bulletin board after the children have had experiences with the number symbol 3 similar to those suggested for 2. After like experiences, the picture-symbol card for 4 will be added, etc.

Teachers must be careful not to introduce the number symbols too fast if understanding is to be reached and confusion avoided. Many weeks of the first term should elapse before all 10 cards in the packet are put on the bulletin board as a reference chart. The children should use this chart without the teacher's help just as they do a color chart.

As this chart "grows," it can be used for various activities. Suppose the picture-symbol cards for numbers 1 to 5 have been put up for reference. Use activities similar to the following:

1. What number means 1 more than 3? Why?
2. What number comes after 4?
3. What number comes between 3 and 5?
4. What number comes before 5?
5. How much larger is 4 than 3?
6. Which is more, 3 or 5? Why?
7. What number means 1 less than 3?
8. Which is larger, 4 or 5?
9. Which is smaller, 3 or 4?
10. I have 4 apples; how many more do I need to have 5?
11. Which numbers are more than 3?
12. Which numbers are less than 3?

As each additional symbol is added to the reference chart, these activities should be repeated and new ones introduced. This is one of the best ways for beginning the development of the arithmetical vocabulary which must have special attention if the proper concepts are to be developed.

# GROUP RECOGNITION CARDS

PICTURE CARDS

Children must be able to think of numbers as groups before they can learn the number facts intelligently. Counting objects one after another will never lead to this idea of number; therefore, it is necessary to teach children to recognize small groups of objects without counting. They will recognize such groups more readily if the objects are arranged in definite patterns. The group for any given number should be presented in more than 1 pattern to prevent any possibility of a child's thinking of a number in terms of 1 arrangement.

In this set of cards, the 3 patterns of 3 used are:
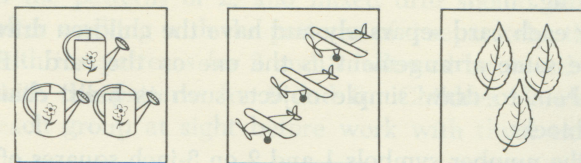
After considerable experience in arranging concrete objects and drawing pictures in these patterns, the children should be encouraged to make other patterns of 3. These arrangements will be among those made:
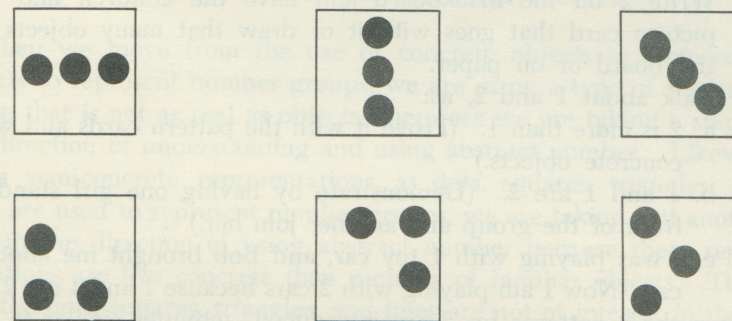
Finally, the children should be able to recognize small groups of objects when in irregular order.

In working with the cards in this packet, begin with the 3 cards with 2 objects on each of them and the card with 1 object:
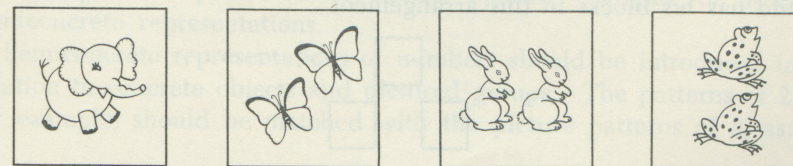

1. Show each card separately, and have the children reproduce the patterns with blocks, spools, buttons, 1-inch squares of colored construction paper, counting sticks, or other concrete objects. At first, they should be allowed to reproduce the patterns while looking at the cards; later, the cards should be exposed for a short time and the patterns reproduced from memory.

2. Flash the cards and have the children tell how many without counting.

3. Show each card separately and have the children draw pictures in the same arrangement as the one on the card. Be sure to ask them to draw simple objects such as balls, chairs, tables, and blocks.

4. Use the number symbols 1 and 2 on 3-inch squares of tagboard, and put them and the picture cards in mixed order in a wall pocket or in the chalk tray of the blackboard. Have a child choose a picture and find the proper symbol. He should tell you what he has done, as: "Here are 2 pigs, and here is the number 2."

5. Write 2 on the blackboard and have the children find the picture card that goes with it or draw that many objects on the board or on paper.

6. Talk about 1 and 2, as:

   a. 2 is more than 1. (Prove it with the pattern cards and with concrete objects.)

   b. 1 and 1 are 2. (Demonstrate by having one girl stand in front of the group and another join her.)

   c. I was playing with 1 toy car, and Bob brought me another car. Now I am playing with 2 cars because 1 and 1 are 2.

When the 3 patterns for 3 are introduced, activities similar to the the preceding ones should be provided. Observe the children as they change their groups from one arrangement to another when the pattern changes. Those children who make the new arrangements by moving only 1 block show better understanding than those who tear up their arrangements and start over each time. For example, if a child has his blocks in this arrangement
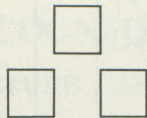
and forms this new arrangement
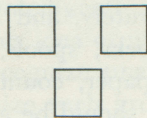
by merely picking up the bottom block and placing it above the 2 blocks which are side by side, he is demonstrating close observation and the growth in understanding that is desired.

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After considerable practice with the patterns of 3, they should be mixed with the patterns of 2, and mixed drill should be provided. Likewise, after working with the patterns of 4 separately, they should be mixed with the patterns for 2 and 3 followed by mixed drill. Do the same with the patterns for 5 and 6. Children should learn to recognize each group at sight before work with these cards is discontinued.

GROUP RECOGNITION CARDS

SEMICONCRETE REPRESENTATIONS

When we move from the use of concrete objects to pictures of objects to represent number groups, we are using a type of representation that is not as real as objects; therefore we are taking a step in the direction of understanding and using abstract number. Likewise when semiconcrete representations, as dots, squares, triangles, and lines are used to represent number groups, we are taking still another step in the direction of using abstract number because these representations are less concrete than pictures of familiar objects. Then, too, the dots, squares, triangles, and lines are not of interest in themselves, and the "threeness" or the "fourness" of a group, for example, is more likely to be observed. We can never be sure that a child is not thinking of something he would like to build when he is working with blocks or wishing that he could play with the dogs in a picture group. These are situations which are not likely to arise when number groups are represented by circles, squares, triangles, or other semiconcrete representations.

Semiconcrete representations of numbers should be introduced in relation to concrete objects and pictured groups. The patterns of 2, for example, should be matched with the picture patterns of 2, as:
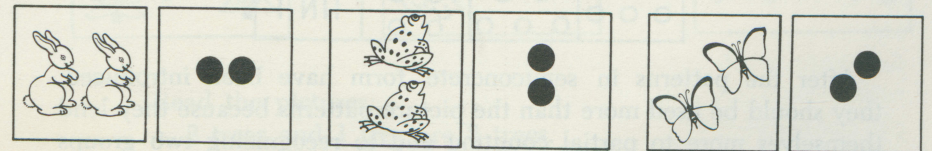
The cards with the semiconcrete representations should be shown and the children asked to reproduce the patterns with concrete objects.

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They should also be able to tell "how many" without counting and to associate the number symbol cards with such pictured groups.

Here is an excellent activity to aid in checking the understandings that are developing:

Have each child fold a sheet of paper into 8 squares as shown below. The teacher should fold a sheet of paper to show the children how. Fold the paper slowly; doing one step at a time, and help those who need help. In the squares in the first row, ask the children to draw rings in the 3 patterns of 2 and a straight line picture of 2. In the second row do the same for 3.
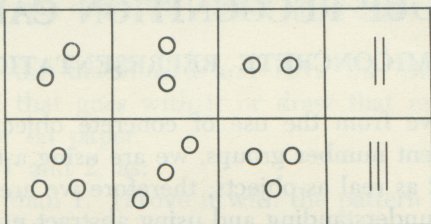
When the patterns for 4, 5, and 6 have been presented, mix the order of the patterns and fold the paper into smaller squares. Note the use of the tally picture to indicate 5. This is used in order that 5 straight marks can be recognized without counting. The picture for 6 can also be recognized at a glance with the tally used as a part of it.
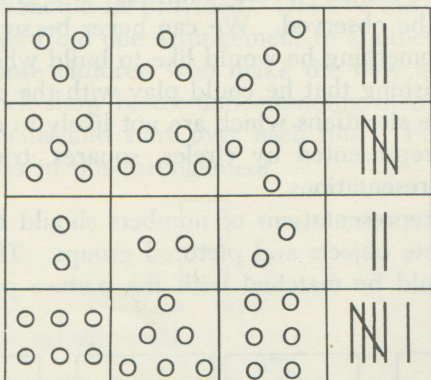
After the patterns in semiconcrete form have been introduced, they should be used more than the picture patterns because they lend themselves more to partial counting and to recognizing two groups and thinking a total. All of the activities suggested for the set of group recognition cards in pictures can also be used with this set of cards.

THE ONE-MORE CARDS

In order to develop the understanding that each number in the counting series is 1 more than the preceding number, the number 3 should be introduced as 1 more than 2, 4 as 1 more than 3, etc.; this should be done by means of pictured representations. The 15 cards in this packet are designed to be used to build this understanding of the counting series to 7. If the relationship is developed carefully, pictures will not be needed for numbers larger than 7, because children should be able to generalize by the time the study of 8 is begun and will understand that each number in the counting series means 1 more than the preceding number:
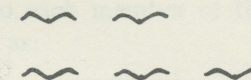
To introduce a number as one more than the preceding number:
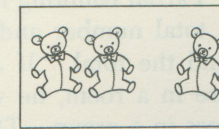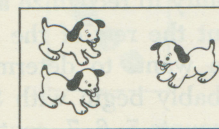1. Give each child 5 blocks, spools, or buttons. Have him put 2 in a row on his desk and 3 underneath, as:
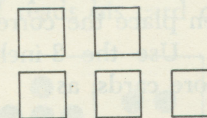
Talk about the number of things in each row. Note that 3 is 1 more than 2.
2. Draw 2 objects on the board and 3 underneath so that one will extend to the right, as:

Talk about how much more 3 is than 2.
3. Use the cards in this packet, as:
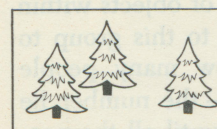
Read the pictures:
a. 2 trees and 1 tree are 3 trees.
b. If 1 dog runs up to 2 dogs, there will be 3 dogs.
c. Make a problem, as: I had 2 teddy bears, and Jane gave me 1 more teddy bear. I now have 3 teddy bears.

4. After the cards showing the relation of 4 to 3 and 1 have been introduced, mix them with the cards which show that 2 and 1 more are 3 and read:

a. 2 dogs and 1 dog are 3 dogs.

b. 3 engines and 1 engine are 4 engines.

5. Put the group recognition cards in one wall pocket and the one-more cards in another and have a child choose two cards which represent the same number, as:
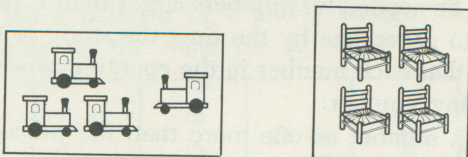
The child should say, "3 and 1 are 4."

6. Put the one-more cards in a wall pocket or in the chalk tray, and have the children place the correct number symbol at the right of each card. Use the 3-inch-square number symbol cards and the one-more cards, as:
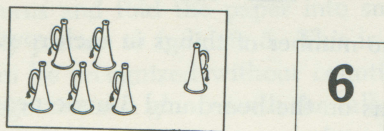

PARTIAL COUNTING CARDS

Partial counting is the ability to recognize a group of objects within a total number and to count the rest of the objects to this group to find the total. If a person wants to determine how many people are in a room, he will probably begin with 3 or 4 — the number he sees in a group. Then he counts 5, 6, 7, continuing until all the people in the room have been counted. This is a more mature way of acting than beginning at 1 and counting in sequence until all the people are counted.

Children should be trained to do partial counting in this way and later to recognize 2 small groups and add to get the total — no counting in sequence being involved.

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Three of the most common patterns of 2, 3, 4, 5, and 6 have been used on these cards. The children should be able to recognize these separate groups without counting before work with these cards is begun.
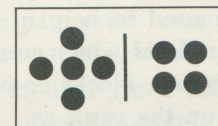
Show these cards and ask a child to tell how many. If this card is exposed,
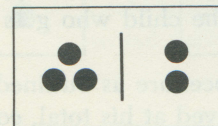
the child should say, "3 — 4, 5," or "2 — 3, 4, 5." He should be allowed to recognize either group and count the other group to it.

Play games with these cards, as:

1. Flash the cards, allowing each child in the group to have a turn. When a child reads his card correctly, as:

5 — 6, 7, 8, 9, or 4 — 5, 6, 7, 8, 9, he is allowed to keep his card. See how many people can get the same number of cards.

2. Pass out a card to each member of the group. Put one card in the chalk tray, as:
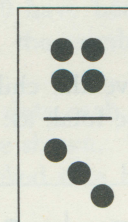
The first child to see that he can match one of the groups on this card with a group on his card does so and counts the remainder of the dots. Suppose the child matches the group of 4 at the top of the card on the chalk tray. He puts his card beside the card he matched and covers the tops of the 2 cards with his hand. He then recognizes the group of 3 at the

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bottom of the first card and counts the group at the bottom of his card to it. Suppose his card has a group of 6 at the bottom. He recognizes 3 and says: 3 — 4, 5, 6, 7, 8, 9. Or he could recognize the 6 on his card and count the 3 to it, as: 6 — 7, 8, 9. Encourage the child to begin with the larger group. If he finds the total correctly, he should be allowed to keep both cards. The child who gets the most cards wins the game.

3. Follow the same procedure as outlined above. After the child has counted and arrived at his total, consider the total his score and let him record it by tallying. The score for the above would be 9; so the child would record it as:
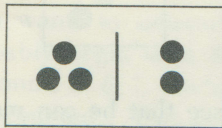
𝍸𝍸 𝍷𝍷𝍷𝍷
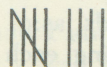
These cards can also be used to help in developing the 15 addition and the 15 subtraction facts which are taught in grade one.

1. Have the children arrange blocks or other objects in the same patterns as the dots on the card, as:
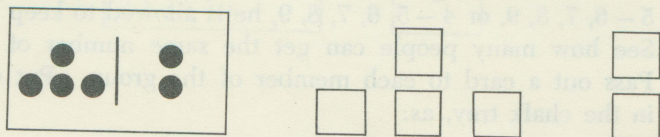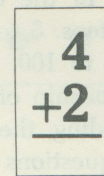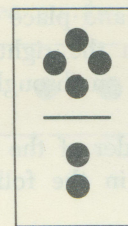
Read: 4 and 2.

2. Flash the cards and have the children name the 2 groups, 3 and 2, without giving the total, as:

3. Later, flash the cards and have them say, "3 and 2 are 5."

4. Select all the cards on which the total number of dots is not more than 6 and use with abstract number cards, as:

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STRIP CHART OF TENS

An understanding of our decimal number system is basic to all other numerical work, so we must begin early to teach something about the meaning of 2-place numbers and why they are written as they are. Children must be taught to think of numbers beyond 10 as a 10 and some 1's, two 10's, two 10's and some 1's, etc. They must also learn how we can write a number of any value with 10 symbols by using zero as a place holder.

Of course children in the first grade can only make a beginning of an understanding of our number system, but if they are expected to read and write 2-place numbers, they must be taught something of the "tenness" of such numbers and that the place in which a number is written determines its value. No amount of time spent in repeating number names in a series or writing numbers in sequence will build these concepts.

After the numbers 1 to 10 have been introduced and proper concepts have been developed, the numbers from 10 to 100 should be introduced.

With the 10 strips of 10 dots each and the single dot cards, any number from 1 to 100 can be shown. These should be used in a wall pocket, but they can be tacked to a bulletin board if a wall pocket is not available.

Suggestions for using the strip chart:

1. Put the 10 strips in a wall pocket, and tell the children that there are 100 dots on the chart. Then count the dots on each row. Establish the fact that there are 10 dots on each row and that there are 10 rows. Tell the children that ten 10's are 100. Count the rows two ways: 1 ten, 2 tens, 3 tens, etc.; 10, 20, 30, etc. Use sticks or narrow strips of tagboard in bundles of 10 and count them the same way.

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2. Have the 10 strips in the chart and place the numbers 10, 20, 30, etc. to 100 in the chart on the right side of the strips. Read: 1 ten, 2 tens, 3 tens, and on through to 100; 10, 20, 30, and on through to 100.

3. Show the relationship of the order of the 10's to the order of the 1's by building the chart in the following manner and answering the questions below.
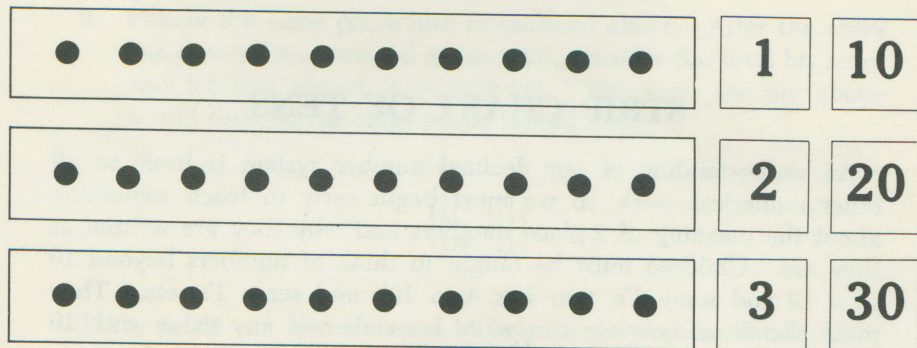
    a. Read: 1 ten makes 10; 2 tens make 20, etc.
    b. If 3 comes after 2, what 10 comes after 2 tens?
    c. Which is more, 4 or 5? 4 tens or 5 tens?
    d. What is 1 more than 5? What is 10 more than 50?
    e. Which is less, 6 or 8? 6 tens or 8 tens?
   f. What number comes between 4 and 6? What 10 comes between 4 tens and 6 tens?
    g. Discuss the use of zero to make a 10 out of a 1 by pushing the 1 over one place toward the left, to make 2 tens out of 2, etc.

4. Have the 10 strips in the chart and ask different children to get 2 tens, 5 tens, 3 tens, etc. Have each child tell you how many strips he got and why. Then ask for 20, 40, 70, etc. Each time ask how many strips and why.

5. Take 4 strips from the wall pocket and ask how many dots. The children should say, "40." Ask how many 10's. They should say, "4." Do this many times with different numbers of strips.

After developing the ideas that (a) there are 10 tens in 100, (b) the order of the 10's is the same as the order of the 1's, (c) 6 tens is more than 4 tens just as 6 is more than 4, and (d) that a zero is used to make a 10 out of 1, etc., it is time to begin building an understanding of the teen numbers.

1. Build the teen numbers in your wall pocket thus:
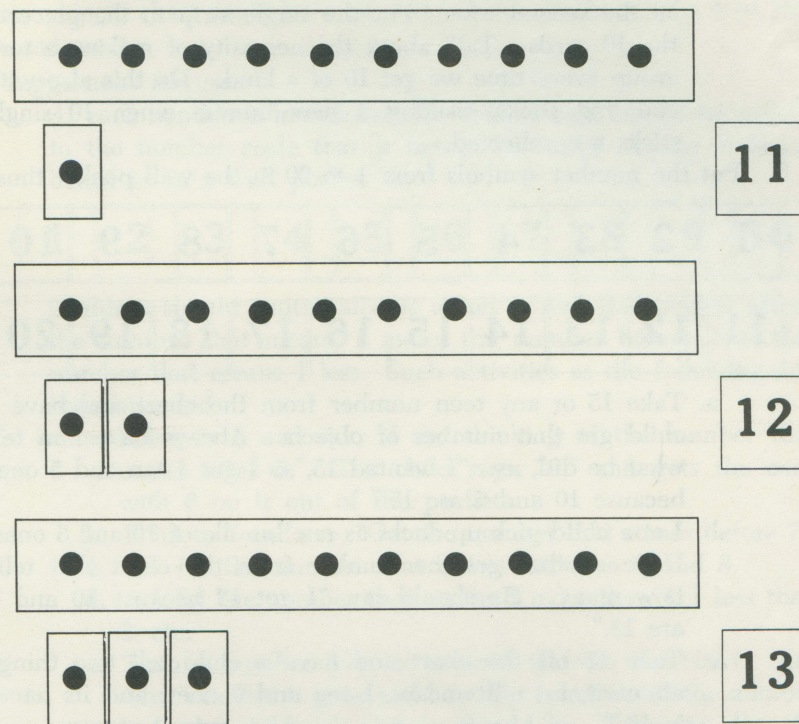
    a. Read: 10 and 1 are 11; 10 and 2 are 12; 10 and 3 are 13. Also use single sticks and sticks in bundles of 10 to show 11, 12, 13, etc.
    b. Tell what each teen number means, as: 11 means 1 ten and 1 more; 12 means 1 ten and 2 more; etc.
    c. Play a game with the teen numbers, as: One child says, "13." He calls on another child to tell what it means. The child called on says, "1 ten and 3 ones." He goes to the chart and points to 13 or goes to the table and picks up a bundle of 10 sticks and 3 single sticks.

2. Have 1 ten strip in the chart and add the single dot cards one at a time, counting 10 and 1, 10 and 2, and on through the teens. Count them this way also: 11, 12, 13, etc. When you have added the tenth card and said, "10 and 10," ask questions similar to the following:
    a. How many 10's do we now have?
    b. What's another way of saying 2 tens?

c. What could we put in the place of the 10 single dot cards on the second row? Put the single strip in the place of the 10 cards. Talk about the necessity of making a new group every time we get 10 of a kind. Do this also with counting sticks, making a new bundle when 10 single sticks are collected.

3. Put the number symbols from 1 to 20 in the wall pocket thus:

1	2	3	4	5	6	7	8	9	10

11	12	13	14	15	16	17	18	19	20

a. Take 15 or any teen number from the chart and have a child get that number of objects. Always have him tell what he did, as: "I wanted 15, so I got 1 ten and 5 ones because 10 and 5 are 15."

b. Let a child pick up sticks as one bundle of 10 and 3 ones. Have another get the number from the chart that tells how many. He should say, "I got 13 because 10 and 3 are 13."

c. Take 16 off the chart and have a child tell two things about it, as: "It means 1 ten and 6 ones, and its name is 16."

4. Have the children write the teen numbers at the blackboard so immediate correction can be made if errors occur. Emphasize the fact that all teen numbers are 1 ten and some 1's and that the 1 ten must be written first.

The same activities can be used in building meaning for numbers larger than 20. For 24, use 2 ten strips and 4 single dot cards; for 39 use 3 ten strips and 9 single dot cards, etc.

A study of 2-place numbers should begin soon after the middle of the school year has been reached, and part of each day's arithmetic time for the remainder of the school year should be used in developing the meaning of numbers from 10 to 100, in comparing them, and in writing them correctly.

THE 100-CHART

For this chart, each number from 1 to 100 is printed on a 3-inch square of tagboard and can be used either in a wall pocket or tacked

to a bulletin board. It can be used in many more ways in this form than a single chart could be used with all the numbers from 1 to 100 printed on it.

Suggestions for use:

1. As each number is introduced, the symbol card should be added to the number scale that is being developed on the bulletin board or in a wall pocket, as:

1	2	3	4	5	6	7	8	9	10

Children should continually be asked to find the number after, the number that means 1 more, the number before, and the number that means 1 less. Such activities as the following are recommended:

a. Point to 5 and say, "I am thinking of the number that comes after 5." The child says, "6," and gets the card with 6 on it out of the pocket.

b. Point to 7 and say, "Get the number that comes before 7."

c. Ask for the number that comes between 6 and 8.

d. Ask for the number that means 1 more than 4, 1 less than 3, etc.

e. Turn a number over or remove it from the chart. Ask what number is gone and how this is known. If the number is 5, the children's answer should be, "5 comes after 4," or "5 comes before 6."

2. While teaching the teen numbers, add numbers 11 to 20 to the chart.

a. Do the same types of exercises with these numbers as was done with numbers 1 to 10.

b. Ask for the number that means 1 ten and 8 ones, 1 ten and 2 ones, etc.

c. When teaching the addition of 1 to a number, ask each child to find the number that means 14 and 1, 16 and 1, etc.

d. Take a number as 13 from the chart and ask someone to get that number of sticks or tickets; to show that number on a strip chart, pegboard, or counting frame; to tell what the number means; or to write the number on the board.

3. After building some understanding of the 2-place numbers other than the teen numbers, put numbers 1 to 40, 1 to 50, and finally 1 to 100 in the wall pocket and repeat all the preceding activities, using these numbers.

SINGLE FACTS CARDS

There are 15 addition cards and 15 subtraction cards in this packet. They should not be used until meanings of both the numbers and of the processes of addition and subtraction are understood.

The addition fact cards are divided into 4 groups:

GROUP I.
$$\begin{array}{ccccc} 1 & 2 & 3 & 4 & 5 \\ +1 & +1 & +1 & +1 & +1 \\ \hline \end{array}$$

GROUP II.
$$\begin{array}{cccc} 1 & 1 & 1 & 1 \\ +2 & +3 & +4 & +5 \\ \hline \end{array}$$

GROUP III.
$$\begin{array}{cc} 2 & 3 \\ +2 & +3 \\ \hline \end{array}$$

GROUP IV.
$$\begin{array}{cccc} 3 & 2 & 4 & 2 \\ +2 & +3 & +2 & +4 \\ \hline \end{array}$$

Show children how the facts in Group I are related to counting by 1's—that is, that adding 1 to a number is the same as saying the next number in the counting series. Use the number scale through 6 and find the number that comes after; the number that means 1 more; the number that means 4 and 1, 2 and 1, etc.

$$\boxed{1}\ \boxed{2}\ \boxed{3}\ \boxed{4}\ \boxed{5}\ \boxed{6}$$
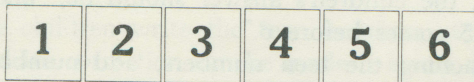
The facts in Group II are related to the facts in Group I. Emphasize this relationship by asking such questions as:

    a. If you know that 4 and 1 are 5, how does this help you with 1 and 4?

    b. If you have 4 sticks in one hand and 1 stick in the other hand, how many sticks do you have when you put them together? Tell this number story two ways.

Help children see that it makes no difference which number is said first, the sum of such related facts is the same.

There are two "doubles" facts in Group III. There is something about repeating numbers that seems to make these facts easy. After some experience with these facts, put them with the nine cards in Groups I and II for mixed practice.

The facts in Group IV involve adding 2 to a number or a number to 2. These are the most difficult addition facts presented in grade

one. Much attention to these facts as a group, using objects to demonstrate meaning, should be provided before practice with these flash cards is introduced.

Considerable practice with these 15 addition facts should be provided before subtraction is introduced to prevent confusion of the processes. As soon as subtraction is introduced, practice on addition should cease until an understanding of the subtraction process is well established and mastery of some of the subtraction facts has been reached.

The subtraction facts are divided into 4 groups:

GROUP I.
$$\begin{array}{ccccc} 2 & 3 & 4 & 5 & 6 \\ -1 & -1 & -1 & -1 & -1 \\ \hline \end{array}$$

GROUP II.
$$\begin{array}{cccc} 3 & 4 & 5 & 6 \\ -2 & -3 & -4 & -5 \\ \hline \end{array}$$

GROUP III.
$$\begin{array}{cc} 4 & 6 \\ -2 & -3 \\ \hline \end{array}$$

GROUP IV.
$$\begin{array}{cccc} 5 & 5 & 6 & 6 \\ -2 & -3 & -2 & -4 \\ \hline \end{array}$$

Use the number scale to show how the facts in Group I are related to counting by 1's—that is, that taking 1 from a number is the same as saying the number that comes immediately before it when counting.

$$\boxed{1}\ \boxed{2}\ \boxed{3}\ \boxed{4}\ \boxed{5}\ \boxed{6}$$
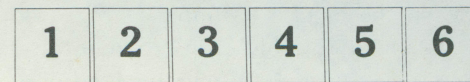
Ask such questions as:
1. What number comes just before 5?
2. What number means 1 less (fewer) than 5?
3. 1 from 5 are how many? Find the number on the chart. Call attention to the fact that 4, the number that comes before 5, is the answer.

The facts in Group II are related to the facts in Group I. Use concrete objects to show this relationship—if 1 from 6 are 5, then 5 from 6 is 1. Etc. Also, as work with this group of facts progresses, help children see that when two numbers come right together in the counting series, the remainder is always 1 when the smaller number is subtracted from the larger.

The 2 facts in Group III are related to the "doubles" facts in ad-

dition, and it will be helpful when working with these 2 facts to introduce the relationship of addition and subtraction, as:

$$\begin{array}{cc} 2 & 4 \\ +2 & -2 \end{array} \qquad\qquad \begin{array}{cc} 3 & 6 \\ +3 & -3 \end{array}$$

The facts in Group IV involve taking 2 away from a number and the related facts. These are the most difficult subtraction facts presented in grade one. Much attention to these facts as a group, using objects to demonstrate meaning, should be provided before flash-card practice is introduced.

RELATED FACTS CARDS

There are 6 addition cards and 6 subtraction cards in this packet. The 4 cards below should be used when the second group of addition facts is introduced to show the relationship of the facts in Groups I and II.

$$\begin{array}{cc} \mathbf{2} & \mathbf{1} \\ \mathbf{+1} & \mathbf{+2} \end{array} \quad \begin{array}{cc} \mathbf{3} & \mathbf{1} \\ \mathbf{+1} & \mathbf{+3} \end{array} \quad \begin{array}{cc} \mathbf{4} & \mathbf{1} \\ \mathbf{+1} & \mathbf{+4} \end{array} \quad \begin{array}{cc} \mathbf{5} & \mathbf{1} \\ \mathbf{+1} & \mathbf{+5} \end{array}$$

These cards can also be used for independent study, since the sum is printed on the back of each card. The 2 other addition facts cards should be used when the facts in Group IV are introduced.

Likewise, the cards below should be used when the second group of subtraction facts is introduced to show the relationship of the facts in Groups I and II.

$$\begin{array}{cc} \mathbf{3} & \mathbf{3} \\ \mathbf{-1} & \mathbf{-2} \end{array} \quad \begin{array}{cc} \mathbf{4} & \mathbf{4} \\ \mathbf{-1} & \mathbf{-3} \end{array} \quad \begin{array}{cc} \mathbf{5} & \mathbf{5} \\ \mathbf{-1} & \mathbf{-4} \end{array} \quad \begin{array}{cc} \mathbf{6} & \mathbf{6} \\ \mathbf{-1} & \mathbf{-5} \end{array}$$

These cards can also be used for independent study, since the remainder for the first fact is always equal to the number which is to be taken away in the second fact, and the remainder for the second fact is always equal to the number which is to be taken away in the first fact. The 2 other subtraction fact cards should be used when the facts in Group IV are introduced.