

COUNTING



If teachers and parents take advantage of natural counting opportunities, there is little need to contrive special counting activities. Children memorize counting sequences through counting songs and rhymes. They count while measuring quantities at the comparing station, adding two columns while graphing or comparing two sorted groups of junk, and so on.

Children learn counting patterns when they are surrounded with a variety of counting experiences. Children should experience counting activities allowing them to count by different groupings — by two's, five's, ten's.... They need to count backwards from a predetermined number as well as forwards.

ROTE COUNTING

Rote counting is the simplest of counting concepts to learn. The ability to count by rote can deceive both the teacher and parent into assuming that the child who can count by rote with ease to a hundred or above, also has an understanding of those numbers. In most cases this simply isn't true. One kindergarten teacher shared a story illustrating this point.



Christopher counted comfortably by one's, two's, five's and ten's to a hundred and beyond. He really understood the counting patterns of counting by a predetermined number. One day he was estimating how many pennies the teacher had placed in a baby food jar. He then had to check the actual total by counting the pennies. The pennies were to be grouped into ten's (each group of ten went into a portion cup) and one's. Then they were placed onto a place value board so the total could be counted.

As Chris was grouping the pennies into ten's, his teacher walked by and noticed the pennies were overflowing from the cups. It was obvious that Chris was putting more than ten pennies in the cups. She reminded him that only ten pennies go in each cup. He acknowledged that was what he was doing. The teacher was puzzled because she knew he could easily count to ten, so she asked him to show her how he was counting the pennies. He dumped out a cup of pennies and told the teacher he counted by two's.

He proceeded to count the pennies into the cup. He counted "two" and placed two pennies in the cup. Then he said "four", and

placed four more pennies in the cup, "six" and counted six more pennies in the cup, and so forth until he got to ten. Naturally, the cup was overflowing. The teacher had incorrectly assumed since Chris could comfortably count by various groupings, he could transfer that skill to counting real materials by the groupings. It was only by observing Chris at work with the concrete materials that she discovered this was not so.

The teacher quickly modeled for Chris how to count by two's using the pennies. He had no problem understanding the process. Just to make sure, the teacher asked Chris to count 18 pennies by two's. Then she asked him to count fifteen pennies by five. Chris quickly formed three groups of five pennies. She then asked if he could count the same group by three's. He rearranged the pennies into five groups of three. Chris's face lit up. It was obvious that he now understood what it meant to count "by" a certain number.

BEYOND ROTE COUNTING

There's more to counting than the ability to memorize a sequence of words by rote. Each one of the following concepts is interrelated and necessary for children to have a clear understanding of counting to be able to apply this ability during number operations.

One-to-One Correspondence

Children display one-to-one correspondence when they count a group of objects while physically or mentally touching each object once, and only once.

Invariance of Number

The number of objects does not change if the objects are displaced (i.e., separated into groups or hidden).

Inclusion

The number labeling how many objects in a group includes all the objects in the group. It does not matter in which order the objects are placed, the number remains the same. For instance, "four" indicates the total number of marbles, rather than just the fourth marble.

Ordinal Counting

The number name indicates the position of something in a series. (First, second, third,...)

Counting-on

Children show an ability to count on when they can count a group of objects and continue from the total when an additional group of objects are added, without needing to start at one again. (Five, six, seven, eight.)

For a more detailed description of the above counting concepts, refer to Assessment 1-5 (NL, pp. 3.7-3.10).

HOW TO BEGIN

Surround children with a variety of counting experiences. Begin with counting books, songs, nursery and counting rhymes, finger play rhymes, etc. and the counting activities suggested in *Mathematics Their Way* (Chapter 4). A suggested list of children's counting books is in Chapter 12, *Integrating Mathematics into the Curriculum*.

Take advantage of natural opportunities during the school day to count in context of real-life experiences —such as preparing snacks, counting out books or paper for each child, lunch count, or taking attendance. Count forward and backwards, by various groupings (e.g., two's, five's and ten's...). Quick thirty-second counting activities can be done easily during free moments throughout the school day. Children can count off by a number sequence while standing in line before they go to lunch, or during the opening activities they might use the Days in School Number Line (pp. 4.8-4.9) to count "by" a certain grouping.

GROUP COUNTING ACTIVITIES

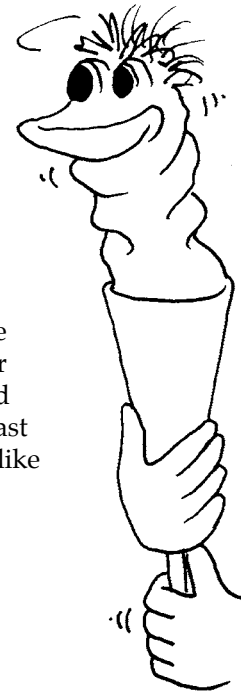
ROTE COUNTING

Count and Clap

Materials: Pop-up puppet

Concept: Counting forward or backwards in a sequence

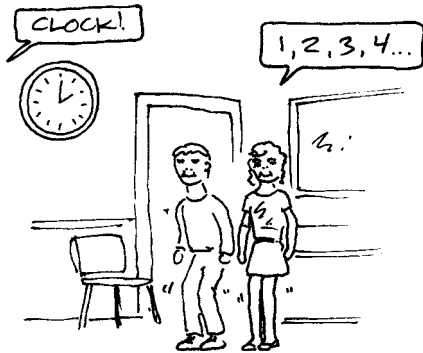
Decide on a counting sequence (i.e., counting by one's from 1 to 7 or counting by two's from 2 to 12). Pop up the puppet on the final number in the sequence only and hide it on the other numbers. The children can count in unison and clap their hands on the final number. Count over and over without missing a beat between the last number and beginning again with "one" (like in the Pendulum Game MTW, p. 95).



Close Your Eyes and Jump

Materials: None

Concept: Counting forward or backwards



Begin by pointing out familiar classroom objects (e.g., door, calendar, piano, flag). Have the children close their eyes. Name one of the objects in the room. Then count the predetermined counting sequence together aloud. On the final number in the sequence, everyone jumps and turns with eyes closed toward the object named.

Everyone opens their eyes to check. Name a second object and repeat the process. Repeat the sequence over and over without pausing. Keep the final number constant within any one day.

Additional Rote Counting Activities

Mathematics Their Way

Count and Turn	p. 93
The Pendulum Game	p. 95
The Circle Game	pp. 98-99
Stand Up, Sit Down	p. 109
Take Over	p. 110
Inside, Outside	p. 111

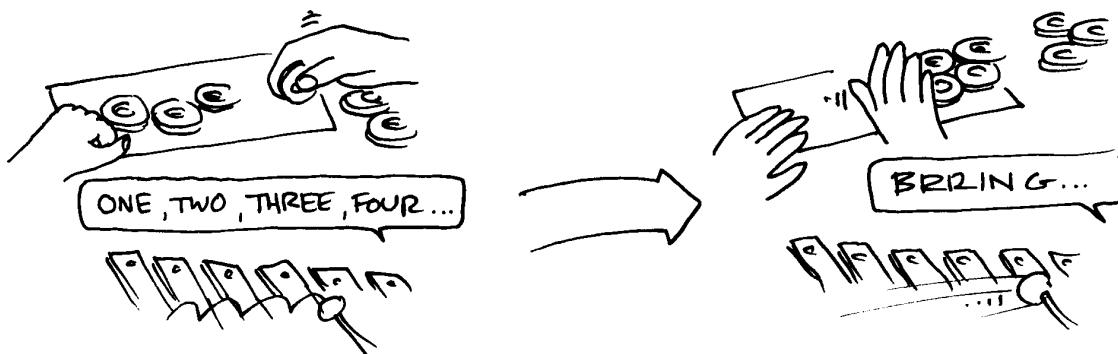
ATTACHING QUANTITATIVE MEANING TO THE COUNTING SEQUENCE

Slide and Check

Materials: Objects to count (e.g., junk, Unifix cubes...); working space papers (MTW, p. 365); xylophone

Concepts: counting, one-to-one correspondence

Each child needs a working space paper and some counting objects. Choose a number under ten to which to count. Ask the children to place an object onto the working space each time a number is counted. Ding the xylophone each time a number is counted. At the end of the sequence, check the objects by recounting the sequence while



the children touch each object once on their work space. Then run the xylophone mallet down the xylophone to indicate to the children to clear their spaces. Repeat the process several times with different numbers.

This same activity can be used at an independent level, by tape recording the above sequence. It is called "The Counting Tape" (MTW, p. 94).

Grow and Shrink

Materials: Work spaces and counters (e.g., junk, Unifix cubes, beans...)

Concepts: Counting forward and backwards, counting-on, quantity

Using the Body

Ask the children to stand. Choose a number to count to and then back to one. Ask the children to make their bodies as small as possible by making it into a ball. This is the starting position. Then ask them to stretch their bodies out as big or as tall as they can. This is the position their bodies will be on the last number of the sequence. Now have them get back into the smallest position and count out the whole number sequence. Gradually the bodies stretch larger and larger until the last number is reached. Then (beginning with the last number in the sequence) count backwards. The bodies shrink in size as the numbers get smaller and smaller until the class reaches one (or zero). Repeat this process (using the same number) several times, each time growing or shrinking as the numbers get larger or smaller.

Now tell the children you are going to say a number (out of sequence). They have to move their bodies to that position.



Using Manipulatives

Repeat the process above. This time instead of using the body, set out the number of objects representing the number to be counted (see Slide and Check NL, pp. 5.4-5.5). First count forwards and backwards in sequence. Later say a number in the sequence and ask the children to make it on their work space. Repeat saying numbers out of sequence several times.



People and Things in the Room

Materials: Children; objects in the room

Counting Groups

Ask the children to sit in a circle. Decide on an attribute by which to sort the group — such as having everyone with tie shoes stand up. Ask the children standing to count off. Continue this activity by choosing other attributes. Encourage the children to think of their own categories.

Counting and Comparing Groups

Extend this activity by comparing two or three groups. Decide how the group will be sorted. Let's say the children decided to sort the group by children who eat hot lunches and children who bring their lunches from home. Predict before counting the groups of children which group will have (more / less / or the same). Count the groups. Compare the numbers and discuss the outcome. If the number in each group is close, the children might have to form a people graph to compare the groups. The children form two lines so each child matches one-to-one with a child in the other group. This can be checked by asking the children to shake hands with one person in the other group.

Ordinal Numbers

Children need real experiences using ordinal numbers. Begin by choosing five children to stand in a line in front of the class. Ask the children to count off in ordinal numbers ("First, second, third, fourth, fifth.") Once the children understand the order, ask the rest of the class questions about the children. The class answers each question by naming the ordinal position of the child.

Sample Questions:

"Which child is the tallest?" (The fourth child)

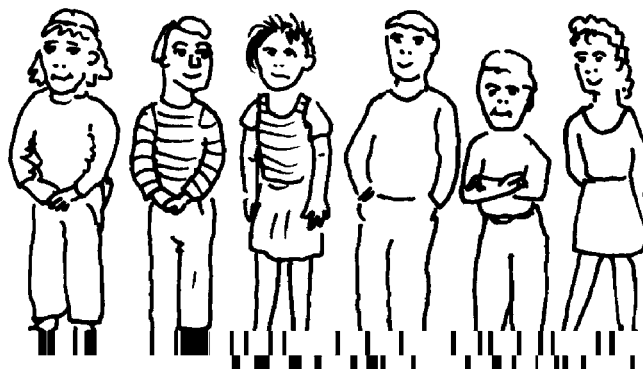
"Which children are wearing striped shirts?" (the second and the third)

"I would like the fifth child to turn to shake hands with the first child."

"Amy, give the third child a pencil."

"What color is the third person's hair?"

Continue in this fashion. Encourage the children to come up with their own questions or commands. Gradually increase the number of participants when the children can comfortably work with five children.



Additional Counting Activities which Attach

Quantitative Meaning

Mathematics Their Way

Bell in the Box	p.	230
Capture	p.	195
Concentration	p.	191
Counting Tape	p.	94
Listen and Count	p.	190
My Turn, Your Turn	p.	231-232
Pattern Book Experiments	pp.	338-359
The Piggy Bank Game	p.	101
Geoboard Number Patterns	p.	260
Chapter 12 Pattern Book Experiments	pp.	328-359

Workjobs

Birthday Cakes	p.	72
Cars and Garages	pp.	162-163
Easter Baskets	pp.	134-135
Fences	p.	174
Flannelboard Groups	p.	145
Flowers and Vases	pp.	164-165
Hangers and Clothes Pins	pp.	156-157
Math Recording Game	pp.	140-141
Nail Board	pp.	170-171
Number Board	p.	138
Number Cans	p.	150
Number Combination Board	p.	168
Number Dots	p.	146
Number Lines	p.	137
Odd Ball	pp.	158-159
Paper Clip Game	pp.	166-167
Piggy Bank	pp.	160-161
Pincushions	pp.	130-131
Safety Pin Game	pp.	132-133
Select-a-Set	p.	152
Trees and Apples	pp.	148-149

<i>Workjobs II</i>	pp.	8-13
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Summary Newsletter

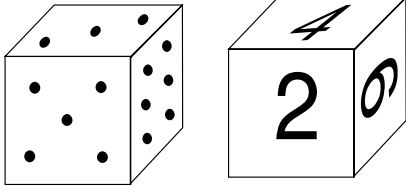
Integrating Mathematics	Chapter 12
Measurement	Chapter 7
Number Operations	Chapter 11
Opening	Chapter 4
Organizing Information	Chapter 8

COUNTING MATERIALS

Milk Carton Dice

MTW, pp. 231

Materials: a half gallon milk carton; Exacto knife; masking tape; plain colored Contact paper

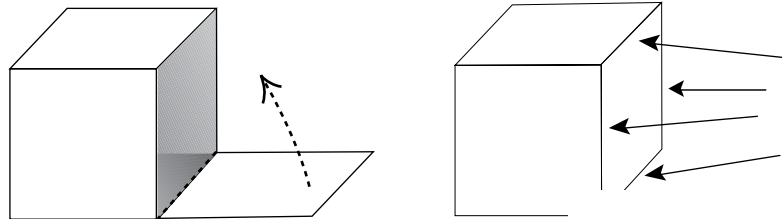


The milk carton die is used with the floor version of game, My Turn, Your Turn (see MTW, p. 231).

Note: The directions can be adapted to a quart milk carton.

Method 1:

Cut three sides of the carton down to 3-3/4" from the bottom. Discard the top. Cut the 4th side 7-1/2" from the bottom. Fold up the long side and tape the edges. Cover the cube with plain colored Contact paper, and make the desired number of dots or numerals using permanent markers or round Dennison labels.



Method 2:

Cut two milk cartons 3-3/4" from the bottom. Discard the tops. Push one carton into the open end of the other. To make this easier, cut 1/4" into the corners of the carton being inserted.

Cover the cube with plain colored Contact paper, and make the desired number of dots or numerals using permanent markers or round Dennison labels.

