

Big Ideas of Number Sense

- ***Rote Counting***- Saying number words in sequence without necessarily attaching meaning.
- ***Unitizing***- Seeing a group as a whole unit and know it is composed of parts; “part-part-whole”
- ***Cardinality***- Knowing the number of objects in a group that has been counted.
- ***1-to-1 Correspondence***- Saying 1 number for each item counted only once. Keeping track, *tagging*, and *synchrony* are all in place.
 - *Tagging*- Touching each object while counting using finger, eyes, head nods, etc.
 - *Synchrony*- Saying one number for each object tagged.
- ***Subitizing***- Seeing small numbers of objects and knowing how many are in a group without counting.
- ***Conservation***- The number of objects stay the same even though they are moved or rearranged.

Number Sense for K Teachers ☺

Aug. 18, 2015

Group One: Facilitator-Tina Wutzke

Concepts: 1-to-1-Correspondence, Number Sequence, Number Relationships

Teacher Instruction for Small Group Activities:

- *Hunt for It*
Level 1: Counting
Level 2: Recognizing Quantities
Level 3: Reading Numerals
- *Peek and Count*
Level 1: Counting
Level 2: Writing Numerals
- *Find a Match*
Level 1: Counting
Level 2: Recognizing Quantities
Level 3: Recognizing Numerals
- ***Hide-It Station*

** Also Activity for Independent/Partner Practice:

Group Two: Facilitator-Kendra Leggett

Concepts: Cardinality, Adding Symbols (Numerals)

Teacher Instruction for Small Group Activities:

- *Tall and Short*
Level 1: Counting
Level 2: Recognizing Numerals
- ***Hiding One More/One Less*(Extension- Numbers to 20; Variation-Add or take away 2 each time)*
- ***Make a Train Race*
Level 1: Counting
Level 2: Recognizing Numerals
- ***Build a Staircase*
Level 1: Counting
Level 2: Recognizing Numerals (Extension-Bigger Staircases)

3. Acting Out Using Counters with Story Boards
 4. Modeling + and – Equations for Stories (both vertically and horizontally; using both natural language and mathematical language)
 5. Acting Out Children’s Stories to Go with Equations
- *Roll and Count + and –* (add or subtract from 10 frame)
 - *Listen and Count + and –* (Seed Drop/Xylophone)
 - *Grow and Shrink using + and –* (show # rolled on 10 frame)
 - *Writing Equations to Label + and – Stories*
- Level 1: Writing Equations using Counters Using Equation Written on the Board
Level 2: Writing and Checking Equations using Counters without a Model; then Teacher Writes Equation on the Board and Students Use it to Check

****Independent Practice:**

- ****Race to 10**
 - ****Counting Story Boards**
 - Matching Equation to Story Boards
 - Writing Equations with Story Boards
- Level 1: Copying Equations
Level 2: Writing Equations Creating Own Story

Hiding Assessment

Activities Based on the work of Kathy Richardson

Developing Number Concepts

Book 1—Counting, Comparing, Pattern

Book 2—Addition and Subtraction

**** Also Activity for Independent/Partner Practice**

Group Three: Facilitator-Andrea Patterson

Concepts: Estimation, Measurement, Count to Check

****Independent/Partner Practice:**

- ****Shape Puzzles**
Level 1: Counting and Recognizing Numerals
Level 2: Writing Numerals
Extension: Numbers to 20
- ****Line Puzzles**
Level 1: Counting and Recognizing Numerals
Level 2: Writing Numerals
Extension: Numbers to 20
- ****Sorting Collections**
Level 1: Counting and Recognizing Numerals
Level 2: Writing Numerals
Extension- Numbers to 20
- ****Sorting Shape Puzzles**
- ****Sorting Line Puzzles**
Extension: Numbers to 20

**** Also Activity for Independent/Partner Practice**

Group Four: Facilitator-Karen Lipp

Concept: Part-Part-Whole (Addition and Subtraction)

Teacher Instruction for Small Group Activities:

- *Story Problems:*
 1. Acting Out Stories using Real Objects
 2. Acting Out Stories using Role-play Fantasy Stories

Children with Special Needs If you have children who are having difficulty learning to count accurately and consistently, provide them with lots of practice with small numbers until they are confident counting them. Have the children work with the same numbers over and over again, but in a variety of ways. The activities in this chapter provide many ideas for varying this repetitive practice. For specific activities, refer to the "Meeting the Needs of Your Children" chart for Chapter 1 in the introduction to this book. (See "Practice with one-to-one counting to ten.")

Goals for Children's Learning*

Goals

When counting objects in a variety of settings, the children will:

- Count to ten with consistency, accuracy, and confidence
- Use numbers to answer the question, "How many?"
- Develop number sense and number relationships by
 - Making reasonable estimates
 - Determining "one more" and "one less" without counting
 - Recognizing small groups of up to five objects without counting
- Recognize the numerals 0 to 10
- Write the numerals 0 to 10 without a model
- Use numerals to record experiences

When working with the activity extensions, the children will:

- Count objects to 20 or 30
- Recognize numerals to 20 and beyond

Analyzing and Assessing Children's Needs

The goals for children working in this chapter go beyond simply counting to ten and recognizing numerals. The emphasis here is on understanding the usefulness of counting, developing facility with counting, and developing a sense of quantities and relationships.

When we assess children's understanding of beginning number concepts and make decisions about what they need to learn, it is not enough to know if they can count by rote or recognize numerals. It is also not enough to know if they can match sets to numerals on a workbook page. Instead, we need to know if they can *use* counting and make sense of number in a variety of settings. We can get valuable information about what children understand by paying close attention to the way they respond to tasks. Observing them at work can guide our interactions with them and help us in planning and pacing the activities we present.

* Adapted from *How Do We Know They're Learning? Assessing Math Concepts*.

The following guide to observations will help you to know what to look for as you assess your children's growth.

Questions to Guide Your Observations*

Always make note of which numbers children are able to work with, as this varies from child to child and changes throughout the year. Are the children able to work with numbers to 6? to 10? to 20? beyond 20?

Questions

Counting Objects

- When the children count, do they use the appropriate counting sequence? Do their errors appear to be random or do they consistently make the same errors?
- Do they count each object once and only once, or do they lose the idea of one-to-one correspondence as they count?
- Do they have a way of keeping track of what they have counted?
- Are they consistent? Are they accurate? If they are inaccurate, are they aware of this? Are they bothered by this?
- Do they check and recheck to make sure they counted correctly?
- Do they remember the number they counted to?
- When asked to get a certain number of objects, do they count correctly or do they count past the number they need?

Number Sense and Relationships

- Can the children instantly identify small groups of up to four or five objects, or do they need to count even when the groups are very small?
- Do they use what they know about one group to help them figure out how many there are in another group?
- Do they make a reasonable estimate about the size of a group? Can they revise their estimate after counting just a few objects in the group?
- When asked to change one number of objects to another, how do they do this? Do they start counting over again? Do they count on? Do they count backward? Do they know how many they need to add or take away without counting?

Working with Symbols

- Can the children say the names of the numerals and build a set that corresponds to each?
- Can they easily write the numerals that name particular sets or do they need models of the numerals in order to write them correctly?

* Adapted from *How Do We Know They're Learning? Assessing Math Concepts*.

The Hiding Assessment

The child determines the missing parts of numbers (up to 10) when shown one part.

Child's Name _____

Assessment Procedures	Observations		
	Date _____	Date _____	Date _____
<p>Ask the child to hand you a particular number of counters. When assessing a child for the first time, ask the child to hand you five counters. Hide some of the counters in one hand and show the child the remaining counters in your other hand. Ask, "How many are hiding?"</p> <p>Change the number of counters that you are "hiding" and ask, "Now, how many are hiding?"</p> <p>Repeat for several combinations for that number.</p>	<p>Number _____</p> <p>____ Makes no response or says, "I don't know." ____ Says an unreasonable number. ____ Tells a number that is close but inaccurate. ____ Figures out how many are hiding. ____ Knows quickly and confidently.</p>	<p>Number _____</p> <p>____ Makes no response or says, "I don't know." ____ Says an unreasonable number. ____ Tells a number that is close but inaccurate. ____ Figures out how many are hiding. ____ Knows quickly and confidently.</p>	<p>Number _____</p> <p>____ Makes no response or says, "I don't know." ____ Says an unreasonable number. ____ Tells a number that is close but inaccurate. ____ Figures out how many are hiding. ____ Knows quickly and confidently.</p>
<p>If the child is successful with the number you are assessing, check larger numbers in the same way. If the child is unsuccessful with that number, check smaller numbers.</p>	<p>Number _____</p> <p>____ Makes no response or says, "I don't know." ____ Says an unreasonable number. ____ Tells a number that is close but inaccurate. ____ Figures out how many are hiding. ____ Knows quickly and confidently.</p>	<p>Number _____</p> <p>____ Makes no response or says, "I don't know." ____ Says an unreasonable number. ____ Tells a number that is close but inaccurate. ____ Figures out how many are hiding. ____ Knows quickly and confidently.</p>	<p>Number _____</p> <p>____ Makes no response or says, "I don't know." ____ Says an unreasonable number. ____ Tells a number that is close but inaccurate. ____ Figures out how many are hiding. ____ Knows quickly and confidently.</p>

Kindergarten math assessment - Kathy Richardson Hiding Assessment

Child's Name _____

Date _____

Have child give you 4 cubes. Say, "How many am I hiding?"	Have child give you 5 cubes. Say, "How many am I hiding?"	Have child give you 6 cubes. Say, "How many am I hiding?"	Have child give you 7 cubes. Say, "How many am I hiding?"	Have child give you 8 cubes. Say, "How many am I hiding?"	Have child give you 9 cubes. Say, "How many am I hiding?"	Have child give you 10 cubes. Say, "How many am I hiding?"
Circle the number child knows.	Circle the number child knows.	Circle the number child knows.	Circle the number child knows.	Circle the number child knows.	Circle the number child knows.	Circle the number child knows.
<i>Remarks:</i>	<i>Remarks:</i>	<i>Remarks:</i>	<i>Remarks:</i>	<i>Remarks:</i>	<i>Remarks:</i>	<i>Remarks:</i>
<i>Knows</i>	<i>Knows</i>	<i>Knows</i>	<i>Knows</i>	<i>Knows</i>	<i>Knows</i>	<i>Knows</i>
<i>Counts</i>	<i>Counts</i>	<i>Counts</i>	<i>Counts</i>	<i>Counts</i>	<i>Counts</i>	<i>Counts</i>
<i>Guesses</i>	<i>Guesses</i>	<i>Guesses</i>	<i>Guesses</i>	<i>Guesses</i>	<i>Guesses</i>	<i>Guesses</i>
<i>Doesn't know</i>	<i>Doesn't know</i>	<i>Doesn't know</i>	<i>Doesn't know</i>	<i>Doesn't know</i>	<i>Doesn't know</i>	<i>Doesn't know</i>
2	2	2	2	2	2	2
4	4	4	4	4	4	4
3	3	3	3	3	3	3
1	5	5	5	5	5	5
0	1	1	1	1	1	1
	0	0	6	8	8	8
		6	0	6	6	6
			7	0	9	10
				7	0	7
					7	0
						9

Kindergarten math assessment - Kathy Richardson Hiding Assessment

Child's Name _____ Date _____

Side 2

What If questions to determine the child's ability to identify missing parts of numbers mentally. Do this after child is solid in knowing 6.

Knows up to 6	Knows up to 7	Knows up to 8	Knows up to 9	Knows up to 10
Say "What if you had ___ cubes and you gave me ___?"	Say "What if you had ___ cubes and you gave me ___?"	Say "What if you had ___ cubes and you gave me ___?"	Say "What if you had ___ cubes and you gave me ___?"	Say "What if you had ___ cubes and you gave me ___?"
Write what the child says.	Write what the child says.	Write what the child says.	Write what the child says.	Write what the child says.
You had - you gave me	You had - you gave me	You had - you gave me	You had - you gave me	You had - you gave me
6 - 2	7 - 2	8 - 2	9 - 2	10 - 2
6 - 1	7 - 1	8 - 1	9 - 1	10 - 1
6 - 3	7 - 3	8 - 5	9 - 4	10 - 6
4 - 1	6 - 4	7 - 4	9 - 6	10 - 3
5 - 2	5 - 1	6 - 2	7 - 2	8 - 2
	6 - 3	7 - 5	8 - 3	7 - 4

Task One – counting objects Would you count these objects?	Task Two – counting out objects Now make a pile of _____ counters.	Task Three – adding one more Begin with the number of counters counted in task two - add one counter at a time. (ie: if child counts to 7 ask 7 and 1 more, etc.) If child needs to count, begin with a smaller number. "18 and one more? How many now?"	Task Four – take away one more Beginning with the number the child can add one to in task three without counting. If child needs to count, begin with a smaller number. Take away 1 counter and say, "If I take away one, how many now?"	Task Five – one more/one less out of sequence Ask the following. What if questions until the child needs to count or can't answer. This task is if child can do tasks tree and four.
32 <i>remarks: can't keep track, checks/rechecks, accurate with ease</i>	18 <i>remarks: counts past, counts with effort, accurately, with ease</i>	18 + 1 19 + 1 20 + 1 21 + 1 <i>remarks: guesses, counts, knows without counting</i>	22 - 1 21 - 1 20 - 1 19 - 1 <i>remarks: guesses, counts, knows without counting</i>	<i>Remarks: child understands number system, child has a difficult time knowing what is more or less.</i> 3 & 1 6 & 1 11 & 1 17 & 1
21	9	9 + 1 10 + 1 11 + 1 12 + 1	13 - 1 12 - 1 11 - 1 10 - 1	5 - 1 9 - 1 13 - 1 16 - 1 20 - 1
12	5	5 + 1 6 + 1 7 + 1 8 + 1	9 - 1 8 - 1 7 - 1 6 - 1	
7				EXTENSION 29 & 1 39 & 1 59 & 1 100 & 1 199 & 1 50 - 1 80 - 1 100 - 1 110 - 1 300 - 1

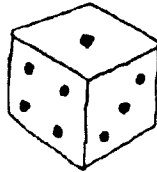
Small Dot Cubes and Small Number Cubes

Small dot and number cubes can be made from plain wooden blocks, by cutting pieces of foam, or by covering commercially made cubes with blank stickers. Color-code the dots and numerals so that you can distinguish between the cubes quickly and easily. You can, for example, mark the 0–5 cube with a blue pen, the 1–6 cube with a black pen, and the 4–9 cube with a red pen.

- The activities in this chapter call for the following dot and number cubes:

Dot Cubes:

- 0–5 dots (blue)
- 1–6 dots (black)
- 4–9 dots (red)



Number Cubes:

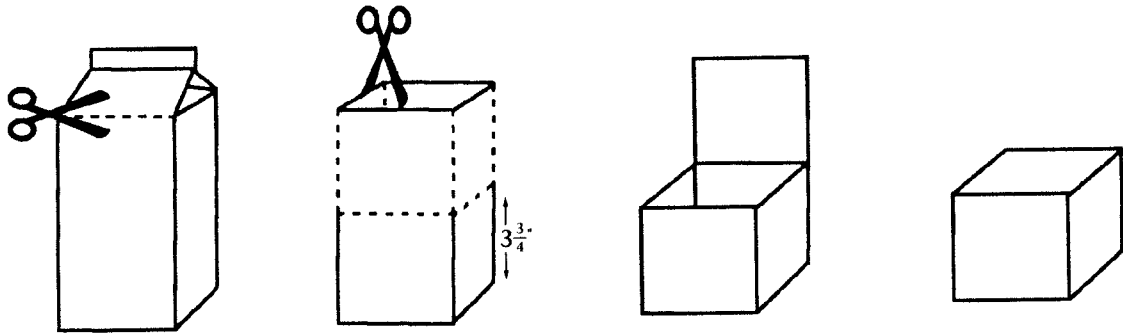
- numerals 0–5 (blue)
- numerals 1–6 (black)
- numerals 4–9 (red)



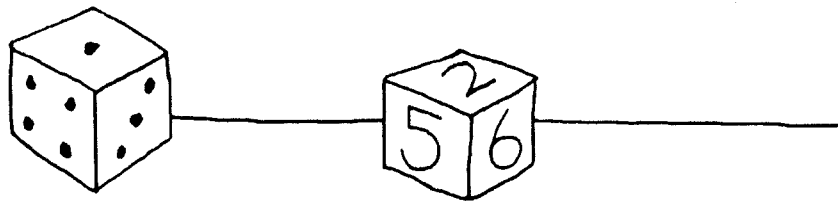
Large Dot Cubes and Large Number Cubes

You can use a half-gallon milk carton to make a cube with markings large enough to be seen easily by all the children in a group.

Cut off the top of the carton at the point at which the sides bend to form the spout. Measure $3\frac{3}{4}$ " upward from the bottom of the carton, marking this distance around all four sides. Then cut downward along each corner, stopping at the $3\frac{3}{4}$ " mark. Cut off *three* of the sides at this point (leaving the fourth side intact) to form an open cube. Now fold the fourth side inward along the $3\frac{3}{4}$ " mark and tape it down to form the closed cube.

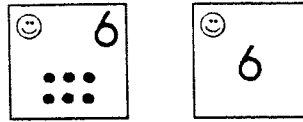


Cover the cube with solid-colored contact paper. Use a marker to make the desired numbers of dots or numerals.



Numerals Cards

Numerals cards, available as blackline masters, are marked so that dots and numerals appear on one side and numerals alone appear on the reverse side.



Children will use the cards at whichever levels they need for success.

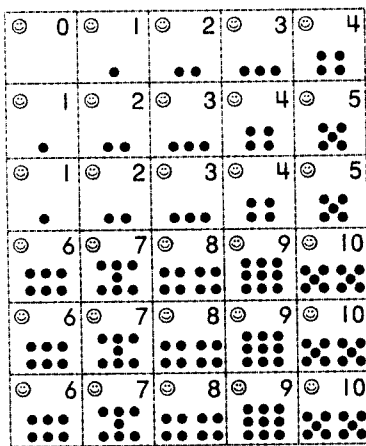
The blackline masters from which you can make three different sets of numerals are as follows.

0-6: BLMs #14 and #15

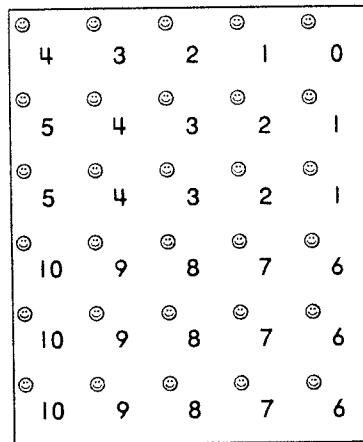
0-10: BLMs #16 and #17

11-20: BLMs #18 and #19

Duplicate each set of numerals on a different-color paper. To make each two-sided card, copy each A set, then turn the paper over and copy the corresponding B set on the other side. Then cut the cards apart along the dotted lines. For example:

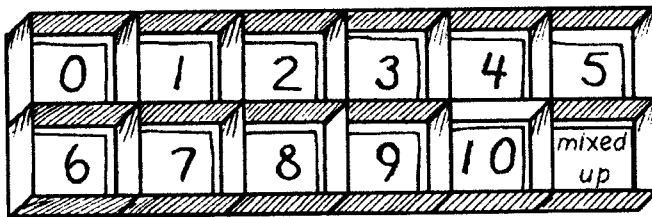


Front



Back

There are some activities and games in which the children need to find certain numerals quickly and easily. The numeral cards can be stored individually in the bottoms of cut-off half-pint milk cartons that have been stapled together. Glue a numeral card onto the bottom of each carton as shown.



Listed below are ideas for things that counters can represent in each setting:

Counting Board	Ideas for Things To Be Represented
Tree	Apples, cherries, lemons, leaves
Ocean (pool, lake)	Boats, fish, shells, whales, children
Barn	Farm animals
Cave	Bears, monsters, bugs, bats
Corral (pasture)	Cows, horses, pigs, cowboys
Store	Various toys
Road	Cars, trucks, motorcycles, people, parade
House	People, things in the house
Garden	Vegetables, flowers
Grass (yard, field)	Bugs, children playing, flowers, butterflies

Additional settings can be created on various kinds of paper, as follows:

Sky (on blue paper)	Birds, airplanes, bugs
Night or outer space (on black paper)	Moon, pumpkins, stars, spaceships
Beach (on sandpaper)	Shells, children playing, rocks, crabs

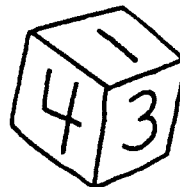
When the counting boards are used in a teacher-directed activity, each child needs one board. If you have more than eight children in a group, make extra copies so that each child can have the same board. When children are working with the counting boards independently, each child needs a complete set of eight. The counting boards can be stored in clear bags or in pocket-type envelopes.

Number Cubes

The children can create a variety of addition and subtraction problems by rolling a variety of number cubes. The cubes can be made from plain wooden blocks by cutting pieces of foam or by covering commercially made cubes with blank stickers. Color-code the numerals so that you can distinguish between the cubes quickly and easily. You could, for example, mark the 0-4 cubes in green, the 4-9 cubes in red, the 0-5 cubes in blue, and the 1-6 cubes in black.

The activities in this chapter call for the following cubes:

- 0-4 (green) [Write "4" on two sides.]
- 4-9 (red)
- 0-5 (blue)
- 1-6 (black)



Number Lines [Blackline Masters #28-29]

Run off BLMs #28 and #29 on tagboard and cut apart. Make the number lines available to children whenever they need models for writing numerals.

The children use addition and subtraction cards for several different activities.

Addition Cards [Blackline Masters #64–68]

Sums to 6 (Horizontal Addition—#64, Vertical Addition—#65)

Sums of 7 to 9 (Horizontal Addition—#66, Vertical Addition—#67)

Sums of 10 (Horizontal and Vertical Addition—#68)

Make copies of the sums to 6 on paper of one color. Make copies of the sums of 7 to 9 and the sums of 10 on paper of a second color. Cut the cards apart.

Subtraction Cards [Blackline Masters #69–73]

Subtracting from 1 to 6 (Horizontal Subtraction—#69, Vertical Subtraction—#70)

Subtracting from 7 to 9 (Horizontal Subtraction—#71, Vertical Subtraction—#72)

Subtracting from 10 (Horizontal and Vertical Subtraction—#73)

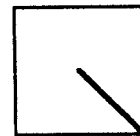
Make copies of differences of up to 6 using the same color paper as you used for sums to 6, and make copies of the differences of from 7 to 9 and from 10 on the same color paper as you used for the corresponding sums.

Plus-or-Minus Spinner

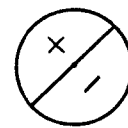
To make the spinner, cut out a tagboard circle about six inches in diameter. The circle can be made by tracing around a large margarine tub lid. Cut out a tagboard square slightly larger than the circle. Poke holes through the center of the square and the center of the circle.



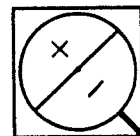
Draw a line from one corner of the square to the center. This line will serve as the pointer.



Draw a line through the center of the circle. Draw a plus sign on one side of the line and a minus sign on the other side.



Cut out three small squares (each measuring about $1\frac{1}{2}$ inches on a side) from the scraps of tagboard. Poke a hole through the center of each and crimp by pinching them. (The small squares will help create a space between the circle and the square base so that the spinner will spin easily.) Open a paper clip and push one end through the square, the three small squares, and the circle.



To keep the spinner from coming apart, and to keep children from sticking themselves, wrap a tiny piece of masking tape around the end of the paper clip. Make sure that the tape does not keep the spinner from spinning. Turn the spinner over and tape the base of the clip to the back of the square to secure the clip.