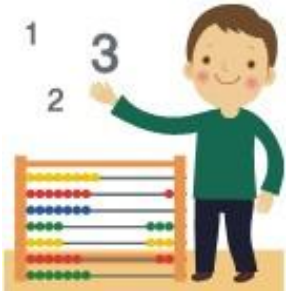
Composing and Decomposing Numbers; Deepening Understanding of Addition & Subtraction

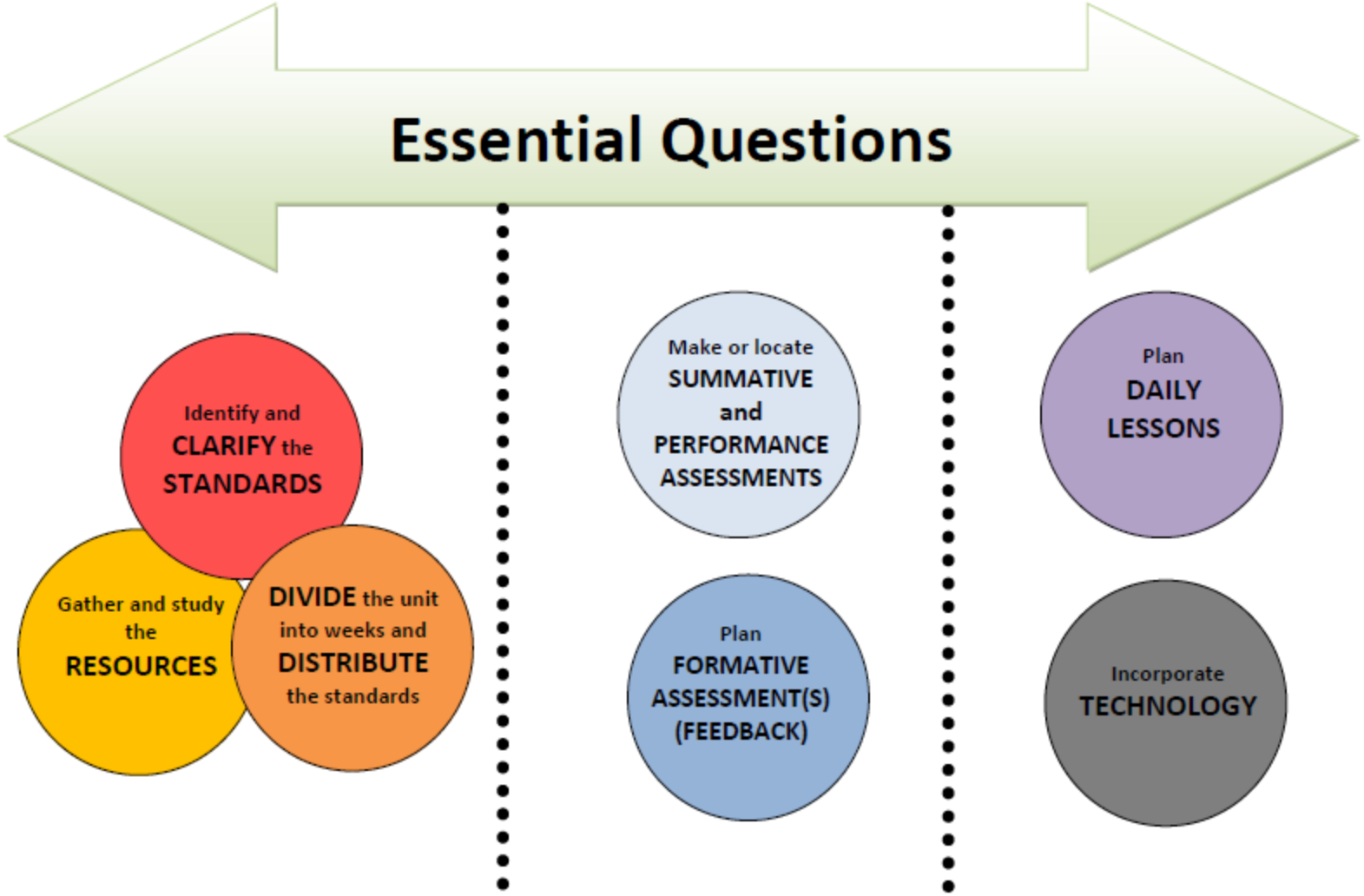


Unit Planning Team:

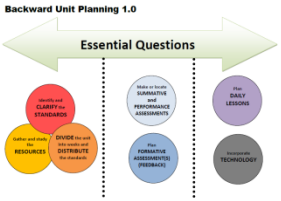
Danielle Audlehelm (JM), Robin Dover (OW),

Jordan Bright (WS), Kasey Benson (OW)

Backward Unit Planning 1.0



Essential Questions



R.P.S. Common Core Math Curriculum — Kindergarten

3rd Quarter (p. 1 of 2)

Composing and Decomposing Numbers; Deepening understanding of Addition and Subtraction

Students will deepen their understanding of numbers and how they are used to represent quantities and solve problems. They will also deepen their work with simple joining and separating situations and work to strengthen their fluency within 5. Students will build upon their understanding of the numbers 11-19 through composing and decomposing these numbers into ten ones and some further ones, thus developing the idea that the number 10 is special. (It will eventually become the "ten" unit in the place value system in 1st Grade.)

Essential Questions:

How can I show my thinking when solving story problems?

How can I build and break apart numbers?

Why is 10 an important number?

Counting and Cardinality	
Know number names and the count sequence.	
K.CC.1	Count to 100 by ones and by tens.
Minimum Quarterly Expectations: Rote count by 1's to 75; Rote count by 10's to 100	
K.CC.2	Count forward beginning from a given number within the known sequence (instead of having to begin at 1).
K.CC.3	Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).
Minimum Quarterly Expectations: Write numbers 0-15	
Count to tell the number of objects	
K.CC.4	Understand the relationship between numbers and quantities; connect counting to cardinality.
	a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.
	b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.
	c. Understand that each successive number name refers to a quantity that is one larger.
K.CC.5	Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.
Minimum Quarterly Expectations: Count to answer "how many" questions about as many as 15 objects...	
Compare numbers	
K.CC.6	Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies. (Include groups with up to ten objects)
K.CC.7	Compare two numbers between 1 and 10 presented as written numerals.

Essential Questions

How can I show my thinking when solving story problems?

How can I build and break apart numbers ?

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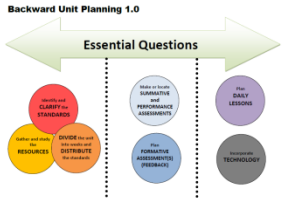
Minimum Quarterly Expectations: Count to answer "how many" questions about as many as 15 objects...	
Compare numbers	
K.CC.6	Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies. (Include groups with up to ten objects)
K.CC.7	Compare two numbers between 1 and 10 presented as written numerals.



Identify and **CLARIFY** the **STANDARDS**

K.CC.7

Before expecting students to be proficient with this standard they need to have ample experiences with sets of objects. (K.CC.3 & K.CC.5) Students should not be expected to be comfortable with this skill until the end of kindergarten.

Operations and Algebraic Thinking

Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from

K.OA.1	Represent addition and subtraction with objects, fingers, mental images, drawings (details not needed), sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
K.OA.2	Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.
K.OA.3	Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).
K.OA.4	For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.
K.OA.5	Fluently add and subtract within 5.

Student progress toward development of fluency will first be reported to parents this quarter. Fluency is the end of year expectation.

Numbers and Operations in Base Ten

Work with numbers 11-19 to gain foundations for place value

K.NBT.1	Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g., 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

K.OA.2, KOA.3, K.OA.4, K.NBT.1

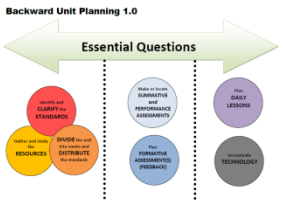
The big idea within these standards is the number 10.

This is what prompted us to add the new essential question—

Why is 10 an important number?

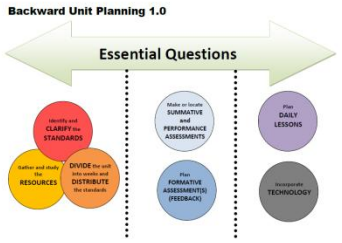
K.OA.5

This standard is being assessed for the first time during 3rd quarter.



Identify and **CLARIFY** the **STANDARDS**

Week	Standards	Structure/Resources
1	K.CC.1, K.CC.3, K.CC.4, K.CC.2 K.OA.1/K.OA.2 K.OA.3/K.OA.4 K.OA.5 K.CC.5 K.CC.6/K.CC.7 K.NBT.1	Counting Collections Games for early number sense Ten frames-It Makes Sense! CGI – JCU, SRU, PPW-WU, PPW-Both Parts unknown Dot images Comparing sets of objects CGI-Compare problem types It Makes Sense! CGI-Multiplication and measurement division
2	K.CC.1, K.CC.3, K.CC.4 K.CC.2 K.OA.1/K.OA.2 K.OA.3/K.OA.4 K.OA.5 K.CC.5 K.NBT.1	Counting Collections Games for early number sense Ten frames-It Makes Sense!-Games using Ten Frames CGI – JCU, SRU, PPW-WU, PPW-Both Parts unknown Dot images It Makes Sense! CGI-Multiplication and measurement division
3	K.CC.1, K.CC.3, K.CC.4 K.CC.2 K.OA.1/K.OA.2 K.OA.3/K.OA.4 K.OA.5 K.CC.5 K.CC.6/K.CC.7 K.NBT.1	Counting Collections Games for early number sense Ten frames-It Makes Sense!-Games using Ten Frames CGI – JCU, SRU, PPW-WU, PPW-Both Parts unknown Dot images Comparing sets of objects CGI-Compare problem types It Makes Sense! CGI-Multiplication and measurement division



DIVIDE the unit into weeks and **DISTRIBUTE** the standards

Assessed for first time during 3rd Quarter K.OA.5- Fluently add and subtract within 5

Week	Standards	Structure/Resources
4	K.CC.1, K.CC.3, K.CC.4 K.CC.2 K.OA.1/K.OA.2 K.OA.3/K.OA.4 K.OA.5 K.CC.5 K.NBT.1	Counting Collections Games for early number sense Ten frames-It Makes Sense!-Games using Ten Frames CGI – JCU, SRU, PPW-WU, PPW-Both Parts unknown Dot images It Makes Sense! CGI- Mutiplication and measurement division
5	K.CC.1, K.CC.3, K.CC.4 K.CC.2 K.OA.1/K.OA.2 K.OA.3/K.OA.4 K.OA.5 K.CC.5 K.CC.6/K.CC.7 K.NBT.1	Counting Collections Games for early number sense Ten frames-It Makes Sense!-Games using Ten Frames CGI – JCU, SRU, PPW-WU, PPW-Both Parts unknown Dot images Comparing sets of objects CGI-Compare problem types It Makes Sense! CGI- Multiplication and measurement division
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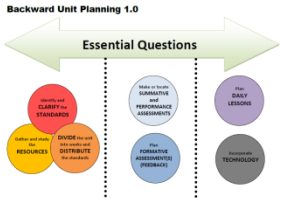

DIVIDE the unit into weeks and **DISTRIBUTE** the standards

You will notice that most weekly plans are the same. **Keep doing the great things you are already doing!** The main difference is that we think focusing on comparing numbers every other week is sufficient.

Week	Standards	Structure/Resources
7	K.CC.1, K.CC.3, K.CC.4 K.CC.2 K.OA.1/K.OA.2 K.OA.3/K.OA.4 K.OA.5 K.CC.6/K.CC.7 K.CC.5 K.NBT.1	Counting Collections Games for early number sense Ten frames-It Makes Sense!-Games using Ten Frames CGI – JCU, SRU, PPW-WU, PPW-Both Parts unknown Comparing sets of objects CGI-Compare problem types Dot images It Makes Sense! CGI- Multiplication and measurement division
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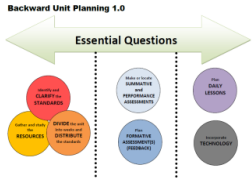


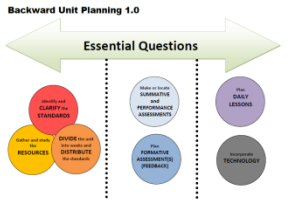
DIVIDE the unit into weeks and **DISTRIBUTE** the standards

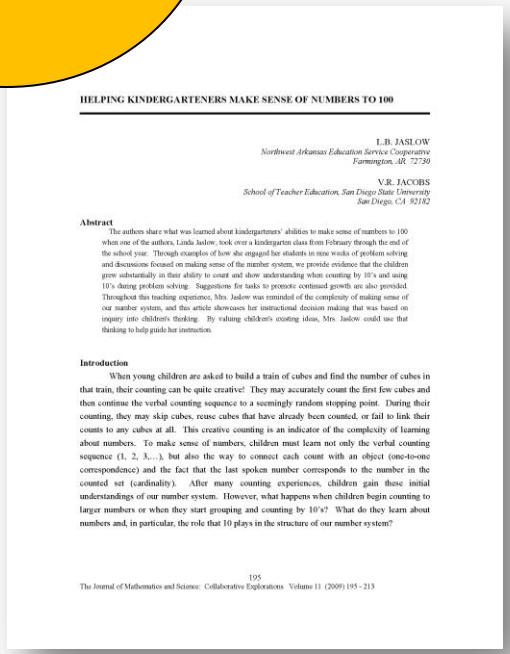
During 3rd Quarter we want to consistently pose problems that **promote base ten**. (Ex: multiplication and measurement division)

Click here for table of problem types

Click here for example problems to pose

Gather and study the RESOURCES





HELPING KINDERGARTENERS MAKE SENSE OF NUMBERS TO 100

L.B. JASLOW
Northwest Arkansas Education Service Cooperative Farmington, AR 72730

V.R. JACOBS
School of Teacher Education, San Diego State University San Diego, CA 92182

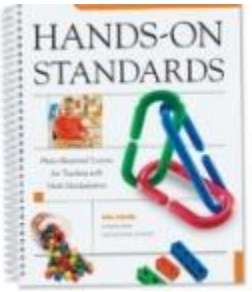
Abstract

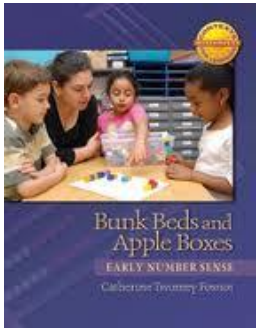
The authors share what was learned about kindergarteners' abilities to make sense of numbers to 100 when one of the authors, Linda Jaslow, took over a kindergarten class from February through the end of the school year. Through examples of how she engaged her students in mini weeks of problem solving and discussions focused on making sense of the number system, we provide evidence that the children grew substantially in their ability to count and show understanding when counting by 10's and using 10's during problem solving. Suggestions for tasks to promote continued growth are also provided. Throughout this teaching experience, Mrs. Jaslow was reminded of the complexity of making sense of our number system, and this article showcases her instructional decision making that was based on inquiry into children's thinking. By valuing children's existing ideas, Mrs. Jaslow could use that thinking to help guide her instruction.

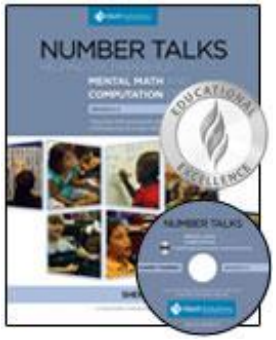
Introduction

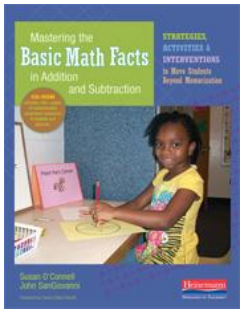
When young children are asked to build a train of cubes and find the number of cubes in that train, their counting can be quite creative! They may accurately count the first few cubes and then continue the verbal counting sequence to a seemingly random stopping point. During their counting, they may skip cubes, reuse cubes that have already been counted, or fail to link their counts to any cubes at all. This creative counting is an indicator of the complexity of learning about numbers. To make sense of numbers, children must learn not only the verbal counting sequence (1, 2, 3,…), but also the way to connect each count with an object (one-to-one correspondence) and the fact that the last spoken number corresponds to the number in the counted set (cardinality). After many counting experiences, children gain these initial understandings of our number system. However, what happens when children begin counting to larger numbers or when they start grouping and counting by 10's? What do they learn about numbers and, in particular, the role that 10 plays in the structure of our number system?

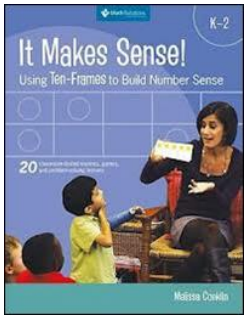
The Journal of Mathematics and Science: Collaborative Explorations Volume 11 (2009) 195 - 213

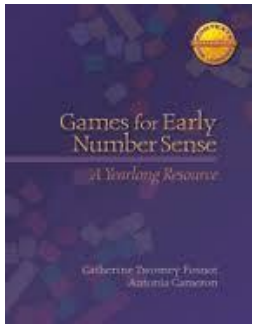


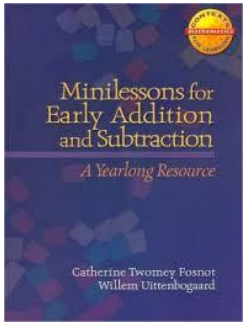


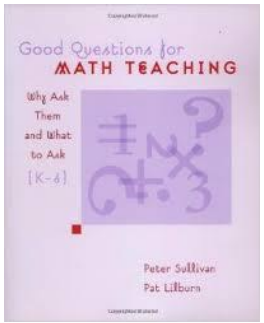












CGI Addition & Subtraction Problem Types

*adapted from *Children's Mathematics Cognitively Guided Instruction* by Carpenter, Fennema, Franke, Levi, Empson

	Result Unknown	Change Unknown	Start Unknown
Join	Sarah had 6 crayons. Brad gave her 7 more crayons. How many crayons does Sarah have altogether?	Sarah has 6 crayons. How many more crayons does she need to have 13 altogether?	Sarah had some crayons. Brad gave her 7 more crayons. Now she has 13 crayons. How many crayons did Sarah have to start with?
Separate	Sarah had 13 crayons. She gave 6 to Brad. How many crayons does Sarah have left?	Sarah had 13 crayons. She gave some to Brad. Now she has 7 marbles left. How many marbles did she give to Brad?	Sarah had some crayons. She gave 6 to Brad. Now she has 7 crayons left. How many crayons did Sarah have to start with?

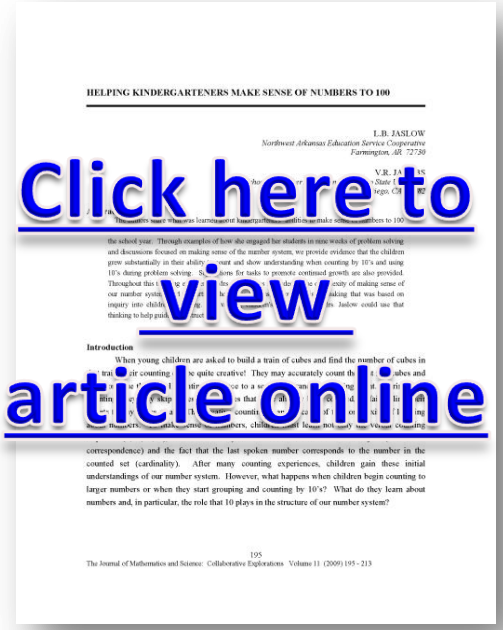
	Whole Unknown		Part Unknown
Part-Part-Whole	Sarah has 6 green crayons and 7 purple crayons. How many crayons does she have?		Sarah has 13 crayons. 6 are green and the rest are purple. How many purple crayons does Sarah have?

	Difference Unknown	Compare Quantity Unknown	Referent Unknown
Compare	Sarah has 13 crayons. Brad has 7 crayons. How many more crayons does Sarah have than Brad?	Brad has 7 crayons. Sarah has 6 more than Brad. How many crayons does Sarah have?	Sarah has 13 crayons. She has 6 more crayons than Brad. How many crayons does Brad have?

Rogers Public Schools

Linda Jaslow's Article: Helping Kindergarteners make sense of numbers to 100

Gather and study the RESOURCES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195
The Journal of Mathematics and Science: Collaborative Explorations Volume 11 (2009) 195 - 213

Click here to view article online

We need to:

***Inquire into children's thinking**

***Value existing ideas**

***Challenge and extend understanding**

***Support growth**

Counting by tens (as a rote chant) is often unconnected to any quantities. Therefore, we need to work to develop ten-to-ten correspondence among our students.

Pose problems that promote base ten understanding:

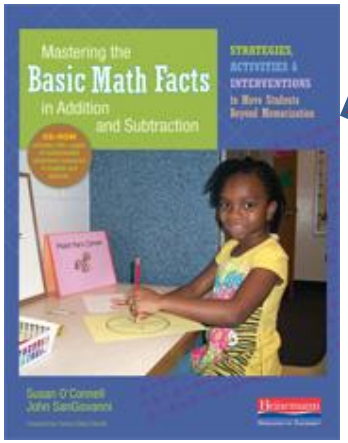
Many students know that 20= 10+10,
but NOT that 11=10+1 or 24=10+10+4.
They need more experiences
working with purposeful problems.

We want our students to see ten as a group,
and then use that information to help
solve problems more effectively.

Pose problems that promote base ten understanding:

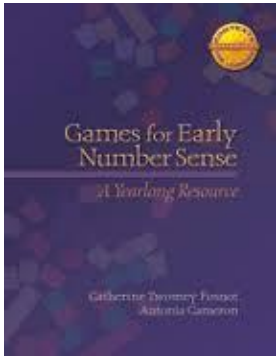
***Groups of 10's problems**
***Problems designed to help children compose**
new numbers from a 10 and some 1's
***Decompose numbers into 10's and 1's**
***Mixing 10's and 1's**
***Counting by 10's from a non-decade number**

Possible Activities to use for Resources

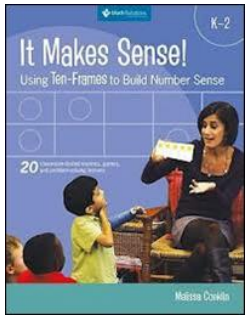


Click on book to view PowerPoint by Denise Crutchfield

K.OA.4
Making Ten-Ten Apples up on Top (Page 95)
K.NBT.1
Understanding Ten Frames-Diary of a Worm (Page 114)



K.CC.2
Leap Frog (Page 15)
Bus Stop (Page 24)



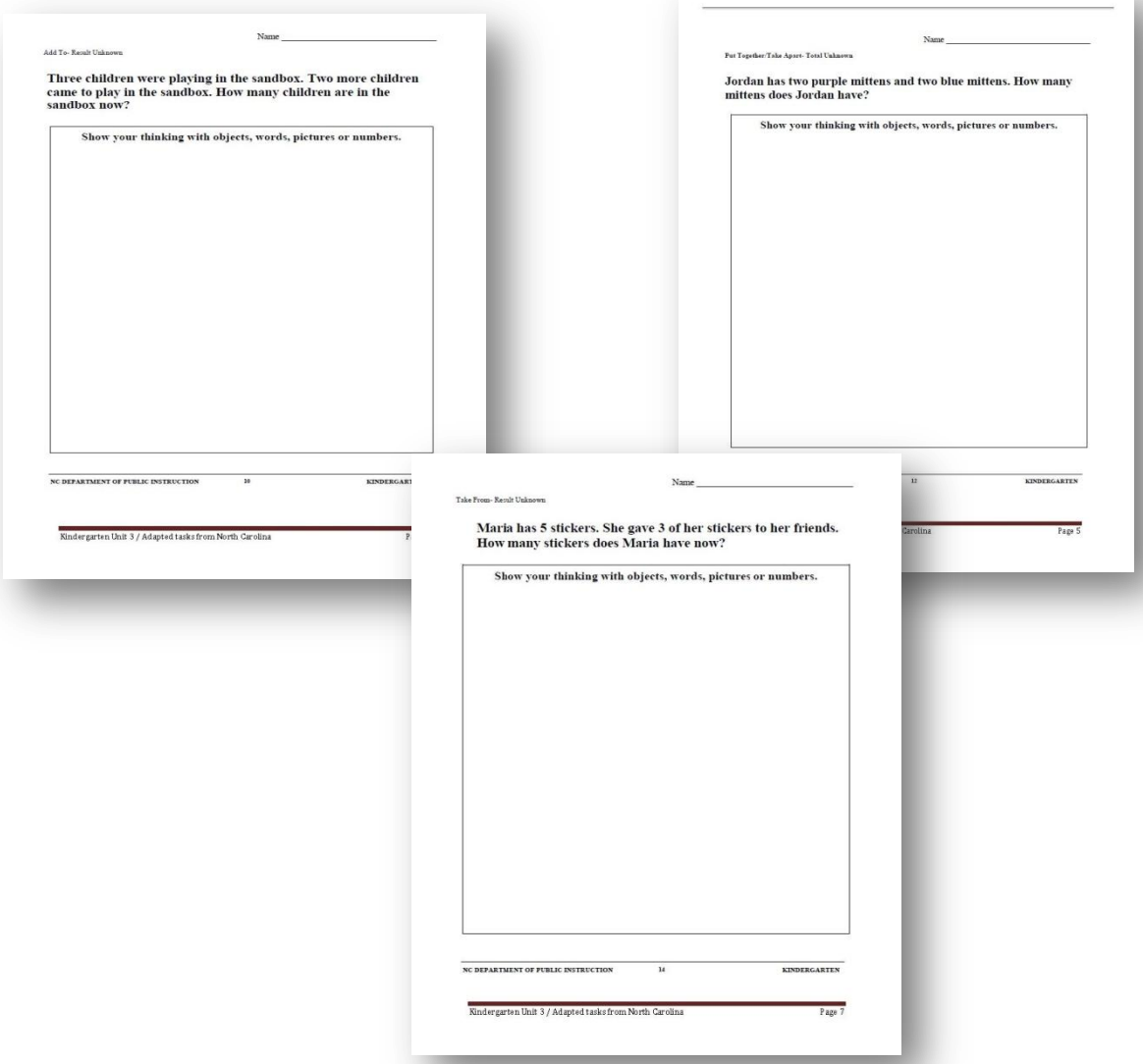
K.OA.1/K.OA.2
K.OA.3/K.OA.4 K.OA.5
Ten Frames- Games Using Base Ten-Frames (Page 64)
K.NBT.1
Routines Using Ten-Frames (starting on page 2)

Click here to access Unit 3 games & activities online

LESSON RESOURCES

Options for Assessment – Available online for Unit 3

K.OA.1, 2 Assessment Options


Name _____

Add To- Result Unknown

Three children were playing in the sandbox. Two more children came to play in the sandbox. How many children are in the sandbox now?

Show your thinking with objects, words, pictures or numbers.

NC DEPARTMENT OF PUBLIC INSTRUCTION 10 KINDERGART

Kindergarten Unit 3 / Adapted tasks from North Carolina

Name _____

Put Together/Take Apart- Total Unknown

Jordan has two purple mittens and two blue mittens. How many mittens does Jordan have?

Show your thinking with objects, words, pictures or numbers.

12 KINDERGARTEN

Carolina Page 5

Name _____

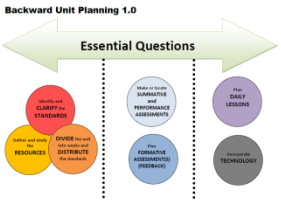
Take From- Result Unknown

Maria has 5 stickers. She gave 3 of her stickers to her friends. How many stickers does Maria have now?

Show your thinking with objects, words, pictures or numbers.

NC DEPARTMENT OF PUBLIC INSTRUCTION 14 KINDERGARTEN

Kindergarten Unit 3 / Adapted tasks from North Carolina Page 7



Make or locate SUMMATIVE and PERFORMANCE ASSESSMENTS

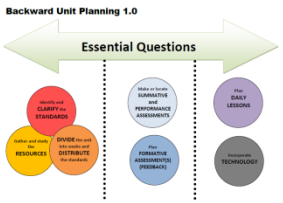
Options for Assessment – Available online for Unit 3

K.NBT.1 Assessment Options

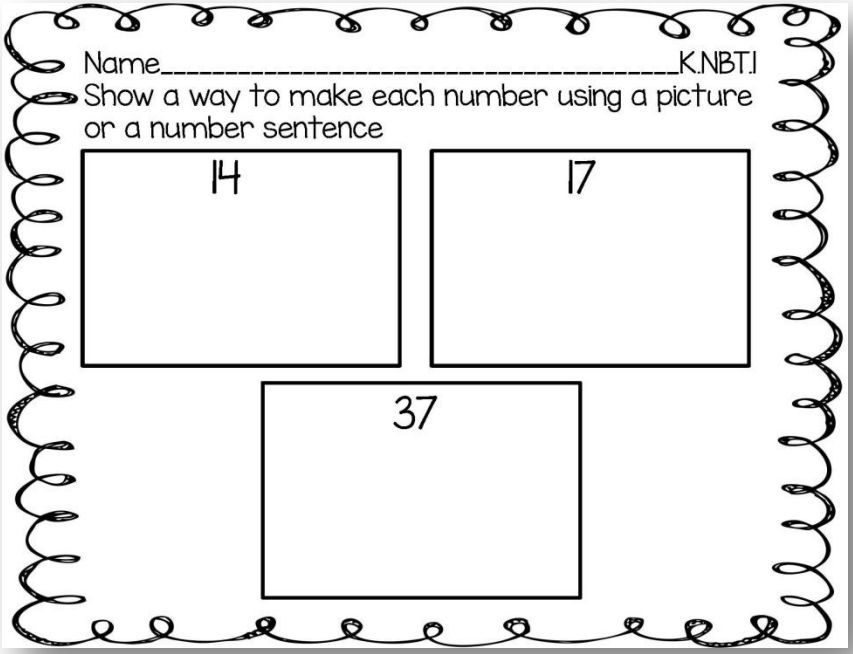
Table 1
Story Problems to Help Children Understand Numbers to 100

	Grouping Problems	Problems to Decompose Numbers Into 10's and 1's
Problems Posed	• *Multiplication (10 in each group):* There are 5 vases of flowers. There are 10 flowers in each vase. How many flowers are there? • *Addition (around 10):* There are 10 cows, 10 horses, and 10 pigs on the farm. How many animals are there?	• *10 + a single-digit number:* There are 10 butterflies. 6 more come. How many butterflies are there? • *Subtracting from a teen to get 10:* There are 19 giraffes eating. 9 walk away. How many giraffes are still eating?
Potential Extensions	• *Division (Grouping by 10's):* You have 50 stamps to put in your stamp book. Each page holds 10 stamps. How many pages will you need? • *Grouping by multiples of 10:* The teacher has 2 new boxes of markers, and each box has 30 markers. How many markers does the teacher have? The clown had 20 blue balloons, 20 red balloons, and 20 yellow balloons. How many balloons did the clown have? • *Mixing 10's and 1's: (beginning with a decade number)* Aisha has 3 bags of candy. Each bag has 10 pieces. She also has 4 loose pieces of candy. How much candy does Aisha have? On Monday, Alicia earned 10 citizenship points. On Tuesday, she earned 10 more points. On Wednesday, she earned 11 points. How many points has she earned? • *Mixing 10's and 1's: (beginning with a non-decade number)* The class counted 22 watermelon seeds. Then they counted seeds from 3 more watermelon pieces, and each had 10 seeds. How many seeds did they count in all? Michael has $23 in his piggy bank. He earned $10 on Saturday and $10 on Sunday. How much money does he have now?	• *Decade number (greater than 10) + a single-digit number:* Raphael had 40 toy cars. His uncle gave him 6 more toy cars for his birthday. How many toy cars does Raphael have now? • *Subtracting a single-digit number from a non-decade number (greater than 20) to get a decade number:* There are 34 butterflies. 4 fly away. How many butterflies are left?

These problems are also listed in the Lesson resources for Unit 3 under *Developing Base Ten Understanding.*



Make or locate SUMMATIVE and PERFORMANCE ASSESSMENTS



LESSONS AND RESOURCES ARE AVAILABLE ONLINE.

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TECHNOLOGY

NEW Teacher Created Resources pages!!!

RESOURCES

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