

Assessing & Developing Math Concepts



Stay Connected!

Kathy Richardson is the author and developer of the *Assessing Math Concepts (AMC)* series of assessments and the *Developing Number Concepts (DNC)* series for Kindergarten through Second Grade Mathematics. Kathy, Program Director for Math Perspectives, is one of the most respected early childhood mathematics educators. Kathy answers questions from teachers across the country who are using AMC and DNC.

If you have questions for Kathy, please send them to Math Perspectives at info@mathperspectives.com.

ASSESSING MATH CONCEPTS: Hiding and Counting Assessments

Q As I trained my first group of teachers on the Hiding Assessment, they were concerned about how many times they had to give the assessment before it ended. I tried with the Counting Objects Assessment as well, and I had to give it multiple times with different numbers. Teachers were told this would take 10 min or less. Are they supposed to keep doing new numbers until it says end test or can they stop after they get an A and aP for example? I do realize the goal is to find their highest A and lowest P, but it seems it can be very time consuming. - *Lemon Grove, CA*

A The goal of the assessments is that teachers will gather the information they need to provide appropriate instruction. In order to get that information as quickly as possible, teachers need to know what is easy for the children and what they need to practice. It is not necessary to check all the numbers. The assessments generally go on too long when teachers have started with a number that is too hard or too easy. Sometimes, this means the teacher should end the assessment and start with the number they think is appropriate and it won't take as long.

Each assessment has information that you can access by clicking the information tab (letter i inside a blue circle) while giving the assessment. The note in the Hiding Assessment explains what to do if the assessment is taking too long.

“NOTE: If a student has an A (Ready to Apply) and then gets 2 Ps (Needs Practice) in a row, you will be asked if you want to END the assessment rather than continuing to assess until you find the I (Needs Instruction). This is because some children will Need Practice (P) with several numbers and no longer Need Instruction (I) with any numbers.

If the student gets several (As) in a row, it means you started with a number that was too small. If the child gets an N (Needs Prereq-

uisite) it means they have made 3 or more errors and the number is probably too large for the child to work with.

If you find you have picked the wrong number to start with, END the assessment and start the assessment over with a different number.”

The Counting Assessment goes quickly if you picked an appropriate number for that child. A teacher may not know what number to choose in the beginning. We recommend starting with 21 if the teacher has no information. Then if 21 is easy, you only have 32 to check. If 21 is much too hard, you end the assessment by gently interrupting the child. Say you have another idea. Then remove the counters and start with a smaller number.

There is a note in the information section for Counting as well. “Hint: If you find you have picked a number that is far beyond what the student can count, cancel the assessment and choose a smaller number.” Choosing the appropriate number will become easier as the teacher has more experience. ~ *Kathy*

ASSESSING MATH CONCEPTS: Counting Objects

Q We are giving the online Counting Objects assessment. In the first question for Task 1 of this assessment, we present a pile of counters to the student. We ask the students, *How many do you think there might be?* The teachers then asks the student to check and see by counting out loud. The next question says *How many did you count?* If the teachers had selected to present 12 cubes but the child counts 10. The teacher then asks the student, *How many did you count?* The student says 10. Does the teacher record the student's answer as “knows” because they knew how many they counted even if it was wrong? Or do we select “doesn't know” because they counted incorrectly? - *Old Lyme, CT*

A Thank you for the thoughtful question. You select “Knows” because they knew how many they counted - which is what we are trying to find out. The error will show up as the teacher proceeds with the assessment and is asked to select how they kept track. ~ *Kathy*

TEACHING FOR UNDERSTANDING: Thoughts from Kathy

We hope those of you who took one of the Math Perspectives K-2 or 3-5 courses this summer or in years past are teaching mathematics with enthusiasm this year. We believe the ideas and approaches we shared with you will truly help children make sense of and enjoy their work with mathematics. That doesn't mean everything has or will go exactly as you might expect. I don't know if any of you are like me or not, but I use to let my enthusiasm sometimes cloud my sense of reality and would end up being frustrated if things didn't quite turn out the way I had imagined them in the summer. Teaching for understanding is extremely important but not always as easy as it might seem. As Mary Baratta-Lorton said, “No magic. No easy answers. But joy and growth, yes, a plenty!”

I have been thinking about what it means to teach for understanding for many years. One of the most interesting professional challenges of my life was working as the principal author of *California Math Model Curriculum Guide** for K-8 published in 1987 by the California State Department of Education. This document was

based on the premise that students need to understand math concepts if they are to become mathematically powerful. Central to the document was the identification of essential understandings for each of the mathematical strands. Also included in the document is a section entitled *Teaching for Understanding: Guiding Principles* in which I identified twelve guiding principles that I thought were important to keep in mind as we work to teach for understanding. I would like to present two of these guiding principles and my current reflections on them for your consideration.

- *Our top priority should be the development of students' thinking and understanding. Whenever possible, we should engage the students' thinking and teach the mathematical ideas through posing a problem, setting up a situation, or asking a question.*
- *We must be interested in what students are really thinking and understanding. Students may be able to answer correctly but still have fundamental misunderstandings. It is in the probing of the students' thinking that we get the information we need to provide the appropriate learning experiences.*

While it would seem obvious that teaching for understanding should be our top priority, there are many pressures that serve to push us off that course. Kids themselves often say, "Just show me how to do it. I don't need to understand." We worry that children will not do well on the standardized test at the end of the year, and we worry about what the next year's teacher is going to think. It seems we just don't have time to wait until "they get it". It is important to remember, however, that our job is to build a foundation that will serve children in the long run, not just allow them to look good in the short run. That means helping children develop a strong sense of number and number relationships rather than mere facility with symbols.

Much of what we have done in the past was to create what I call "illusions of learning." Because children learned procedures and could do the page of problems, we often assumed they understood what they were doing. However, we only have to look at how they apply what they know in problem solving situations to see that that may not actually be the case.

Teaching for understanding means we have to get children thinking in a different way than is necessary when they are learning procedures. That means we must redefine what it means to teach. It is no longer enough to just give information or show our students how to get right answers even using manipulatives. We need to ask them questions or pose problems to get them to think about what they are learning.

We do that when we say such things as:

Can you find out? ...how long the piece of yarn is if we measure it using toothpicks?

What do you think will happen if? ...we measure the same piece of yarn using paperclips? Do you think it will take more paper clips or fewer paper clips? **Why?**

Make your yarn into a shape.

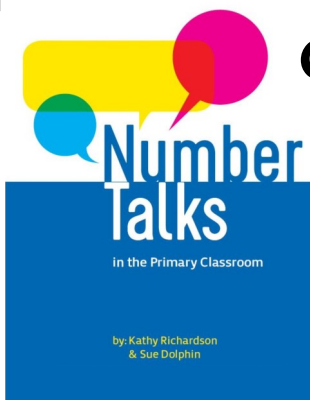
Can you find out? ...how many tiles fit into the Yarn Shape?

What do you think will happen if? ...you changed the shape of the yarn? **Can you make a shape that** ...will hold more? Less? **Why or why not?**

When we ask children to show or tell what they think, we will see what they really know rather than if they can parrot back what we told them to say or do. Finding out what children really understand can be a mixed blessing, for when we begin to really look at understanding and not just facility with symbols and procedures, we often discover basic misconceptions. I remember overhearing a couple of fourth graders who were trying to determine how many pinto beans there were in a quart jar. They had counted 39 beans in one scoop and had found out the jar held 16 of those scoops. They were in the process of writing down 39 sixteen times when one of them said, "Too bad we don't have our calculators, I don't know how to multiply, but I could do it on the calculator." The other one responded, "Yes but I think you get more when you multiply than when you add." What misconception do you think this revealed? What would you do next?

The hard part for us when teaching for understanding is not to just remember that we can't force understanding. Helping children develop understanding does not always happen on the timeline we would like but the payoff in the long run is really worth it. When understanding remains the top priority children will stop saying "Just show me what to do" and will try to make sense of mathematics. They will then be able to use what they have learned in increasingly complex situations.

By Kathy Richardson



Coming in 2020!

Be one of the first to receive this book by scheduling your K-2 Number Talks course for Summer 2020 today.

Email Sheryl Russell at:
Sheryl@mathperspectives.com

If you're using *Assessing Math Concepts* and have a question regarding any of the nine assessments, we'd love to hear from you. Please email us your question to info@mathperspectives.com.



If you are using the paper Student Interview forms and would like to receive information on the Web-based version or professional development, please contact us at info@mathperspectives.com.