Math Perspectives Teacher Development Center

GUIDELINES FOR USING ASSESSING MATH CONCEPTS (AMC)

Assessing Math Concepts (AMC) is a continuum of assessments developed by Kathy Richardson, to help teachers provide more effective instruction in their classrooms. The AMC assessments focus on number and are formative, as well as diagnostic and summative. The information teachers get from these assessments is precisely what they need to inform their instruction and meet the range of needs for every student in their classroom.

Assessing the Development of Math Concepts Over Time

AMC helps determine where children are in the development of core concepts in number. These concepts develop over many weeks and months, and even years, as children deepen their understanding of these concepts and recognize the connections between them. The concepts assessed are the basic underpinnings for all work with number. Generally, the concepts develop in a particular order, but every concept continues to develop even while new ones are being learned. So, for example, children must know how to count before they can add; but they can begin to learn to add before they can count by 2s. They can learn that ten is a unit before they know all the parts of numbers to ten.

The core number concepts can be sorted into the following major topics. Each topic develops in complexity over time. The assessments provide information related to each topic.

- Counting
  - Counting Objects
- Number Relationships
  - Changing Numbers
  - More/Less Trains
- Parts of Numbers
  - Number Arrangements
  - Combination Trains
  - The Hiding Assessment
- Place Value
  - Ten Frames
  - Grouping Tens
  - Two-Digit Addition and Subtraction

Assessing Math Concepts determines what children know (or don't know) about a concept, not simply whether or not they got the right answer. Children develop an understanding of number concepts at varying times. This means teachers need to know what level of understanding each child has reached. Most children in a grade level will be at a similar level of understanding, but some children will be "ahead" and others "behind" the typical child. This means teachers at a particular grade level can begin with the same assessment and then go on or back as needed to identify the instructional needs of all the students.

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Below, you will find our recommendations for grade levels kindergarten through second grade. It will be of value to you to read over the other grade levels so you see how your grade level fits into the development of these concepts.

Questions

If you have questions regarding any of the Math Perspectives assessments, we encourage you to let us know. Please submit your questions to info@mathperspectives.com. You will receive a reply as quickly as possible. All questions with the corresponding answers are posted on our website and remain there for future reference at http://www.assessingmathconcepts.com/faqs.html.

Facebook

Math Perspectives is also on Facebook. If you take a moment to click "like" on our page, you will also receive updates and be able to send a response to anything posted. You can also start a discussion for others to join.

GUIDELINES FOR CHOOSING ASSESSMENTS

Because number concepts develop in relatively predictable ways, there are particular concepts and Critical Learning Phases that the majority of children at specific grade levels need to work with. Teachers can use the Assessing Math Concepts (AMC) assessments to determine the instructional needs of their students along a continuum as they develop competence with the particular concepts. We hope the following information provides guidance for teachers who are using AMC to plan appropriate instruction for the whole class as they focus on various concepts throughout the year.

Try to give the first assessment recommended at your grade level as early in the year as is practical. This gives you a baseline for showing growth and helps you know where to begin instruction. Then, based on what your students have learned, move on to the other recommended assessments when you need the information to guide appropriate instruction

Note: You may need additional information about particular children not addressed in these guidelines. For example, some first grade teachers prefer to give the Counting Objects assessment with some of their students at the beginning of the year. Some first grade teachers use More/Less Trains to ensure their students are able to tell how many more or less one number is than another. Some second grade teachers use Combination Trains to see if their students are seeing and using relationships between combinations. Some kindergarten teachers use the Hiding Assessment with some of the more advanced students in the spring to see if they are internalizing parts of numbers.

Kindergarten Teachers

Assessments for the Beginning of the School-Year

Begin with *Assessment 1: Counting Objects* Tasks 1 and 2

One of the most important math goals for your children is to learn to count objects with consistency and accuracy and to develop a sense of number and number relationships. You will begin the year by finding out the largest number of objects your students can count and whether they can hold a number in mind to count out a particular number of objects. It is valuable to have this information from the very beginning of the year so you can identify those children who know little about

counting as well as those who already can count to 21 or more. You will be able to see the growth they make as you reassess them later in the year.

Go on to Tasks 3 and 4: One More/One Less for those children who have a good start learning to count

If you find some of your children can already count 12 or more objects and can make a pile of 9 or more, go on to Part Two of the ***Counting Assessment*** to find out if they know one more and one less for the numbers they can count.

Do Changing *Numbers* with students ready for a challenge

If you find any of your students can already count to 21 and know one more and one less without counting on both Task 3 and Task 4 to 12 or more, see if they know any number relationships by giving ***Assessment 2: Changing Numbers***.

Assessments Towards the Middle of the School Year

The focus in kindergarten is on learning to count objects to 21 or more, to make a pile of 18 or more, and to learn one more and one less for those numbers the child can count (Assessment 1: Counting Objects), but developing meaning for the quantities and seeing relationships between numbers is also important. As the children progress, they begin to move from seeing numbers as one and one more and one more to seeing that one number is contained within another number and how these numbers are related to each other (Assessment 2: Changing Numbers). Next the children begin to see that numbers are composed of parts (Assessment 4: Number Arrangements).

What you reassess will depend on the results of previous assessments and/or observations.
The information you gain from reassessing can also lead to additional assessments.

COUNTING OBJECTS TASKS 1 AND 2: RESULTS OF PREVIOUS ASSESSMENT

- If the student was not yet able to count 21 objects and make a pile of 18

  Reassess using *Assessment 1: Counting Objects* Tasks 1 and 2

  Go on to **Part Two: Tasks 3 and 4 One More/One Less** if the student can count 12 objects and make a pile of 9.

- If the student was able to count 21 or more objects and make a pile of 18, but does not yet know 1 more and 1 less for numbers to 21

  Reassess using *Assessment 1: Counting Objects* Part Two: Tasks 3 and 4 One More/One Less.

COUNTING OBJECTS TASKS 3 AND 4: RESULTS OF PREVIOUS ASSESSMENT

- If the student knows 1 more and 1 less for numbers to 8 or more

  Assess using *Assessment 2: Changing Numbers.*

CHANGING NUMBERS: RESULTS OF PREVIOUS ASSESSMENT

- If the student is able to change numbers and describe what they did for numbers to 10

  Assess using *Assessment 4: Number Arrangements*

Assessments Towards the End of the School Year

As this school year draws to a close, we are recommending that some assessments be given to all your students in order to have some information about where they are in the development of certain concepts even if they have not met all the goals for Counting Objects.

CHANGING NUMBERS

- Assess all students not *Ready to Apply* for all levels of Changing Numbers

NUMBER ARRANGEMENTS

- Assess all students not *Ready to Apply* for all levels of Number Arrangements

First Grade Teachers

Assessments for the Beginning of the School-Year

Start with *Number Arrangements* with most of your students

A major goal for first graders is to learn parts of numbers to 10. Children who know parts of numbers with ease essentially know the basic facts. If they know 5 is 2 and 3, they can more easily learn 2 + 3 = 5 and 5 - 2 = 3, for example. In order to learn parts of numbers, children need to first be able to see and describe parts and then eventually learn to combine these parts without counting.

Assessment 4: Number Arrangements helps you find out what your students know about identifying and combining parts. If you have no data for a student, start with *Number Arrangements*. You will assess almost all the children in your class even if they were assessed previously in kindergarten. It is likely that many of your children will know some things they didn't know last year.

Go on to *Assessment 6: Hiding Assessment* for a few of your students

You may have a few children who were *Ready to Apply* for both Identifying Parts and Combining Parts when assessed in kindergarten or when you assessed them this year on Number Arrangements. If so, go on to the **Hiding Assessment**, starting with 5 counters.

Assessments Towards the Middle of the School Year

Children take much longer to learn the parts of numbers than most people expect, so you will be reassessing students to see what progress they have made thus far. What you reassess will depend on the results of previous assessments and/or observations. The information you gain from reassessing can also lead to additional assessments.

NUMBER ARRANGEMENTS: RESULTS OF PREVIOUS ASSESSMENT

- If the student was NOT able to identify and combine parts of numbers (A on *Identifying Parts of Numbers* and P or A on *Combining Numbers*)

  Reassess with *Assessment 4: Number Arrangements.*

- If the student WAS able to identify and combine parts of numbers (A on *Identifying Parts of Numbers* and P or A on *Combining Numbers*),

  Go on to *Assessment 6, Hiding Assessment*. Start with 5 and go up or down depending on the student's responses. Stop when you have determined the largest number the student has internalized. (i.e. knows the parts quickly and confidently)

HIDING ASSESSMENT: RESULTS OF PREVIOUS ASSESSMENT

- If the student knew parts of numbers from 4 through 7 or more

  Assess using Combination Trains

  This assessment will allow you to see what combinations the students know without counting for Numbers to 6, to 10, and to 20. You can also find out if the student is able to use what they know about one combination to determine an unknown combination.

- If the student knew parts of numbers from 4 through 10

  Assess using *Assessment 7: Ten Frames*.

Assessments Towards the End of the School Year

As this school year draws to a close, we are recommending that some assessments be given to all your students, no matter what level they have achieved, in order to have some information about where they are in the development of certain concepts. You will be able to see if any students are still unable to identify missing parts through the Hiding Assessment and will be able to determine if some students are beginning to think of ten as a unit and are able to add or subtract by making or breaking up tens.

HIDING ASSESSMENT

- Assess all students not *Ready to Apply* for Numbers through 10

TEN FRAMES ADDITION

- Assess all students not *Ready to Apply* for all levels of Ten Frames Addition
- If *Ready to Apply* on Ten Frames Addition, go on to **Ten Frames Subtraction**

Second Grade Teachers

Assessments for the Beginning of the School-Year

Begin with *Assessment 7: Ten Frames* with most of your students

The long-range goal for second graders is to learn to add and subtract two-digit numbers. In order to reach that goal, children need to understand that numbers are made up of tens and ones and they need to use the parts of numbers they learned in first grade to solve problems.

You can find out what children know about 1 ten and some more and whether they know and can use parts of numbers to add and subtract using the **Ten Frames Assessment.**

- If the student was not able to use parts of numbers (N or I on **Concept 1 of Ten Frames: Knows Parts of Numbers)**

  Assess using Assessment 6: Hiding Assessment

Go on *to Assessment 8: Grouping Tens* for a few of your students

- If you had children who were assessed in first grade or you assessed them this year and they were *Ready to Apply* on all parts of Ten Frames, go on to **Grouping Tens.**

Assessments Towards the Middle of the School Year

Learning to think of two-digit numbers as tens and ones is the most important concept for second grade students to learn. Whether or not they know parts of numbers to 10 (Hiding Assessment) or can use parts in making a ten and some ones (Ten Frames), they need to begin work on developing an understanding of tens.

GROUPING TENS

- Assess all students who have not already shown that they are *Ready to Apply* for all levels of **Grouping Tens**
- Go on to **Two-Digit Addition** if *Ready to Apply* for all parts of **Grouping Tens**
- If student was unable to add two-digit numbers using tens (N or I on **Two-Digit Addition**), assess using **Ten Frames: Addition**
- If *Ready to Apply* on all parts of **Two-Digit Addition**, go on to **Two-Digit Subtraction**

HIDING ASSESSMENTS: RESULTS OF PREVIOUS ASSESSMENT

- If students did not know the parts of numbers (N or 1 for 7 or fewer)
  Reassess using Assessment 6: Hiding Assessment

Assessments Towards the End of the School Year

GROUPING TENS RESULTS OF PREVIOUS ASSESSMENT

- Assess all students who have not already shown that they are *Ready to Apply* for all levels of **Grouping Tens**
- Go on to **Two-Digit Addition** if *Ready to Apply* for all parts of **Grouping Tens**

TWO-DIGIT ADDITION RESULTS OF PREVIOUS ASSESSMENT

- If not *Ready to Apply* on all parts of Two-Digit Addition, reassess using Two-Digit Addition
- If *Ready to Apply* on all parts of **Two-Digit Addition**, go on to **Two-Digit Subtraction**

TWO-DIGIT SUBTRACTION RESULTS OF PREVIOUS ASSESSMENT

- If not *Ready to Apply* on all parts of Two-Digit Subtraction, reassess using Two-Digit Subtraction
- If *Ready to Apply* on all parts of **Two-Digit Subtraction**, you do not need to reassess