GUIDED MATH, SESSION 2

DAPHNE IRBY
HOMEWORK FROM SESSION 1

Look at your classroom environment. What does it say about how you feel about math? Is it a numeracy rich environment? Is it conducive to rich math discussions? What are some really strong elements of your math environment? What would you like to improve? Be prepared to discuss next session.
MATHEMATICALLY RICH ENVIRONMENT
(CHAPTER 2, MATH WORKSTATIONS IN ACTION)

• General meeting space
• Available tools (manipulatives, student toolkits)
• Daily Schedule
• Math Word Walls
• Math Notebooks
• Math Library
• Math Workstation Data and Folder Area
• Calendar
• Anchor charts
• Learning Objectives
"Just a darn minute! -- Yesterday you said that X equals two!"
ON GOING ASSESSMENTS
WHAT ASSESSMENTS DO YOU USE AT THE BEGINNING OF THE YEAR TO KNOW WHERE YOUR STUDENTS ARE MATHEMATICALLY?

- STAR Math
- AIMS Probes
- End of Year Assessment from previous grade
- Number Readiness Assessments
- Easy CBM
TURN AND TALK

WHAT DO YOU USE AS FORMATIVE ASSESSMENTS THROUGHOUT THE YEAR?

WHAT DO YOU DO WITH THE DATA?
TURN AND TALK

FLUENCY - WHAT IS IT AND HOW SHOULD IT BE MEASURED?

Read the article - *Fluency without Fear: Research Evidence on the Best Ways to Learn Math Facts* by Jo Boaler

Pick out the most important paragraph to you, and then the most important sentence from that paragraph.

Share with your group and come to a consensus on the “big idea” to share.

Share out.

How do you assess fluency?
HOW DO YOU START YOUR MATH CLASS?

DO YOU HAVE AN ESTABLISHED ROUTINE?
WARMUPS

• Math Journals
• Number Talks
• Problem of the Day (5/5/5 format)
• Number of the Day
• Calendar Activities

Anything to get them talking about their thinking!
NUMBER TALKS WARMUP
WHAT IS 45% OF 63?
WHAT ARE NUMBER TALKS?

A Number Talk is a short, ongoing daily routine that provides students with meaningful ongoing practice with computation:

• keep Number Talks short, as they are not intended to replace current curriculum or take up the majority of the time spent on mathematics.

• spend only 5 to 15 minutes on Number Talks

• Talks are most effective when done everyday (at least 3 times a week)
mentally solve

85-29
Column 1:
1. Place value with regrouping
   - 85 → 70 + 15
   - 20 - 9
   - 50 + 6
   - 56

Column 2:
1. Think addition or reversibility
   - 1 + 50 + 5
   - 56

Column 3:
3. Constant difference
   - 85 - 29
   - 56

Column 4:
4. Removal in parts
   - 85 - 20 = 65
   - 65 - 5 = 60
   - 60 - 4 = 56
   - 29
NUMBER TALKS

• A number talk is a short 5-15 min talk about numbers during which your students will talk about “number relationships and the structures of numbers to add, subtract, multiply and divide” (Richardson, 2011).

Dr. Jo Boaler - Stanford University, author of *Mathematical Mindsets*
Standards for Mathematical Practice

Mathematically Proficient Students can...........

1. Make sense of problems and persevere in solving them
   - doing mathematics means solving problems and discussing how they solved them
   - plan a solution pathway and adjust as needed as they work through the problem
   - persevere ("First, I drew a diagram, and it didn’t help, so I tried to make a table. That worked much better because I found a pattern.")
   - explain thinking through equations, verbal descriptions, tables, graphs, diagrams and search for trends in data

2. Reason abstractly and quantitatively
   - numbers represent quantities and these quantities can be represented with symbols
   - generalize based on what they observe
   - "I know that rectangles are parallelograms with four right angles, so that means this square must be a rectangle because . . . ."

3. Construct viable arguments and critique the reasoning of others
   - make conjectures with support and reason through the use of objects, drawings, diagrams and actions
   - ask and respond to questions like, “How did you get that?” and “Why is that true?”

4. Model with mathematics
   - put mathematics in the context of real world situations and identify those relationships
   - use organizational strategies such as making a table, creating a number line, drawing diagrams, use objects, etc.

5. Use appropriate tools strategically
   - use familiar, grade appropriate tools and know when they can be helpful
   - recognize both the strengths and limitations of the tool being used

6. Attend to precision
   - communicate precisely to others through my language, models and representations
   - calculate accurately and efficiently, and show flexibility with strategies

7. Look for and make use of structure
   - look closely at patterns and structure
   - identify and understand the make-up and inclusion of number (commutative and distributive properties)

8. Look for and express regularity in repeating reasoning
   - continually evaluate the reasonableness of intermediate results ("I notice when I divide 4 by 11, I get 0.36, then I keep dividing the same numbers over and over.")
   - students continually check their work by asking themselves, “Does this make sense?”
WHAT DO NUMBER TALKS LOOK LIKE?

• Students are near each other so they can communicate with each other (central meeting place)
• Students are mentally solving problems
• Students are given thinking time
• Thumbs up show when they are ready
• Teacher is recording students' thinking

Number Talk - Cathy Humphreys
Middle School Dot talk
1ST GRADE NUMBER TALK
PURPOSEFUL PROBLEMS

• Start with small numbers or less complex so the students can learn to focus on the strategies instead of getting lost in the numbers

• Use a number string (a string of problems that are related to and scaffold each other) What do you notice?

7 + 19
16 +29
19 +18
29 +33
PROBLEM-SOLVING WARMUP
"The ultimate goal of mathematics instruction is to teach students to solve problems independently. The flexible nature of these components encourages the gradual release of responsibility."

Laney Sammons
READ OVER THE PROBLEMS. WHICH PROBLEM BEST PROMPT STUDENTS TO SHARE THEIR DEVELOPING THINKING?

Tom had a large candy bar. He cut it into pieces so that he could share it equally with his best friend. Show different ways Tom might have cut the candy bar. Label each piece as a fraction.

Lauren shares a sandwich with her brother. They each get an equal part. How many equal parts are there?
INSTEAD OF TRADITIONAL TEACHING – I, WE YOU …

HOW ABOUT …

You, Y’all, We (Magdalene Lampert) - Teacher assigned a “problem of the day” designed to let students struggle - first on their own (you), then in peer groups (Y’all) and finally as a whole class (We).
Problem of the Day - The goal is for students to engage deeply with rich tasks.

- Process of problem-solving
- Can take several days (multi-step)
- Independent and cooperatively
- Reasoning
DAN MEYER - TED ED
PROBLEM SOLVING (5/5/5)

- Math Journals
- EngageNY Application problems
- Ohio State test released items
CALENDAR MATH WARMUP
CALENDAR MATH

Calendar math is a great way for students to see how math is part of our everyday lives. We should show those type of connections whenever we can.

Calendar websites:

• Dr. Nicki’s Calendar Activities
• Calendar Math - Jessica Meacham
• Math Their Way
• Mathwire
<table>
<thead>
<tr>
<th>Components of Primary Calendar (K–2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SCHOOL CALENDAR/COMMERCIAL CALENDAR</strong></td>
</tr>
<tr>
<td>Have both calendars so your students can see the everyday calendar we use in real life. On the school calendar, reinforce patterns.</td>
</tr>
<tr>
<td><strong>COINS TO SHOW DATE</strong></td>
</tr>
<tr>
<td>Use coins to display the date, because this will reinforce money concepts. I always have the students draw two ways to make the money in their journal.</td>
</tr>
<tr>
<td><strong>COUNTING JAR</strong></td>
</tr>
<tr>
<td>It is important to have some sort of counting jar where your students can see the quantity grow. You can do this with a counting jar or a picture where students are putting some sort of sticker up every day.</td>
</tr>
<tr>
<td><strong>TOOTH CHART OR BAR GRAPH</strong></td>
</tr>
<tr>
<td>It is good to have both a tally chart and a bar graph. One suggestion is to do a tally lost tooth chart and a weather bar graph. Keep them all up (perhaps stapled on top of each other) or presented in a line across the room so your students can compare the data across the year.</td>
</tr>
<tr>
<td><strong>PLACE VALUE COUNTER</strong></td>
</tr>
<tr>
<td>It is important to emphasize naming the number in a variety of ways. For example, 42 can be 4 tens and 2 ones, or 42 ones.</td>
</tr>
</tbody>
</table>

| **ODD AND EVEN COUNTERS** |
| You can use cubes and stack them by 2s to determine if the day is odd or even. This is a great visual tool. |
| **COUNTDOWN** |
| These are fun to countdown upcoming holidays. For example, you put up a turkey and 30 links, and the students remove a link each day to count down to Thanksgiving. |
| **GROWING CALENDAR** |
| Whatever your system, students should be in charge of it. Some people use sticky notes and the students write the number and add it every day. Some people use a blank hundreds grid and the students add a number every day, while others use adding machine paper tape. |
| **DATE** |
| Some teachers have a frame that students fill out. Other teachers use some sort of markers (clothespin) and students clip the day of the week and use phrase stems like these: Today is _______. Yesterday was _______. Tomorrow will be _______. The month is _______. The year is _______. OR Today is _______. It is also written as _______. It is the _______ day of school. |
| **BIRTHDAY GRAPH** |
| Ideally this should be made into some sort of bar, tally, or pictograph so that students can see the shape of the data and ask math questions about it. Put the questions in bubbles with the student's name on it around the graph. |
Today is ___________
Also written: ___/___
It is the ___ day of school.
Is it prime or composite?

<table>
<thead>
<tr>
<th>Today's Number is:</th>
<th>Write the Number in:</th>
<th>Round to the Nearest:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standard:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Expanded:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Word:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>School Day Fractions</th>
<th>Today's M&amp;M's</th>
<th>Area &amp; Perimeter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fraction:</td>
<td>Mean:</td>
<td></td>
</tr>
<tr>
<td>Decimal:</td>
<td>Median:</td>
<td></td>
</tr>
<tr>
<td>Simplify?</td>
<td>Mode:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range — Outlier</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Daily Division</th>
<th>Daily Equations</th>
<th>Today's Activities</th>
</tr>
</thead>
</table>

Factors: [Calendar with August display]
• **Question of the Day** - The goal is to look at how people collect data and to show different forms of graphs.
  • Focused on data and graphs
  • Voting

• **Number of the Day** - The goal is to develop flexibility with numbers, fractions and/or decimals (fluency).
**NUMBER OF THE DAY**

**Figure 4.4 Number of the Day Ideas**

<table>
<thead>
<tr>
<th>Number of the Day Ideas</th>
<th>K-2</th>
<th>Grades 3-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Draw the number with base-ten block models</td>
<td>• Draw the number with base-ten block models</td>
<td>• Draw the number with base-ten block models</td>
</tr>
<tr>
<td>Double the number/half the number</td>
<td>• Double the number/half the number</td>
<td>• Double the number/half the number</td>
</tr>
<tr>
<td>Show the number with money</td>
<td>• Find all the factors of the number</td>
<td>• Find all the factors of the number</td>
</tr>
<tr>
<td>Show the number in a ten or double ten frame</td>
<td>• Find all the multiples of the number</td>
<td>• Show the number with money</td>
</tr>
<tr>
<td>Write the number in expanded form</td>
<td>• Write the number in expanded form</td>
<td>• Show the number with money</td>
</tr>
<tr>
<td>Make the number using addition and/or subtraction</td>
<td>• Make the number using addition, subtraction, multiplication and/or division</td>
<td>• Write the number as an array</td>
</tr>
<tr>
<td>Add/subtract 10 or 100 to the number</td>
<td>• Draw a rectangle with a perimeter of this number</td>
<td>• Draw a rectangle with an area of this number</td>
</tr>
<tr>
<td>Write the number name</td>
<td>• Draw the number name</td>
<td>• Write the number name</td>
</tr>
</tbody>
</table>

Activities vary depending on the grade. Activities should be aligned to the standards. See many examples here: www.pinterest.com/dmnick7/number-of-the-day/

**Figure 4.5 Fraction of the Day and Decimal of the Day**

<table>
<thead>
<tr>
<th>Fraction of the Day (Grades 3-5)</th>
<th>Decimal of the Day (Grades 4-5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Decide if the fraction is in simplest form</td>
<td>• Write the decimal in word form</td>
</tr>
<tr>
<td>• Add 1/4 to the fraction; draw a model</td>
<td>• Write the decimal in fraction form</td>
</tr>
<tr>
<td>• Subtract 1/4 from the fraction; draw a model</td>
<td>• Write 2 decimals that are greater than this decimal (show them all on the number line)</td>
</tr>
<tr>
<td>• Add 1/2 to the fraction (you want students to realize that this is easy... just decompose 1/2 into fourths); draw a model</td>
<td>• Write 2 decimals that are less than this decimal (show them all on the number line)</td>
</tr>
<tr>
<td>• Subtract 1/2 from the fraction (see above); draw a model</td>
<td>• Write the decimal in expanded form</td>
</tr>
<tr>
<td>• Multiply the fraction by 3/write a story to go with your equation</td>
<td>• Add .9 to this decimal</td>
</tr>
<tr>
<td>• Compose/decompose the fraction...like 3/4 = 1/4 + 1/4 + 1/4 or 3/4 = 1/2 + 1/4</td>
<td>• Subtract .9 from this decimal</td>
</tr>
<tr>
<td>• Divide 3 by the fraction/write a story to go with your equation</td>
<td>• Multiply 2 by this decimal/write a story about this equation</td>
</tr>
<tr>
<td>• Draw the fraction on a number line...is it closer to 0, 1/2, or 1?</td>
<td>• Round the decimal to the nearest tenth and hundredth</td>
</tr>
<tr>
<td>• Draw the fraction as a set and/or as the area model</td>
<td>• Compare the decimal with symbols to 2 other decimals</td>
</tr>
</tbody>
</table>

Activities vary depending on the grade. Activities should be aligned to the standards.
HOMEWORK- SESSION 2

CHOOSE A WARMUP ROUTINE (NUMBER TALK, PROBLEM/QUESTION/NUMBER OF THE DAY, ETC) AND DO IT AT LEAST 3 TIMES DURING THE WEEK. BE PREPARED TO REPORT BACK. HOW DID IT GO? WHAT WENT WELL? WHAT MIGHT YOU DO DIFFERENTLY NEXT TIME? HOW DID THE STUDENTS RESPOND?
RESOURCES

• https://www.youcubed.org/

• https://hcpss.instructure.com/courses/108/pages/grade-5-program-tools (grade 5)

• http://insidemathematics.org/index.php/number-talks

• https://www.haikudeck.com/number-talks--education-presentation-n6bMt4GzSx

• http://www.cobbk12.org/bullard/NumberTalksK-2.pdf

• http://numberstrings.com/

• https://schoolwires.henry.k12.ga.us/Page/73087