Assessment Practices + DOK = Deeper Understanding of Math

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Assessment

What is your current assessment structure?
Agenda

• Develop a deep understanding of what a formative assessment process is and how it can be used to support and enhance student learning.

• Explore DOK levels using SBAC items to create learning intentions to support students as they progress toward deeper understanding of mathematics.

• Process and apply your learning using the CCSSM standards and SBAC support documents.
# Self-Assessment

<table>
<thead>
<tr>
<th>Objective</th>
<th>Not Yet</th>
<th>Got It</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can create learning intentions that describe the mathematics and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>expectations for a cluster of standards at my grade level.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I understand the uses of formative and summative assessments, and have</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a framework for structuring assessment to support and improve student</td>
<td></td>
<td></td>
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<tr>
<td>learning.</td>
<td></td>
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</tr>
</tbody>
</table>
Understanding Assessment

Introducing the CA Framework on Assessment
Assessment Overview

“In order for assessment to be effective, teachers need to have clear reasons for why they are using the assessment tools they are using.”

Evidence gathered from the assessment should be used to inform instructional decisions.

Assessments that are implemented without a clear goal or use for the results of the assessment are not apparent, then the assessment practice in question should be reexamined.

CA Mathematics Framework, November 2013
Assessment Overview

Assessment in mathematics should go beyond how well a student used a memorized algorithm or procedure and should include variety in what students produce (charts, diagrams, etc).

The focus of assessment must shift toward assessing content knowledge and practices as opposed to simply assessing content (what students know how to do).
Two Types of Assessment

Describe each of the following based on your current understanding.

Formative Assessment
Summative Assessment
Formative Assessment

“The primary purpose of formative assessment is to improve learning, not merely audit it.”

Formative assessments . . .

• inform teacher decisions and student actions based on the information gathered from the assessment.
• are not formative if the results are used only as a mark in the grade book.
Formative Assessment

... formative assessment provides information that changes what both the teacher and learner are doing.
Formative Assessment

- Clarify Intended Learning
- Elicit Evidence
- Interpret Evidence
- Act on Evidence

Goals should be clear. We should know where we are headed.

What are the things students are doing that might allow us to gather information about their understanding? If evidence is difficult to gather, consider another task. What can students do?

Where to next? Based on what students did, what does it mean for instruction with regard to our goals?

What do you do? What do students do? This process should include the students as well.
Summative Assessments

Summative assessments . . .
• record a learner’s understanding at a given point in time.
• assess the effectiveness of instruction, progress of student learning, or an instructional program.
• may not be used to inform instruction.
Backwards Mapping

Where are we headed?
Clarifying intended learning using SBAC, DOK, PLCs, and other tools.
Backwards Mapping: Developing Goals

- Choose grade 3, 5, or grade 7, then you will be given a cluster.
- For your cluster, create a list of learning targets.
- For each learning target, describe the success criteria.
Backwards Mapping: Developing Goals

3.OA.A Represent and solve problems involving multiplication and division.

5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

7.EE.A Use properties of operations to generate equivalent expressions.
Understanding the Smarter Balanced Assessments

How might the new assessments guide us?
### Smarter Balanced Assessments: Terminology

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SBAC Claims</strong></td>
<td>These are the <em>four things</em> the new assessment intends to measure and report on (Concepts and Procedures, Problem Solving/Modeling and Data Analysis, Communicating Reasoning.)</td>
</tr>
<tr>
<td><strong>Targets</strong></td>
<td>Under each SBAC Claim are several “targets.” In claim 1, targets mirror the content standard clusters. In claims 2, 3, and 4, they read more like mathematical practice standards.</td>
</tr>
<tr>
<td><strong>ALDs</strong></td>
<td>Each target has it’s own “Achievement Level Descriptors,” that is, a scale with <em>four levels</em> describing levels of student understanding.</td>
</tr>
<tr>
<td><strong>DOK</strong></td>
<td>Depth of Knowledge: A classification system with <em>four levels</em> for the way in which a student might engage with the content.</td>
</tr>
</tbody>
</table>
Smarter Balanced Claims

1. Concepts and Procedure
2. Problem Solving
3. Communicating Reasoning
4. Modeling and Data Analysis
Smarter Balanced Claims

1. Concepts and Procedures
2. Problem Solving
3. Communicating Reasoning
4. Modeling and Data Analysis

Content
Math Practices
### Smarter Balanced: Claims v. DOK

<table>
<thead>
<tr>
<th>DOK</th>
<th>CLAIMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>≈20 Q</td>
</tr>
<tr>
<td>2</td>
<td>9 Q (with 4)</td>
</tr>
<tr>
<td>3</td>
<td>8 Q</td>
</tr>
<tr>
<td>4</td>
<td>9 Q (with 2)</td>
</tr>
</tbody>
</table>
Backwards Mapping: Developing Goals

Revisit your learning targets and success criteria for grades 3, 5, or grade 7.

• How do your learning targets compare to the Evidence Required on the SBAC Claim 1 Item Specifications
• Read through the Achievement Level Descriptors and your success criteria, where do they align and differ?
• Do your learning targets support students in accessing the types of questions provided in the Task Models?
Discuss

How might you use the SBAC Claim 1 Item Specifications to support your classroom instruction?

What other ideas do you have?
Depth of Knowledge

What is DOK and how might it inform your process?
Depth of Knowledge

What is it?
Why should we care?
How could it be useful?
<table>
<thead>
<tr>
<th>Depth of Thinking (Weeb) + Type of Thinking</th>
<th>DOK Level 1</th>
<th>DOK Level 2</th>
<th>DOK Level 3</th>
<th>DOK Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Revised Bloom)</td>
<td>Recall &amp; Reproduction</td>
<td>Basic Skills &amp; Concepts</td>
<td>Strategic Thinking &amp; Reasoning</td>
<td>Extended Thinking</td>
</tr>
<tr>
<td>Remember</td>
<td>Recall conversions, terms, facts</td>
<td>Specify, explain relationships</td>
<td>Use concepts to solve non-routine problems</td>
<td>Relate mathematical concepts to other content areas, other domains</td>
</tr>
<tr>
<td>Understand</td>
<td>Evaluate an expression</td>
<td>Make basic inferences or logical predictions from data/observations</td>
<td>Use supporting evidence to justify conjectures, generalizations, or connect ideas</td>
<td>Develop generalizations of the results obtained and the strategies used and apply them to new problem situations</td>
</tr>
<tr>
<td>Apply</td>
<td>Locate points on a grid or number on number line</td>
<td>Use models/diagrams to explain concepts</td>
<td>Explain reasoning when more than one response is possible</td>
<td>Explain phenomena in terms of concepts</td>
</tr>
<tr>
<td>Analyze</td>
<td>Solve a one-step problem</td>
<td>Make and explain estimates</td>
<td>Use reasoning, planning, and supporting evidence</td>
<td>Initiate, design, and conduct a project that specifies a problem, identifies solution paths, solves the problem, and reports results</td>
</tr>
<tr>
<td></td>
<td>Represent math relationships in words, pictures, or symbols</td>
<td>Make a and explain estimates</td>
<td>Translate between problem &amp; symbolic notation when not a direct translation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Follow simple procedures</td>
<td>Select a procedure and perform it</td>
<td>Design investigation for a specific purpose or research question</td>
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</tr>
<tr>
<td></td>
<td>Calculate, measure, apply a rule (e.g., rounding)</td>
<td>Solve routine problems applying multiple concepts or decision points</td>
<td>Use reasoning, planning, and supporting evidence</td>
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</tr>
<tr>
<td></td>
<td>Apply algorithm or formula</td>
<td>Retrieve information to solve a problem</td>
<td>Translate between representations</td>
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</tr>
<tr>
<td></td>
<td>Solve linear equations</td>
<td>Translate between representations</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Make conversions</td>
<td>Retrieve information from a table or graph to answer a question</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Identify a pattern/trend</td>
<td>Categorize data, figures</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Organize, order data</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Select appropriate graph and organize &amp; display data</td>
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<td></td>
<td></td>
<td>Interpret data from a simple graph</td>
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<tr>
<td></td>
<td></td>
<td>Extend a pattern</td>
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<tr>
<td></td>
<td></td>
<td>Extend a pattern</td>
<td></td>
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</tr>
<tr>
<td>Evaluate</td>
<td>Cite evidence and develop a logical argument</td>
<td>Compare information within or across data sets or texts</td>
<td>Apply understanding in a novel way, provide argument or justification for the new application</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Compare/contrast solution methods, verify reasonableness</td>
<td>Analyze and draw conclusions from data, citing evidence</td>
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<tr>
<td></td>
<td></td>
<td>Generate hypotheses or observations or prior knowledge and experience</td>
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<tr>
<td></td>
<td></td>
<td>Develop an alternative solution</td>
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<tr>
<td></td>
<td></td>
<td>Synthesize information within one data set</td>
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<tr>
<td></td>
<td></td>
<td>Synthesize information across multiple sources or data sets</td>
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<td></td>
<td></td>
<td>Design a model to inform and solve a practical or abstract situation</td>
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(Hess, Canick, Jones, & Waalkes, 2009)
Identifying DOK Levels

Identify the level of DOK for each of the SBAC sample items.
## Answers

<table>
<thead>
<tr>
<th>Item #</th>
<th>DOK Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Activity
Formative Assessment

Improving learning through intentional monitoring and support.
Formative assessment is good teaching.

Can and should happen every day. The goal is to increase the amount of meaningful feedback students get as they actively engage with the content.

It is a process, not an event.

The intent is to improve learning, not merely audit it.
Formative Assessment Video

https://www.youtube.com/watch?v=ccr8eT2Q98A
Formative Assessment

Goals should be clear. We should know where we are headed.

What are the things students are doing that might allow us to gather information about their understanding? If evidence is difficult to gather, consider another task. What can students do?

Where to next? Based on what students did, what does it mean for instruction with regard to our goals?

What do you do? What do students do? This process should include the students as well.
What did you learn?

It shouldn’t be, “What questions do you have?” [I hope you have none so that I can tell myself you learned something.]

It should be, “What new questions can you ask?” [I hope you have some because otherwise our work is having no effect on your mind.]

Formative Assessment

In your groups, generate a list of ways that you might “check for understanding.” Try to list as many as you can.
Checking for Understanding

• Checking for understanding (including most tests, assignments, etc.) are, at best, diagnostic.

• As teachers, we learn what the student knows, and does not know.

• For the student, the learning typically stops.
Formative Assessment

• How do we get more out of this?

• A student needs meaningful feedback - information that is actionable and orients them to re-engage with the material they are learning.

• The feedback must be meaningful.
  • This means fair, accurate, specific, timely.

• The feedback requires student and teacher action.
Formative Assessment

Select one of the “checks for understanding” and transform it into a formative assessment process, that is, increase the meaningful feedback a student would get and determine the required student actions.

Is it meaningful feedback (information that is actionable and orients them to re-engage with the material they are learning)?

Is the feedback fair, accurate, specific, timely?

Does it require action by the students and teacher?
Formative Assessment Feedback

- Beverage total: $10.00
- Pizza size and toppings:
  - no toppings and 1 topping
  - How is that enough dessert for everyone?
  - Is a $23.90 tip what you're going to leave?

Work space:

- I can't tell what the totals are for.
- Label your work.
- Great job on 4/5.
Discuss

How might teachers use formative assessments throughout the year to support students success on the end of the year summative assessment?
Statewide Summative Assessments are Like Icebergs

Examining Data From the Smarter Balanced Summative Assessment, Presented to the Leadership Convening – October 1, 2015 by Deb Sigman, Deputy Director, Assessment & Standards Development Services, WestEd
On the Surface . . .

Summative tests provide information not to be ignored

May offer clues about what to do next

• Slow Down
• Go Back
• Change Direction
• Full Speed Ahead
How Summative Tests Can Add Value

• Rarely provide definitive answers, but raise many questions allowing reflection on practice
• Provide a general direction and a necessary story
• Provide an entry point into a collaborative, honest conversation
• Must dig deeper to determine cause
• Focus on groups, programs and disaggregation (not individuals)
Smarter Balanced Hierarchy of Scores

Overall Scaled Score

Claim

Target (Winter)
Within each level can divide into high, medium, low performance.

<table>
<thead>
<tr>
<th>Level</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Standard Not Met</td>
</tr>
<tr>
<td>Level 2</td>
<td>Standard Nearly Met</td>
</tr>
<tr>
<td>Level 3</td>
<td>Standard Met</td>
</tr>
<tr>
<td>Level 4</td>
<td>Standard Exceeded</td>
</tr>
</tbody>
</table>
### Achievement Level Ranges

<table>
<thead>
<tr>
<th>Grade</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Equal to or Below</td>
<td>From</td>
<td>To</td>
<td>From</td>
</tr>
<tr>
<td>3</td>
<td>2380</td>
<td>2381</td>
<td>2435</td>
<td>2436</td>
</tr>
<tr>
<td>4</td>
<td>2410</td>
<td>2411</td>
<td>2484</td>
<td>2485</td>
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<tr>
<td>5</td>
<td>2454</td>
<td>2455</td>
<td>2527</td>
<td>2528</td>
</tr>
<tr>
<td>6</td>
<td>2472</td>
<td>2473</td>
<td>2551</td>
<td>2552</td>
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<tr>
<td>7</td>
<td>2483</td>
<td>2484</td>
<td>2566</td>
<td>2567</td>
</tr>
<tr>
<td>8</td>
<td>2503</td>
<td>2504</td>
<td>2585</td>
<td>2586</td>
</tr>
<tr>
<td>11</td>
<td>2542</td>
<td>2543</td>
<td>2627</td>
<td>2628</td>
</tr>
</tbody>
</table>
Reflecting Beyond the Scores

• Data (scores) are necessary, but not sufficient
• Consider the culture, climate, context of the school/district
• Reflect on what you can impact to move beyond the scores:
  ○ Practice
  ○ Policies and Procedures
  ○ People
  ○ Programs

Examining Data From the Smarter Balanced Summative Assessment, Presented to the Leadership Convening – October 1, 2015 by Deb Sigman, Deputy Director, Assessment & Standards Development Services, WestEd
Shifts in the Accountability System

- We have a new set of standards and a new test, so these are new scores.
- There is no “lower” because we cannot compare.
- The goal of the assessments is to inform teaching and learning, accountability will be a byproduct not the purpose.

\[
\text{new standards + new instruction + new assessment = different results}
\]
The Recap

Tying it all together.
## Self-Assessment

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<td></td>
</tr>
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</table>

**Activity**
Self-Assessment

- In what areas did you experience growth today?
- How did you gain these new insights?
- As you reflect, identify a next step.
- Write it down and share it with a partner.
<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Send your text message to this Phone Number: 37607

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**Poll Code for this Session:**

- **Speaker was well-prepared and knowledgeable (0-3):**
- **Speaker was engaging and an effective presenter (0-3):**
- **Session matched title and description in program book (0-3):**
- **Other comments, suggestions, or feedback (words):**

**Example:** 28257 323 *Inspiring, good content*

**Non-Example:** 28257 3 2 3 *Inspiring, good content*

**Non-Example:** 28257 3-2-3 *Inspiring, good content*
Thank You!

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