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

Objective	Not Yet		Got It	
A	B	C	D	E
I can create learning intentions that describe the mathematics and expectations for a cluster of standards at my grade level.				
I understand the uses of formative and summative assessments, and have a framework for structuring assessment to support and improve student learning.				

Activity

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.

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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.
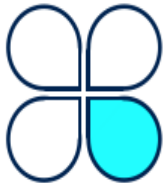
Formative Assessment

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.

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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.

Activity

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Understanding the
Smarter Balanced Assessments

How might the new assessments guide us?

Smarter Balanced Assessments: Terminology

SBAC Claims	These are the *four things* the new assessment intends to measure and report on (Concepts and Procedures, Problem Solving/Modeling and Data Analysis, Communicating Reasoning.)
Targets	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.
ALDs	Each target has it's own "Achievement Level Descriptors," that is, a scale with *four levels* describing levels of student understanding.
DOK	Depth of Knowledge: A classification system with *four levels* for the way in which a student might engage with the content.

Smarter Balanced Claims

1   Concepts and Procedure

2   Problem Solving

3   Communicating Reasoning

4   Modeling and Data Analysis

Smarter Balanced Claims

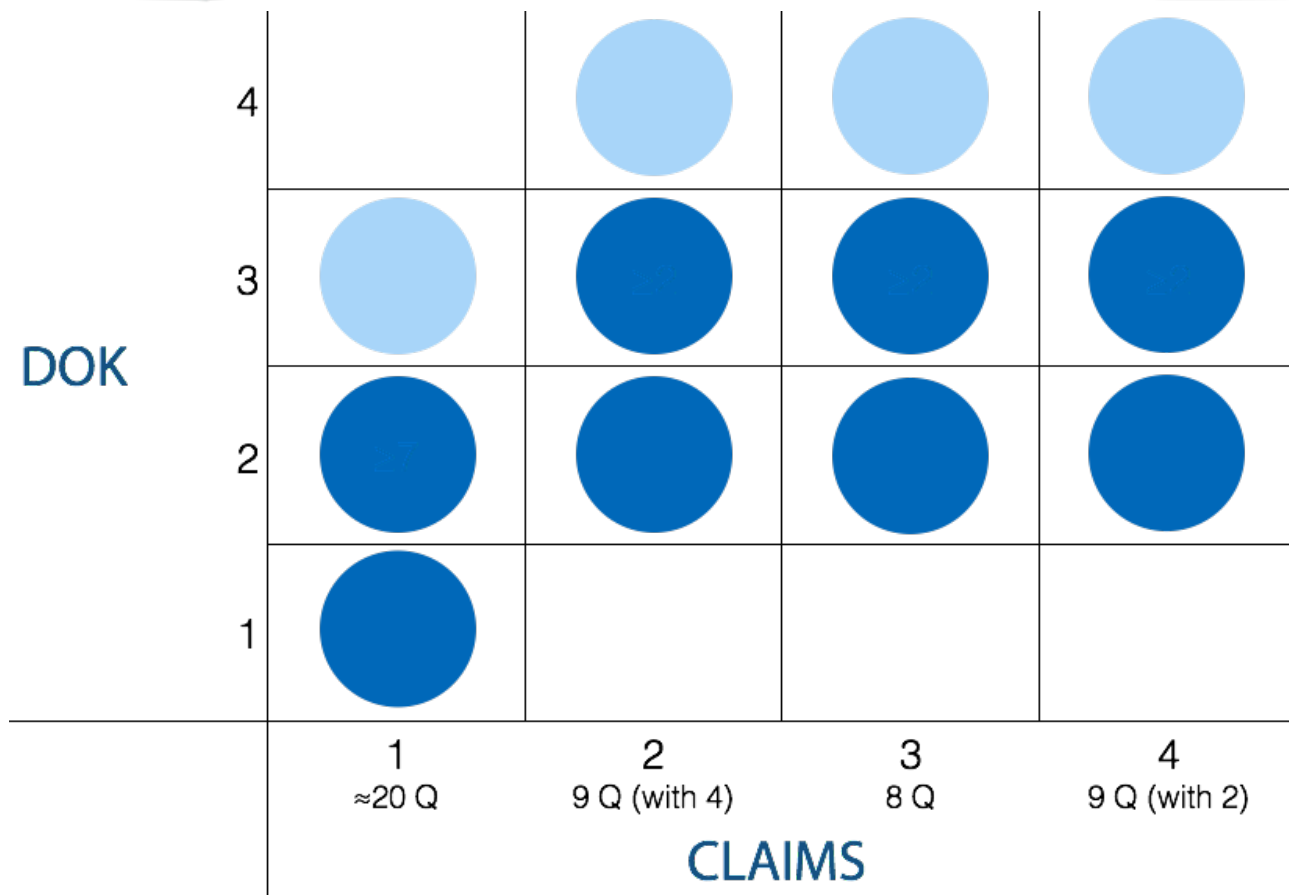**1** Concepts and Procedures — Content

2 Problem Solving

3 Communicating Reasoning — Math Practices

4 Modeling and Data Analysis

Smarter Balanced: Claims v. DOK

DOK

4
3
2
1

CLAIMS

| | 1 ≈20 Q | 2 9 Q (with 4) | 3 8 Q | 4 9 Q (with 2) |

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?
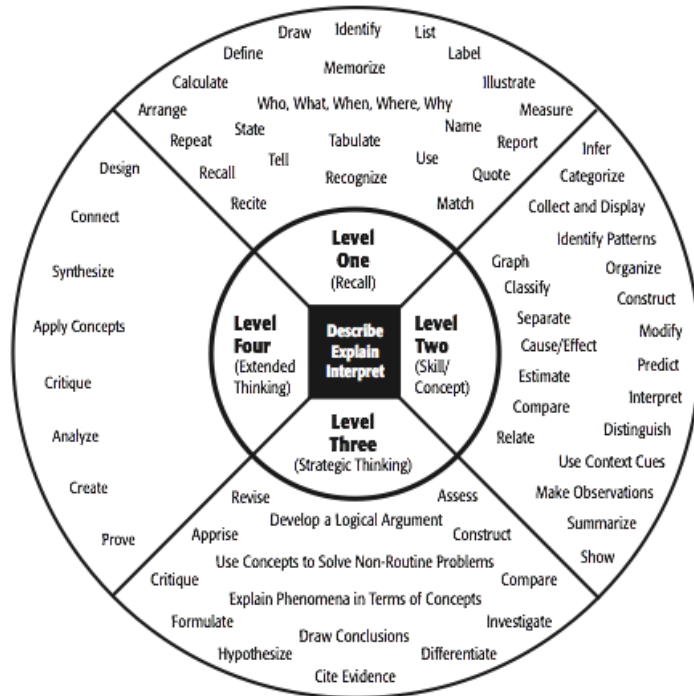
Activity

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 4. A "Snapshot" of the Cognitive Rigor Matrix for Mathematics.

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

(Hess, Carlock, Jones, & Walkup, 2009)

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Identifying DOK Levels

Identify the level of DOK for each of

the SBAC sample items.

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Answers

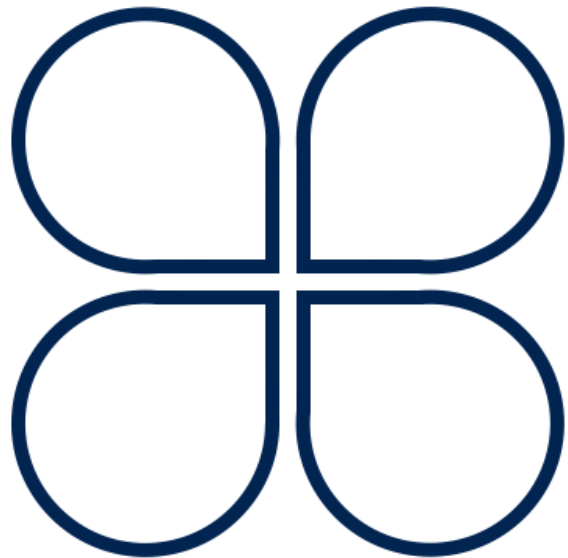| Item #	DOK Level

Activity

Formative Assessment

Improving learning through intentional monitoring and support.

Formative Assessment

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.

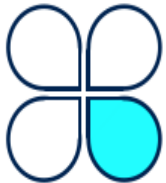**Formative Assessment Process**

Formative Assessment Video

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

Formative Assessment

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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.]*

What did you learn?, Christopher Danielson, https://christopherdanielson. wordpress.com/2013/08/23/what-did-you-learn/

Formative Assessment

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

Activity

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?

Activity

Formative Assessment Feedback

Beverage total:

$10.00

...izza size and toppings:

...opping and 1
...toppings.

Is this enough pizza for everyone?

Pizza total:

...for 6 people
...for 6 people
...inks/Appetizer Pizza /Dessert
WORK SPACE:

+24.45
2.15
26.60

$2...

I can't tell what the totals are for. Label your work. ☺

great job on +/−

...ily ordered...
no toppings and...
...za with toppin...

is that enough desert for everyone?

Is a $23.90 tip what you're going to leave?

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Formative Assessment Feedback

https://www.teachingchannel.org/videos/math-test-grading-tips

Highlighting Mistakes: A Grading Strategy
Grades 6-12 / Math / Assessment
CCSS: Math.Practice.MP1

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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

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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)

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Smarter Balanced Hierarchy of Scores

Overall Scaled Score

Claim

Target (Winter)

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Performance/Achievement Levels

Smarter Levels → California Levels

Level 1 Standard Not Met	
Level 2 Standard Nearly Met	
Level 3 Standard Met	
Level 4 Standard Exceeded	

Within each level can divide into high, medium, low performance.

Achievement Level Ranges

Mathematics						
Grade	Level 1	Level 2		Level 3		Level 4
	Equal to or Below	From	To	From	To	Equal to or Above
3	2380	2381	2435	2436	2500	2501
4	2410	2411	2484	2485	2548	2549
5	2454	2455	2527	2528	2578	2579
6	2472	2473	2551	2552	2609	2610
7	2483	2484	2566	2567	2634	2635
8	2503	2504	2585	2586	2652	2653
11	2542	2543	2627	2628	2717	2718

Reflecting Beyond the Scores

- Data (scores) are necessary, but not sufficient

- Consider the culture, climate, context of the school/district

- Reflect <u>on what you can impact</u> to move beyond the scores:
  - Practice
  - Policies and Procedures
  - People
  - Programs

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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 can not compare.
- The goal of the assessments is to inform teaching and learning, accountability will be a byproduct not the purpose.

new standards + new instruction + new assessment =
different results

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The Recap

Tying it all together.

Self - Assessment

Objective	Not Yet		Got It	
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Self - Assessment

- In what areas did you experience growth today?
- How did you gain these new insights?
- As you reflect, identify a next step.
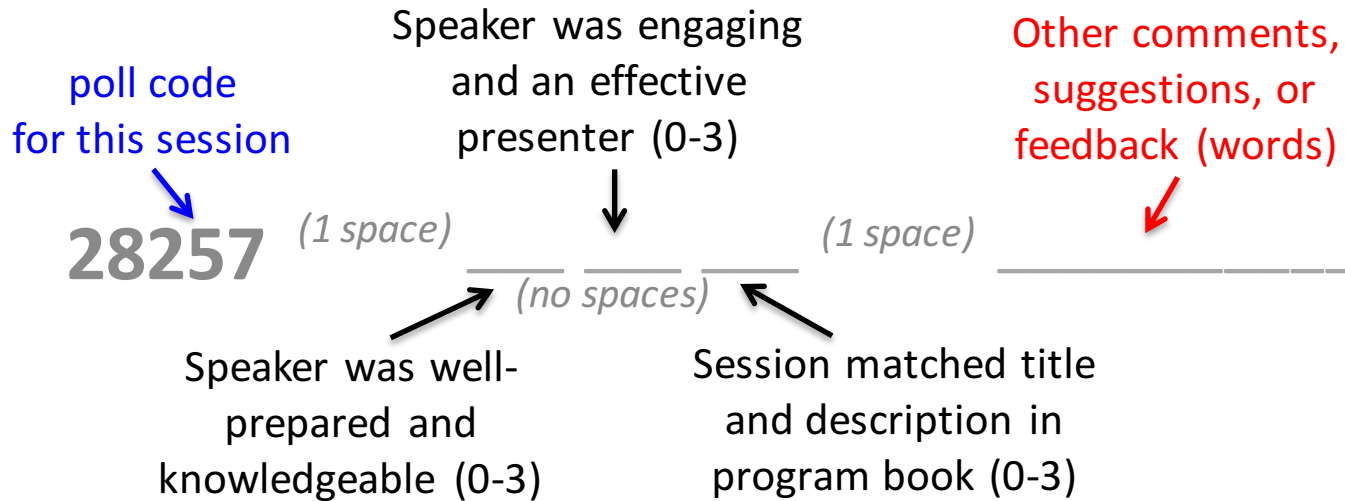- Write it down and share it with a partner.

Thank You!

@TCOEstephanie
@tcoechristine
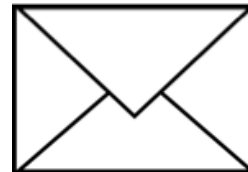
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