

Closing the K-12 Common Core Mathematics Learning Gap

A vision cannot be true or false but ultimately is evaluated against other possible directions for your classroom, your school, or your district.

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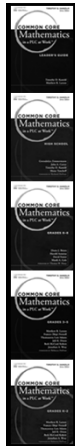
What Would You Say ...

... if I walked into your school and asked to examine all of your current mathematics and ELA tests, quizzes, projects, assignments, and exams given to the students on a weekly, monthly, and yearly basis?

CCSS Sustained Implementation Begins Here

How would you know if they are really **really** good?

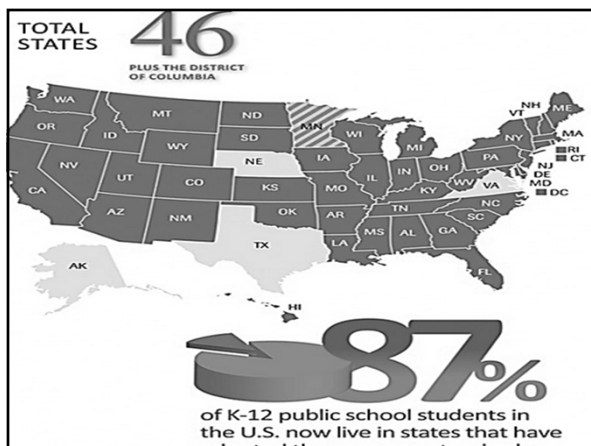
How would you know if they are being used for the **right purposes**?



Sustained Implementation of the CCSS Requires Four Pursuits

1. A thorough review of all current local mathematics assessments
2. High-quality common assessments and the accurate scoring of those assessments
3. A robust formative assessment process for students and adults—using the assessment instruments
4. Instruction that provides evidence of student understanding via the mathematical practices







Published Online: April 23, 2013
 Published in Print: April 24, 2013, as *PARCC Proposes Common-Core Test Accommodations*

PARCC Proposes Common-Core Test Accommodations

ELLs, special needs focus of release
 By Leslie A. Maxwell and Christina A. Samuels

The first of two groups of states working to design assessments aligned to the Common Core State Standards has released a draft accommodations manual that outlines the types of test supports that can be used to help English-language learners and students with disabilities demonstrate their content knowledge and skills.

The Partnership for the Assessment of Readiness for College and Careers, or PARCC—made up of 22 states—will circulate the policy for public comment through May 13. The PARCC governing board will vote on the final document in June.

The manual's recommendations, released last week, are intended to expand access to tests beyond what may be currently available for students in some states, said Tamara Reavis, PARCC's senior adviser for assessment, accessibility, and equity. Its details indicate that some accommodations once linked to students with special needs—such as repeating instructions aloud or magnifying text—are now among the test's "embedded supports" available to any student, even those who are not formally identified as ELLs or students in special education.

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State Assessment Improvements for Mathematics

- A mix of item types:
 - Short answer and longer, open response, performance based
 - Up to 50 percent
- Richer multiple-choice items

State Assessment Improvements for Mathematics

Write your answer to the following problem in your answer booklet:

San Francisco Giants' stadium: 41,915 seats	Washington Nationals' stadium: 41,888 seats	San Diego Padres' stadium: 42,445 seats
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Compare these statements from two students.

Jeff said, "I get the same number when I round all three numbers of seats in these stadiums."

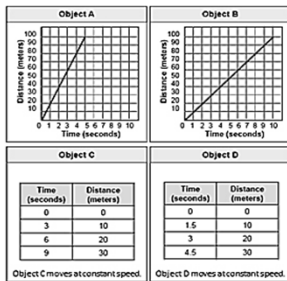
Sara said, "When I round them, I get the same number for two of the stadiums but a different number for the other stadium."

Can Jeff and Sara both be correct? Explain how you know.

—The Charles A. Dana Center and Agile Mind, Inc.,
Mathematics Common Core Toolbox (www.ccsstoolbox.com) (2012)

Grade 7 (Speed)

SAMPLE ITEM



If an object has constant speed, then the speed can be computed by the change in distance divided by the change in time.

Information about objects A, B, C and D are shown. Objects C and D both have constant speed.

Based on the information given, drag and drop the object names in order from greatest speed to least speed in the table provided.

Object A	Greatest Speed	
Object B		
Object C		
Object D	Least Speed	

—PARCC (parcconline.org), 2012

SAMPLE ITEM

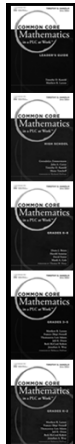
A portion of the graph of a quadratic function $f(x)$ is shown in the xy -plane. Selected values of a linear function $g(x)$ are shown in the table.



x	$g(x)$
-4	7
-1	1
2	-5
5	-11

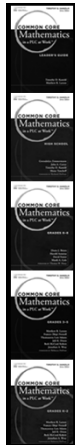
For each comparison below, use the drop-down menu to select a symbol that correctly indicates the relationship between the first and the second quantity.

First Quantity	Comparison	Second Quantity
The y-coordinate of the y-intercept $f(x)$	\leq	The y-coordinate of the y-intercept $g(x)$
$f(3)$	\geq	$g(3)$
Maximum value of $f(x)$ on the interval $-5 \leq x \leq 5$	\leq	Maximum value of $g(x)$ on the interval $-5 \leq x \leq 5$
$\frac{f(5) - f(2)}{5 - 2}$	\geq	$\frac{g(5) - g(2)}{5 - 2}$



Your First Pursuit for Sustainability

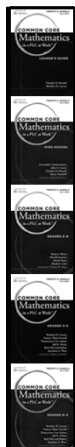
Conduct a thorough review of your current local assessments on a unit-by-unit basis.



Why Is This So Important to Pursue?

Left unattended, the design and use of assessment instruments such as quizzes and tests in mathematics is an **inequity** creator.





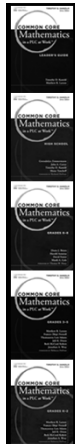
Why Is This So Important to Pursue?

Evaluating the evidence:
John Hattie's (2009) meta-analysis of over 800 studies.

Assessment (and grading) as a process of formative feedback

.73





Assessment as a Process of Formative Feedback: .73

Turn to the *Popham* reading ...

Take a moment to scan the reading and highlight or underline statements that connect with your current assessment situation.

When ready, share one or two highlights with a shoulder partner.

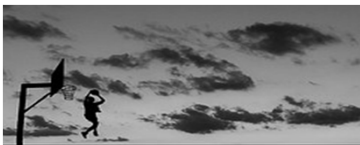


Assessment as a Process of Formative Feedback: .73



Assessment as a *means*
of learning and *not* an
end to learning

Student *action* to
feedback really matters.





You Must Evaluate the Quality of Your Surfboards!

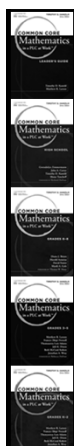
On what **basis** do you determine the characteristics of a high-quality unit or chapter assessment or exam?

In mathematics ...

Figure 4.4:
Evaluation Tool for Assessment Instrument Quality

Assessment indicators	Description of Level 1	Requirements of the Indicator Are Not Present	Limited Requirements of This Indicator Are Present	Substantially Meets the Requirements of the Indicator	Fully Achieves the Requirements of the Indicator	Description of Level 4
Identification and emphasis on learning targets	Learning targets are unclear or absent from the assessment instrument. Too much attention is given to one target.	1	2	3	4	Clearly stated learning targets are on the assessment and connected to the assessment questions.
Visual presentation	Assessment is sloppy, disorganized, and difficult to read. There is no room for teacher feedback.	1	2	3	4	Assessment is neat, organized, easy to read, and well spaced. There is room for teacher feedback.
Time allotment	Few students can complete the assessment in the time allowed.	1	2	3	4	Test can be successfully completed in time allowed.
Clarity of directions	Directions are missing or unclear.	1	2	3	4	Directions are appropriate and clear.
Clear and appropriate scoring rubrics	Scoring rubric is either not in evidence or not appropriate for the assessment task.	1	2	3	4	Scoring rubric is clearly stated and appropriate for each problem.
Variety of assessment task formats	Assessment contains only one type of questioning strategy and no multiple choice. Calculator usage is not clear.	1	2	3	4	Test includes a variety of question types, assesses different formats, and includes calculator usage.
Question phrasing (precision)	Wording is vague or misleading. Vocabulary and precision of language is problematic for student understanding.	1	2	3	4	Vocabulary is direct, fair, and clearly understood. Students are expected to attend to precision in responses.
Balance of procedural fluency and demonstration of understanding	Test is not balanced for rigor. Emphasis is on procedural knowledge. Minimal cognitive demand for demonstration of understanding is present.	1	2	3	4	Test is balanced with product- and process-level questions. Higher cognitive demand and understanding skills are present.

—Kanold & Larson, *Common Core Mathematics in a PLC at Work, Leader's Guide* (2012)

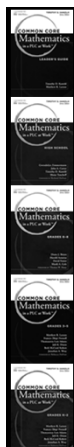


High-Quality Assessment Instruments Diagnostic Tool

Using the “Assessment or Test Evaluation Rubric” criteria:

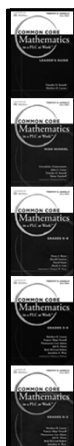
Turn to a shoulder partner ...

- What would you add to the rubric?
- What do you like or dislike?
- How you might use it in your school?



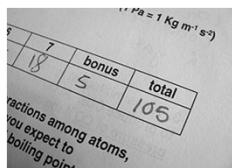
Your Second Pursuit for Sustainability

Ensure the **accurate scoring** of common unit-by-unit grade-level or course **assessment instruments**.



Do You Trust Me Enough to ... ?

How do you know that all assessment instruments will be scored with a **fidelity of accuracy** by those who teach the same course or grade level?



Creating a Culture of Collaborative Assessment and Scoring

It is one of the most important tasks of grade-level or course-based teachers and teacher teams.


Why?

The CCSS-M Demands: A Depth of Knowledge (DOK)

Cognitive demand—the complexity of reasoning required by the student ...


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

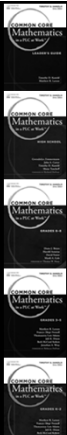
Depth of Thinking (Webb) + Type of Thinking (Revised Bloom)	DOK Level 1 Recall & Reproduction	DOK Level 2 Basic Skills & Concepts	DOK Level 3 Strategic Thinking & Reasoning	DOK Level 4 Extended Thinking
Remember	<ul style="list-style-type: none"> Recall conversions, terms, facts 			
Understand	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Specify, explain relationships Make basic inferences or logical predictions from data/observations Use models /diagrams to explain concepts Make and explain estimates 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Relate mathematical concepts to other context areas, other domains Develop generalizations of the results obtained and the strategies used and apply them to new problem situations
Apply	<ul style="list-style-type: none"> Follow simple procedures Calculate, measure, apply a rule (e.g., rounding) Apply algorithm or formula Solve linear equations Make conversions 	<ul style="list-style-type: none"> Select a procedure and perform it Solve routine problem applying multiple concepts or decision points Retrieve information to solve a problem Translate between representations 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Initiate, design, and conduct a project that specifies a problem, identifies solution paths, solves the problem, and reports results
Analyze	<ul style="list-style-type: none"> Retrieve information from a table or graph to answer a question Identify a pattern/trend 	<ul style="list-style-type: none"> Categorize data, figures Organize, order data Select appropriate graph and organize & display data Interpret data from a simple graph Extend a pattern 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Analyze multiple sources of evidence or data sets



Two Questions

1. What percent of the current math assessment instruments (surfbboards) in your school or district have DOK levels 3 and 4 questions?
2. How do you know that the type of student responses required (explanations, etc.) are scored accurately?






Improving the Accuracy of Your Feedback and Grading Practices

Double scoring: A different teacher does a second score on student papers (group scoring).

Calibration: Evaluators agree on the rubric score for an exam (anchor papers).

Inter-rater reliability: Two or more evaluators agree on a student score (discuss differences).



Rate Your PLC Collaborative Teams

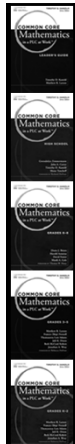
- Take a moment to examine the common assessment continuum.
- Consider your current collaborative teams.
- Rate your teams (I–V) on the continuum.

Common Assessment Continuum - Rate your PLC Collaborative Teams

I	II	III	IV	V
<p>How have these items been used?</p> <p>• How well are students doing on these items?</p> <p>• How do you know?</p>	<p>How have these items been used?</p> <p>• Are the assessments aligned with standards?</p> <p>• Are scores on common assessments used to inform instruction?</p>	<p>How have these items been used?</p> <p>• Are the assessments aligned with standards?</p> <p>• Are scores on common assessments used to inform instruction?</p>	<p>How have these items been used?</p> <p>• Are the assessments aligned with standards?</p> <p>• Are scores on common assessments used to inform instruction?</p>	<p>How have these items been used?</p> <p>• Are the assessments aligned with standards?</p> <p>• Are scores on common assessments used to inform instruction?</p>

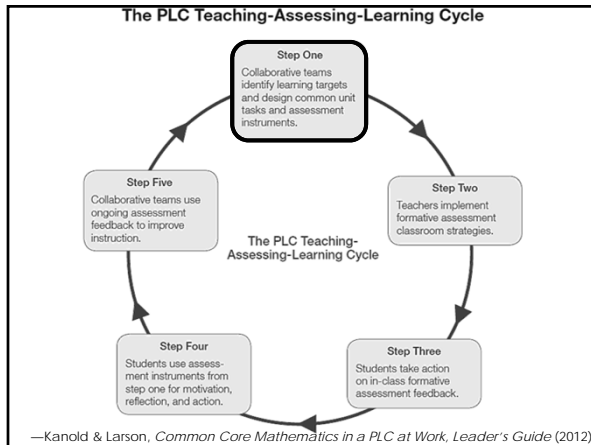
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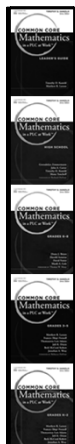
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Your Third Pursuit for Sustainability

Pursue forever a robust **formative assessment process** for students and adults—in response to the surfboards used in your school.

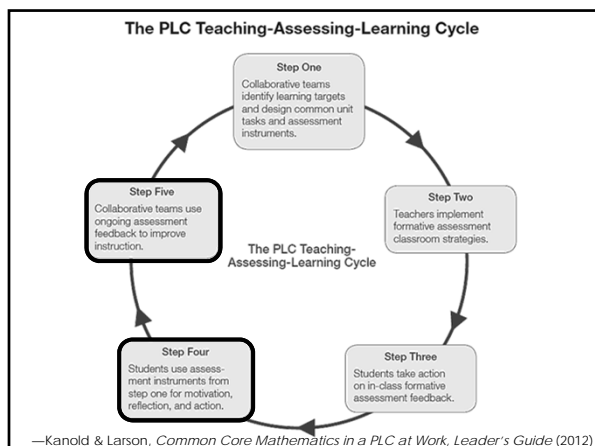




Step 1: Teaching-Assessing-Learning Cycle

On a unit-by-unit basis:

1. Agreement on common content standards and **practice** standards
2. Agreement on common high-quality, high-cognitive-demand tasks
3. Agreement on all common assessment instruments and the scoring of them



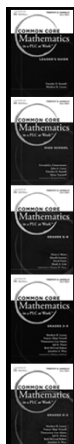
**Step 4:
Teaching-Assessing-Learning Cycle**

Students reflect on successes and focus next-step actions based on evidence of areas of weakness, during and after the unit of study—as the **assessment instrument** is used for formative student learning.

How can this be done in your school or on your team for each unit cycle?

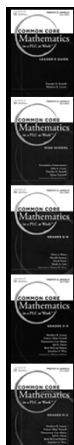
**Step 5:
Teaching-Assessing-Learning Cycle**

Mathematics faculty reflect on successes and focus next-step actions based on evidence of areas of weakness, during and after the unit of study—as the **assessment instrument** is used for formative adult learning.



Your Fourth Pursuit for Sustainability

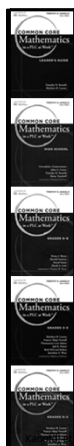
Pursue **instruction planning and design** that provides evidence of student understanding via proficiency in the **Mathematical Practices** during the unit of study ...



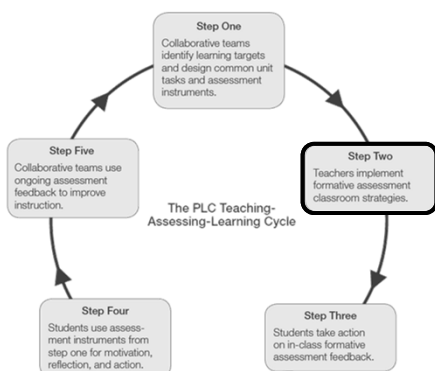
Steps 2 and 3: Teaching-Assessing-Learning Cycle

Daily in-class checks for understanding using the Mathematical Practices.

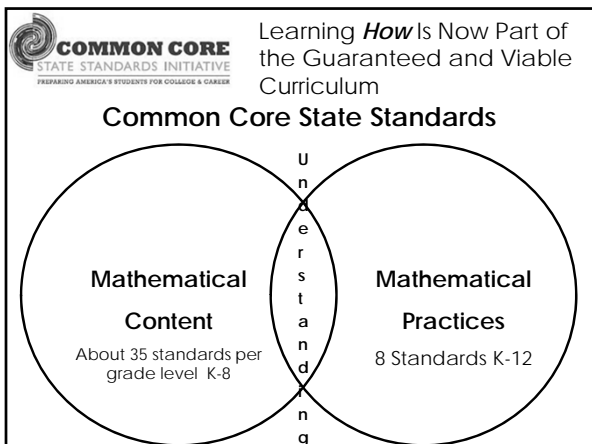


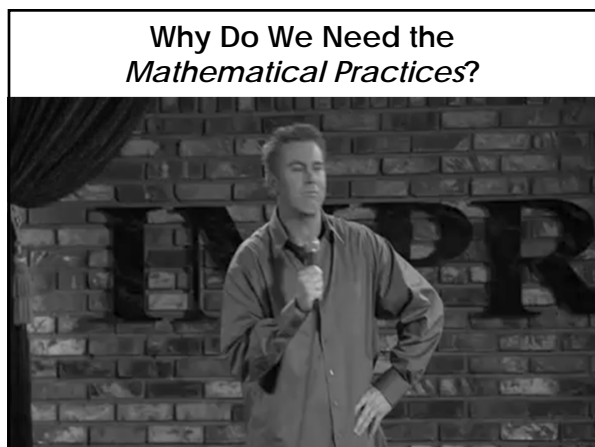


The PLC Teaching-Assessing-Learning Cycle




2012






- Mathematical Practices: U.S.**
1. Make sense of problems and persevere in solving them.
 2. Reason abstractly and quantitatively.
 3. Construct viable arguments and critique the reasoning of others.
 4. Model with mathematics.
 5. Use appropriate tools strategically.
 6. Attend to precision.
 7. Look for and make use of structure.
 8. Look for and express regularity in repeated reasoning.



Standard for Mathematical Practice 3

MP 3 Construct viable arguments and critique the reasoning of others:

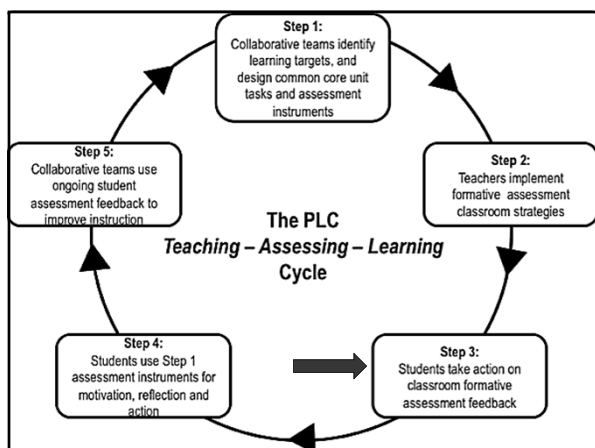
1. Students make conjectures.
2. Students justify their conclusions and communicate them to others.
3. Students compare the effectiveness of two plausible arguments.
4. Students listen and respond to the arguments of others for sense making and clarity.



For Each Common Core Standard for Mathematical Practice ...

Your collaborative teams should answer:

1. What is the intent and why it is important?
2. What teacher actions help to develop this CCSS MP?
3. What evidence exists that students are demonstrating this MP?



Mathematical Practices Are What Students *Do as They Learn Mathematics.*

Turning Vision Into Action

By Timothy Kanold

SUNDAY, APRIL 21, 2013

Finding Formative Assessment while Checking for Understanding!


It's April and that means....

Mathematics educators from across the U.S. and Canada (and parts of the world) come to our national meetings for mathematics. I have been attending the National Council Supervisors of Mathematics (NCSM – mathedleadership.org) and the National Council Teachers of Mathematics (NCTM – nctm.org) meetings every year since 1980. I have colleagues who have been attending as far back as 1961 – but I won't name them here!

The annual meetings provide a time and an opportunity every year for us to refresh and renew in our knowledge development and our relationships with so many mathematics educators and leaders facing the same issues and problems we face in our local schools.


I had the opportunity to speak at both conferences this past week and I am grateful to the many of you that attended those sessions. It means a lot to me and always inspires and surprises me that so many would choose those sessions when there are other wonderful choices as well.

A BRIEF GLIMPSE

 Timothy Kanold
I served as the Director of Mathematics and Science and as Superintendent at Adlai E. Stevenson HSD 125 in Illinois. I am an author for Houghton Mifflin Harcourt and Solution Tree Publishing. Our Common Core - PLC professional development team provides support for school leadership development as well as K-12 mathematics program success.
[View my complete profile](#)

ABOUT THIS BLOG
This blog is dedicated to the improvement of K-12 school mathematics *Teaching and Learning* as well as the leadership growth and development of K-12 School educators and leaders. Primarily focused on ideas that support the growth of teacher and administrator learning teams and the ideals of professional learning communities - that understand the magnified impact on student learning caused by the meaningful and research affirmed work of collaborative teams as the engine that drives the PLC culture.

Caution!



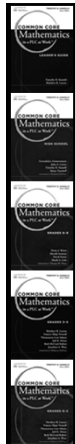
If, during the best teacher-designed moments of classroom formative assessments (checks for understanding and provision of feedback), students **fail to take action** on evidence of continued areas of difficulty ...

... then the teaching-assessing-learning cycle is **stopped** for the student.

Final Thought

Mathematics teachers cannot check for understanding from the front of the classroom.

The 65% rule ...



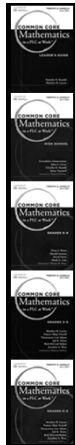
Why Is Your Role as Leader, Teacher, and Collaborator and So Important?

"You have high impact on the front lines as you *snag children in the river of life....*"

—Pulitzer prize winner Tracy Kidder

Timothy D. Kanold
tkanold.blogspot.com





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