



**Carl Vinson
Institute of Government
UNIVERSITY OF GEORGIA**

Georgia K-12 Mathematics Standards Review Process

Citizens Review Committee

Description of Committee Activities and Working Notes
from the December 6, 2019 Meeting

Georgia K-12 Mathematics Standards Review Process

CITIZENS REVIEW COMMITTEE

Description of Committee Activities and Working Notes from the December 6, 2019 Meeting

The meeting was convened by Governor Brian P. Kemp and State School Superintendent Richard Woods, who welcomed the group and provided remarks about the standards review process.

The committee received an orientation about the K-12 Mathematics Standards Review Process, including a rationale for the review, proposed timeline, and overview of the three committees involved in the process, the Citizens Review Committee, Academic Review Committee and Working Committee of Teachers.

- **Citizens Review Committee**: composed of 21 members appointed by the Governor and State School Superintendent, representing parents, students, business leaders, educators and concerned citizens.
 - Roles and Responsibilities:
 - Be a voice - providing feedback, insight and input on behalf of Georgia's students, parents, business leaders and concerned citizens.
 - Articulate the K-12 Mathematics Standards Review Process and the roles of the Academic Review Committee and Working Committee of Teachers.
 - Inform the work of the Working Committee of Teachers by reviewing the results of the stakeholder survey for mathematics, providing feedback and adding key themes or observations about the survey.
 - Review the recommended revisions of the revised standards made by the Working Committee of Teachers and provide feedback.

CITIZENS REVIEW COMMITTEE MEMBERS

Jim Arnold	Jane Robbins
Joseph Cortes	Christopher Sanders
Cori Cain	Teri Sasseville
Andrew Gibbs	Michelle Smith
Stacey Gyorgyi	Walter Stafford
Lisa Marie Haygood	Lori Talbert
Kathy Hildebrand	Samuel Teasley
Jonathan Jones	Grant Thomas
Anne Kaiser	Amy Williams
Isabella Martinez	Barbara Williams
Madeline Price	

- **Academic Review Committee**: composed of 16 members appointed by the Governor and State School Superintendent, representing higher education (Technical College System of Georgia and University System of Georgia), pre-K (Department of Early Care and Learning), business and industry, child development experts and educators.
 - Roles and Responsibilities:
 - Ensure post-secondary readiness
 - Age appropriateness
- **Working Committee of Teachers**: composed of 200 mathematics teachers from across Georgia organized in teams of 8-12 members for each grade level and high school course. Members appointed by the Governor, State School Superintendent, Georgia State Board of Education and Georgia Department of Education.
 - Roles and Responsibilities:
 - Review and revise the current K-12 mathematics standards
 - Make recommendations to the Citizens and Academic Review Committees, State School Superintendent and Georgia State Board of Education.

MATHEMATICS SURVEY 2019

The primary purpose of the December 6, 2019 meeting of the Citizens Review Committee was to inform the work of the Working Committee of Teachers by reviewing the results of the stakeholder survey for mathematics, providing feedback and adding key themes or observations about the survey.

Before delving into the review process, the committee was provided a copy of the survey and background information regarding its development. This included a cursory review and opportunity for clarifying questions for the following survey terms:

- Developmentally appropriate;
- Language terminology that is accessible;
- Clear and concise language terminology;
- Appropriate level of relevance for the age/grade level;
- Balance between the number of standards versus time to teach them;
- Key concepts and skills;
- Cohesive instructional sequence;
- Creativity and autonomy in the classroom;
- Preparation for college, careers and life;
- Level of rigor;
- Emphasis on standards; and,
- Standards drive instruction.

REVIEW OF THE MATHEMATICS SURVEY 2019

Mathematics survey results were organized into six grade/content areas (K-5, 6-8, Algebra I, Geometry, Algebra II, and Pre-Calculus) as posted on the Georgia Department of Education's website behind the tab "Mathematics Results." Members of the Citizens Review Committee were organized into six small groups and assigned one of the grade/content survey results areas. To the extent possible, small groups represented a cross section of stakeholder types (i.e. parents, educators, business, etc.) represented on the committee.

Review Methodology

Each group was provided survey results for the grade/content area assigned as posted on the Georgia Department of Education’s website behind the tab “Mathematics Results.” Survey results were designated as either “parent responses” or “math teacher responses”. Group members were then asked to perform the following tasks.

1.

- Teacher response survey results- Individually review the survey data from mathematics teachers. Then as a group, let the following questions guide your discussion.
 - What does the data suggest?
 - What are assumptions your group can make?
 - Discuss and post your observations on chart paper.
-

2.

- Parent response survey results- Individually review the survey data from parents. Then as a group, let the following questions guide your discussion.
 - What does the data suggest?
 - What are assumptions your group can make?
 - Discuss and post your observations on chart paper.
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3.

- Next, group members were provided for their assigned grade/content area a copy of the document “Key Findings of the Stakeholder Survey on the Georgia Standards of Excellence for Mathematics” as posted on the Georgia Department of Education’s website behind the tab “Key Findings from the Mathematics Survey.” Directions for this activity were as follows: Individually review the “overall trends” and data from the teachers and parents from your content area. Then, as a group discuss the trend data. Are there any similarities/differences between your group’s observations and the trend information? Other reflections?
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4.

- Finally, group members were asked to complete a summarizing activity. Directions were as follows: Based on observations made during the previous three activities, are there “themes” or key points your group would like to pass on to the Working Committee of Teachers? Discuss and post your observations on chart paper.
 - At the conclusion of this activity, each group reported out observations and reflections.
 - Following the reports, committee members were asked to walk around the room to view responses from the six grade/content groups in preparation for the culminating session of the day.
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WORKING NOTES OF THE CITIZENS REVIEW COMMITTEE - MATHEMATICS SURVEY REVIEW

The information in this section presents the observations of the six grade/content groups regarding the four activities described in the section, Review of the Mathematics Survey 2019. *The content was captured as stated from the flip chart paper notes.*

K-5 Math

Teachers

- Only 1 category was over 50% POSITIVE on the survey – that the standards were accessible to the teachers
- Cons:
 - Not enough time to teach/learn
 - Not accessible to parents
 - Creativity/autonomy – stifled
 - Not accessible to students
 - Not developmentally appropriate

Parents

- Accessible to teachers (under 33%)
- Everything else was even lower (same as teachers)
- Cons:
 - Not enough time to teach/learn
 - Not accessible to parents

- Creativity/autonomy stifled
- 57% said not developmentally appropriate
- Not age/grade relevant
- Too rigorous and too much emphasis on standards driven instruction

Themes or Key Points

- Teachers and parents disagree about emphasis on standards. Teachers think it is appropriate and parents think it is too much.
- Parents think standards are developmentally inappropriate.
- Teachers seemed to think standards are developmentally appropriate, but too “rigorous”? How can that be? It is contradictory.
- How long have teachers been teaching? Pre Common Core or after?

6-8 Math

Teachers

- Not enough time to teach – last 2 weeks are for standardized tests
- No Internet drives access for parents/students
- Process/delivery different for the same math concepts
- Teachers are trained – not parents
- Basics not present at middle school – add, subtract, rulers, measures
- One size fits all, not enough time to remediate and assist
- Writing is not needed
- No groups – lifting peers
- Rigor not grade appropriate

Parents

- Not enough time
- No small groups/levels
- Rigor is not grade relevant
- Aligns with teachers in many places
- Teaching to the test, not to mastery
- Missing full 12 years of math exposure
- Cramming 14 years of content into 12

Themes or Key Points

- More time needed for deeper comprehension
- Focus on grade level rigor that is developmentally appropriate
- Writing not needed
- Not prepared for life
- Missing 12 years of full math exposure
- Creative early learning

- New processes aren't necessary – hurt kids, fail to involve and equip families
- Testing too early, results not utilized
- Need more groups/differentiated learning

Algebra I

Teachers

- Time to teach
- Accessibility to Internet access – technology and bandwidth
- Rigor* is too hard and age appropriate
- Creativity and autonomy
- Real life experience embedded into standards (need examples)

Parents

- Seeing the same frustrations as the teachers
- Standards not easily accessible to parents – knowing how to navigate the GADOE site
- Time to learn
- Creativity and autonomy
- Preparing for life and career
- Rigor* too hard
- Too much emphasis on recall of standards, not the application of them

Themes or Key Points

- Parents and teachers seeing the same frustration
- Creativity and autonomy is limited based on time to teach
- Out of 470 parents, there were only two positive aspects about the standards:
Accessibility to teachers and preparing students for college

*A note about the term “rigor”- It is assumed the survey had no definition of rigor and it is very possible, if not probable that parents misunderstood what they were being asked. The traditional definition of rigor would suggest that the standard expects students to study hard and know a lot. However, parents might have interpreted the term to mean the standard requires highly confusing and complex math processes that are unnecessary and in conflict with the much more efficient standard algorithms. That understanding might have led parents to criticize the level of rigor- not because they don't want their children challenged, but because they don't want them needlessly confused and frustrated.

Geometry

Teachers

- More than half don't think it's accessible to parents
- More than 70% say there's not enough time to teach the current standards
- About half say this does not prepare them for life or careers
- About half say curriculum prepares students for college

Parents

- 72% say there's not enough time to teach and learn this
- More than 70% say it's not accessible to parents and doesn't prepare them for life/college
- More than half said too much emphasis on standards and standards drive instruction

Themes or Key Points

- Nearly 2/3 of teachers thought it was age appropriate and developmentally appropriate, parents think the exact opposite
- Both groups agree curriculum does not foster creativity and autonomy
- Both groups agreed there's not enough time to teach/learn
- Rigor results not in line with rest of survey

Algebra II

Teachers

- Positives
 - Developmentally appropriate
 - Accessibility to teachers
 - Preparation for college
- Negatives
 - Time
 - Accessibility to parents
 - Preparation for life
- Is there too much push to pass the tests?
- Rigor is OK, emphasis on standards is OK
- Standards drive – of course

Parents

- Positives
 - Accessibility to teachers
 - Developmentally appropriate
 - Preparation for college is tied to accessibility to students

- Negatives
 - Time
 - Preparation for life
 - Overall impact tied with clear and conciseness
- Felt very strongly that there was:
 - Too much rigor
 - Too much emphasis on standards
- Is it too much rigor or did they not get the foundation?

Themes or Key Points

- Need a question to reveal process versus learning
- Parents and teachers are aligned except for questions 5-7

Pre-Calculus

Teachers

- Assume not all math teachers answered this – only those who felt comfortable analyzing pre-calculus standards
- Overwhelming majority said not enough time to learn it – not enough time for repetition – “Covering a standard is not teaching it”
- Huge problem: connecting teacher assessment to test scores – panic to cover everything
- “Creativity” in math? Good if it allows teachers to choose best way to get material across
- Georgia standards should be designed to allow normal kids to get to calculus (not pre-calculus) by senior year. If they don’t, they can’t go to elite schools. So start Algebra I in 8th grade

Parents

- By this level, most parents are less able to assess – they trust teacher to know how to do it
- Pre-calculus is rigorous by definition – designed as a college-prep course – so serious kids take it
- Good for standards to drive instruction if they are good standards
- Survey shows general unhappiness with pre-calculus, but is that because kids didn’t get an A? Or kids weren’t prepared in lower grades?

Themes or Key Points

- There are great standards out there that are proven – we don’t need to reinvent the wheel

STAKEHOLDER GROUPS

For the culminating activity of the day, committee members were asked to “self-select,” organizing themselves into one of three stakeholder groups: parents/students, business/government and educators.

- Directions:
 - Taking into consideration the information you have heard and seen today and *thinking about preparing students to apply mathematical knowledge beyond high school graduation*, list observations you would want the Working Committee of Teachers to know **from your stakeholder group’s perspective**. This information might reemphasize an observation made during the day or there could be a new observation.
 - Write observations on chart paper.

At the conclusion of this activity, each group reported out observations and reflections.

WORKING NOTES OF THE CITIZENS REVIEW COMMITTEE- STAKEHOLDER GROUPS

The information in this section presents the observations of the three stakeholder groups regarding the culminating activity of the day. *The content was captured as stated from the flip chart paper notes.*

Stakeholder Group: Business and Government

- Flexibility
- Traditional methods and creativity
- Are they mastering basic concepts to be ready for college/work?
- Has the brain changed due to technology – should teaching practices change?
- Give us thoughtful feedback on what works and doesn't work

Stakeholder Group: Parents and Students

- Caution with equipping new teachers and parents on new standards
- Transitional plan for veteran teachers as well
- Total dump of current standards –meaning the current standards should not be used as the template to which revisions will be made, but rather to use another set of pre-Common Core standards(such as from MA or IN) as the first draft and merely customize those for GA. The sense of the review committee is that it is critical not to merely nibble around the edges of Common Core, but to make a clean sweep and replace CC with proven math standards.
- Adopt/adapt successful standards (i.e. Massachusetts pre-common core, Indiana, and Minnesota) and market it with a Georgia flair - “Georgia Grown/Georgia Owned”
- Small group collaboration is important – peer tutoring
- Mastery before moving on
- Trade and tech preparation
- Relevancy of math for all content areas to promote critical thinking
- Teach standard algorithm first
- Math taught across the board
- Stress accurate calculation rather than process

Stakeholder Group: Educators

- Standards need to be fewer, simpler, more concise (age and grade appropriate)
- Equip with basic tools through memorization of basic arithmetic facts
- Make sure students are mastering basic skills instead of teachers “teaching to the test (Georgia Milestones Assessment System)
- Emphasize the importance of using pre Common Core standards (Massachusetts et. al.) as a starting point for revision, and the critical step of re-training teachers in the application of the new standards that are eventually created. Teachers teaching teachers in small groups is the single most effective way to implement the professional development aspect.

APPENDIX A

This section contains documents and/or reflections committee members shared after the December 6, 2019 meeting.

What is RIGOR in MATHEMATICS?

Kathy S. Hildebrand

Citizen Review Committee

It seems to me that there is **much talk**, and **little real communication**, about the amount of rigor that we have or should have in our math education standards. I think the reason some of us think there is too much, and others not enough (even though our committee is, overall, likeminded in our goals) is because we are operating under 3 different definitions of the term “rigorous” as it relates to math ed.

1. Many seemed to use “rigor” (erroneously, I think) as a synonym for “difficult.”
2. Common Core advocates tend to see “rigor” as a step away from mere memorization toward “thinking, analyzing, understanding, applying.”
3. I personally believe the traditional use of the word in math ed is all about “proving” or mathematically justifying every step of your solution or proof.

Common Core: Below is a quote taken from: <https://www.origoeducation.com/blog/rigor-in-math/>
“What Is **Rigor in Math**? The Common Core State Standards for **math** (CCSSM) clearly states that **rigor in math** includes a balance of **procedural skills/fluency, conceptual understanding, and application.**”
Jun 19, 2019

The CC emphasis is purportedly on establishing a balance between the following:

PROCEDURAL SKILLS/FLUENCY: **HOW?**

CONCEPTUAL UNDERSTANDING: **WHY?**

APPLICATION: **WHEN?**

While I heartily agree that there should be a balance and that all 3 of these are crucial to develop, I personally think that CC does not devote the time/effort to the necessity of establishing a strong “HOW”/skills foundation by having students truly mastering the arithmetic facts/skills to a degree that they are “fluid” (2nd nature) to them. The ability to add, subtract, multiply, and divide integers, fractions, and decimals is basic to EVERY elementary student. Yes, they will need them to negotiate any future math concepts/classes they happen to encounter, but more importantly, they will need them to negotiate life itself. Whether you want to go to trade school or are on a grad-school track and want to be an engineer, the first step in math is to build this firm arithmetic foundation. You cannot rush through the hard & mundane work of learning these facts in the name of “understanding” or “creativity.” You cannot whiz by them so you have time for “creative” group projects or countless mandated tests. Teach the basics by using the traditional algorithm. And yes, you may want to teach an alternate method or two to those who have mastered one way to do something and who are interested and motivated to get to the same solution another way. Presenting another approach can be an enriching and fascinating exercise to good students, but presenting 6 ways to do something to a student who still hasn’t mastered the first way is a sure way to overwhelm and discourage that student. Problem solving and creative thinking are certainly crucial in math, but students are done a disservice if they have to use up their

mental energy on trying to “figure” 6×7 every time he/she faces that math fact rather than simply knowing without thinking at all that it is 42. Save their problem-solving energy for the many upcoming problems that actually require such energy.

Traditional:

*This definition is what I, as an undergrad and graduate math education major, have always understood “mathematical rigor” to mean. And, being defined as such, I believe it to be an essential part of mathematics. That is, at least in secondary mathematics, you cannot have too much rigor, any more than you can have too much evidence at a trial. Rigor is why math is a science and not a collection of opinions. It makes math reliable, worthwhile, even enjoyable.

***Mathematical rigor** usually refers to the degree to which a mathematical argument (or, more formally, a mathematical [proof](#)) is [logically](#) valid and sound. Mathematical rigor is the axiomatic approach that pervades each statement of a [theory](#) together with its proof.

A **mathematical theory** is a set of **principles** and **consequences of the principles** which allows one to organize the knowledge in a systematic fashion.

Taken from: https://math.wikia.org/wiki/Mathematical_rigor

Speaks of “useful knowledge”

(That is, you have to HAVE knowledge before you can use it.)

A few more thoughts on the idea of RIGOR:

I have been a math student (who loved and was challenged/fascinated by math, though it did not always “come easy” to me).

I have also been an upper level high school math teacher (who was tasked with teaching students who loved math and those who hated it, those who excelled in it and those who failed it miserably, those who understood the concepts and wanted to press on to learn new ones and those who were overwhelmed and discouraged every step of the way).

I think it’s unfortunate that CC has taught too many ways of doing simple arithmetic calculations before the students have mastered one. I also think there is a “newer-ways-are-always-better-ways” mentality that is not only arrogant, but erroneous. Subtraction can/should still be taught with the old “borrowing” algorithm, and students “get it.” Yes, the students should also be taught, as we all were so many years ago, about the units/tens/hundreds/etc. places and why borrowing works. But bottom line;

they need to know how to subtract. And it's a good thing for their parents to be able to help them do it.

But I do not want to throw the baby out with the Common Core bath water. I do think it's important to cultivate a WHY mentality in our students -- a "prove-it-to-me" culture in math, especially as you proceed to Algebra and beyond. That is, I agree with the CC folks that you should NOT just throw the distance formula at a student and tell them to use it, without first showing them that it's actually just a very useful application of the Pythagorean Theorem. So yes, derive the formula first; then you have the right to use it. But my earlier point is that you have to start somewhere. That is, before you use Pythagoras to derive the distance formula, you actually have to prove the Pythagorean Theorem. And back you go to the beginning. You have to start somewhere. Another great Algebra example is the use of the quadratic formula to solve 2nd degree equations. Any good algebra teacher would first teach the factoring method. But when quadratics are not factorable, they would proceed to "completing the square" (rigorously giving a reason justifying each step). Then I might give just enough "complete the square" homework problems to make them see how cumbersome this would be if you had to do it every time you encountered a non-factorable quadratic. THEN... I would take a generic quadratic and together DERIVE the quadratic formula by completing the square for ANY future quadratic equation. NOW they have earned the right to use the formula. And the good news is that, if they ever forget it, they can derive it again because they now know where it came from.

To: Russ Cook, Carl Vinson Institute via email
From: Teri Sasseville, Georgians to Stop Common Core
Re: Common Core Citizen Review Panel,
ADDITIONAL OBSERVATIONS

Date: January 5, 2020
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The exercises the Citizen Review Panel engaged in at our initial meeting on December 6 were helpful, but did not yield a comprehensive review of what is currently missing, developmentally inappropriate, or out of sequence in the current standards, nor what is needed in Georgia's new math standards.

World class mathematicians have analyzed the Common Core and identified specific math processes that are out of sequence, or are left out, altogether. Those analyses are readily available online and would probably prove extremely helpful to the writing committee.

I gave a copy of one document containing some of this information to Matt Jones at the meeting on December 6. I hope our Georgia writing team will have access to some of the established analyses available, identifying the shortcomings of Common Core math and suggested corrections, as they address new standards. (This document was developed as a template by the group tasked with ending Common Core in Florida). Pages 7-9 deal very specifically with math concepts that are excluded or out of sequence in Common Core standards:

Recommendations with Documentation for Ending the Common Core/Florida Standards in Mathematics and English

<http://www.flstopccoalition.org/files/E0AB8B1E-5539-452A-88C4-CC7BE080FF20--970AB8BA-A96E-48B2-8497-8E0AA8DF44C3/recommendtions-for-fl-common-core-executive-order.pdf>

THESE ARTICLES MIGHT ALSO BE HELPFUL:

How States Can Fix Math Education Post-Common Core <https://thenationalpulse.com/commentary/states-fix-math-education-post-common-core/?fbclid=IwAR2unqim5dUPNYZhJNeyzJ6AtvMExRv8SZ78B76KrYvRxZwAaLRuk86s73M>

One of the most outspoken critics of Common Core is mathematician and math professor emeritus at Stanford University, **Dr. James Milgram**. Dr. Milgram served on the validation committee for Common Core, but declined to endorse the standards. He makes the following statement about what students need to be taught:

"In Kindergarten through 8th grade, there are a number of basic—absolutely crucial—parts of mathematics that are introduced which are going to be important all the way through college. Through calculus, and then through differential equations, and then through real statistics and data analysis. So you have certain key topics that you have

to carefully teach all the way to real mastery in these early grades. These key subjects include fractions and above all ratios, rates, percentages, and proportions. If students manage to learn these basic topics, and learn them so well that they can use them on-demand and do everything that's expected of them, this will last them well past calculus. Those items represent the majority of things they really need."

From **What's Wrong with U.S. Math Education? An Interview with Stanford Mathematician Jim Milgram** <https://www.reasoningmind.org/blog/2016/09/28/an-interview-with-james-milgram/?fbclid=IwAR1aIa7YQIDBoy1mLJ7MwdBLCu9EeJ9Jv1wWY0qubCd72tpTJDXXfmzZueI>

Re: Parent and Student Stakeholder Group Report:

"Total dump of current standards."

The Parent/Student group made this unambiguous recommendation that reflects the desires of Governor Kemp and Supt. Woods

As one who has observed the attempted exits of several states from Common Core over the years, I would recommend that the writing teams be advised that **Common Core standards (or GSE) should not be used for comparison or reference in any way during this re-writing process.** Writers should not access them on mobile devices or use them in any way as a guideline in this process. Otherwise, Georgia could end up with another re-write of Common Core!

"Georgia Owned and Georgia Grown"

While "*Georgia grown and Georgia owned*," are important factors in the process, it is also important not to force our teachers and students into another *untested* set of standards, as Common Core is. Georgia needs to adapt evidence-based standards with a track record that reflects high student achievement, to the specific needs of Georgia's students. *The pre-Common Core Massachusetts, Indiana, Minnesota, Washington, and California standards* were mentioned, as model frameworks on which to consider basing new Georgia Standards.

"Small group collaboration/peer tutoring"

I don't think this falls under the category of 'standards' Not sure this should be included in this report.

"Teach Standard Algorithm first"

This should be a priority! Students need a foundation in math facts and concepts. Standards should start with the standard algorithm and math concepts should be introduced in a developmentally appropriate sequence.

New Georgia Math Standards should not focus on unnecessarily complicated math processes or ELA exercises explaining those processes. This aspect of the common core needs to be removed!

"Stress accurate calculation rather than process [or explanation]."

New standards should not focus on teaching processes, but on teaching students how to do accurate calculations. No subjective ELA writing component should be injected into math.

Special Education was not discussed in this meeting, but it is of special interest to me and it needs to be addressed in the context of Common Core.

Special education students should no longer be required to be taught or given standardized tests based on grade level standards. This practice needs to go away with the Common Core.

Special needs students should go back to having IEPs that are not standardized. And their math performance should be considered on the merits of their math skills, not on the basis of their often compromised language/communication skills.



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