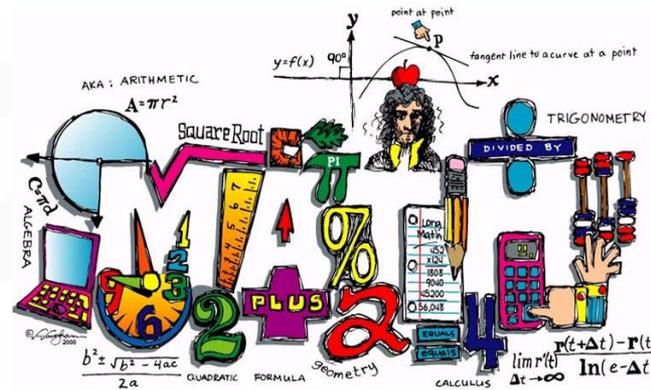


Mathematics Update: Resources and Tools for Teachers and Leaders in Georgia



Brooke Kline and Lya Snell
 Mathematics Program Specialists
 Georgia Department of Education
 April 2018



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
ga.gov
gaedoe.org

Purpose

Big Idea 1: Purpose

Ensure all students learn at high levels

Teachers should ask and answer these four questions when planning instruction:

- ✓ *What is it we want our students to learn?*
- ✓ *How will we know if our students are learning?*
- ✓ *How will we respond when students do not learn?*
- ✓ *How will we enrich and extend the learning for students who are proficient?*

Georgia Department of Education

What is it we want our students to learn?



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
ga DOE.org

- Georgia Standards of Excellence
 - Coding... MGSE...
- www.georgiastandards.org

Georgia Department of Education

College Readiness Mathematics



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
ga DOE.org

- CRM is designed for students who have been successful in the first three courses but have struggled and need additional support in preparation for enrollment in non-STEM post-secondary study.
- CRM meets the 4th course requirements for High School graduation purposes and has been approved by USG as a 4th course beyond Algebra II or Advanced Algebra for non-STEM majors.
- NCAA has not approved CRM as an additional mathematics course or as a course that can be included in the "additional course" area.
- CRM resources are available on georgiastandards.org.
- Through a partnership with SREB, CRM Summer Professional Learning is being offered in Macon on June 12 – 14, 2018.

Technical College Readiness Mathematics



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"

gadoe.org

- TCRM is designed to solidify content assessed on the Technical College System of Georgia's placement assessment – ACCUPLACER.
- Students must meet the enrollment criteria outlined in the Frequently Asked Question document <http://bit.ly/2BegjzN>.
- While districts' strategic waivers can offer the flexibility to include this course for mathematics graduation requirements for a very specialized population of students, the course needs to be marketed as an alternative to Algebra II/Advanced Algebra ONLY for students who have experienced difficulty in passing middle school mathematics End of Grade (EOG) assessments, have struggled significantly in the first one or two high school core mathematics courses, and have scored less than 34 on the Arithmetic ACCUPLACER Placement Test.
- By completing TCRM and attaining the required ACCUPLACER score, students will be able to take advantage of the Senate Bill 2 option associated with Dual Enrollment.
- TCRM resources developed by Hall County are available through TRL.

What is it we want our students to learn?



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
gaode.org

- Georgia Standards of Excellence
 - Coding... MGSE...
- www.georgiastandards.org

Georgia Department of Education



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
ga.gov
gaedoe.org

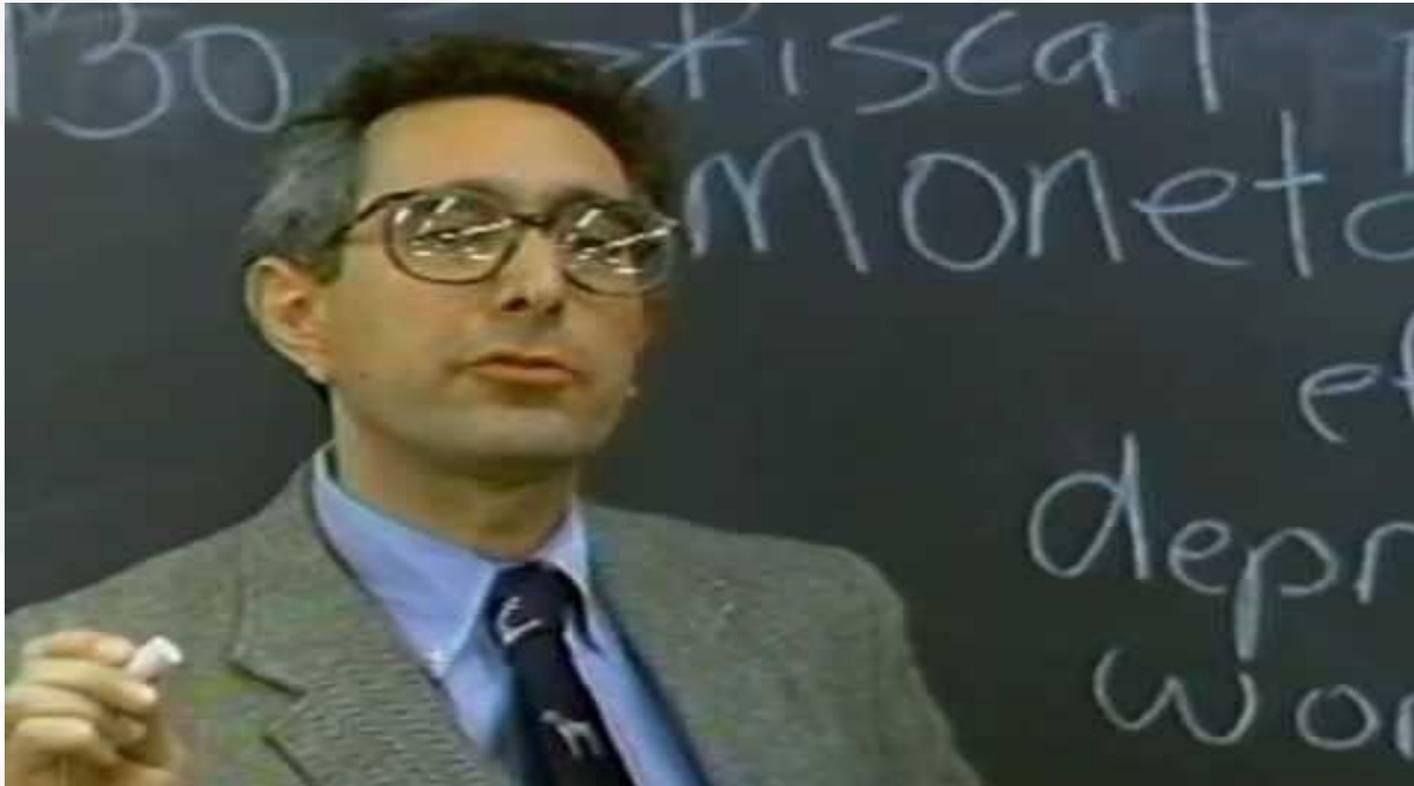
How will we know if our students are learning?

Georgia Department of Education

Remember When...



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
ga DOE.org





Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
gaDOE.org

Focus on the 8 Overarching Standards for Mathematical Practice

Georgia Department of Education

There are 8 important
Standards for Mathematical
Practice
that should be incorporated in
daily lessons to help students
develop the critical-thinking
and problem solving skills
necessary for success in their
post-secondary college and
career plans.

The 8 Standards for Mathematical Practice are:

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

Why SMPs?



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
ga DOE.org

“The Standards for Mathematical Practice describe ways in which developing student practitioners of the discipline of mathematics increasingly ought to engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle and high school years.”

—*Georgia Standards of Excellence for Mathematics*

Georgia Department of Education



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
gaDOE.org

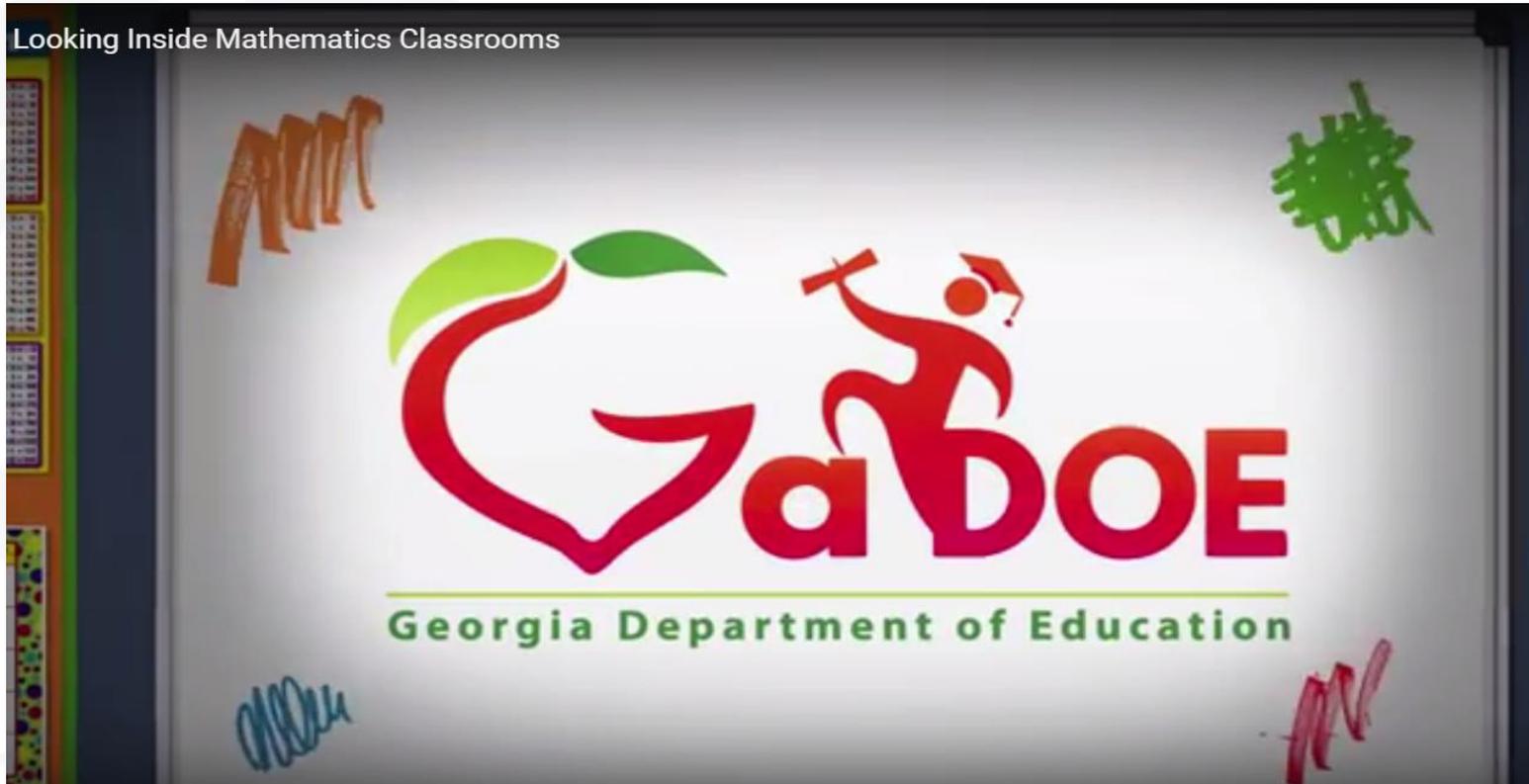
How do we transform our current classrooms into content-rich, engaging mathematics learning laboratories?

Georgia Department of Education

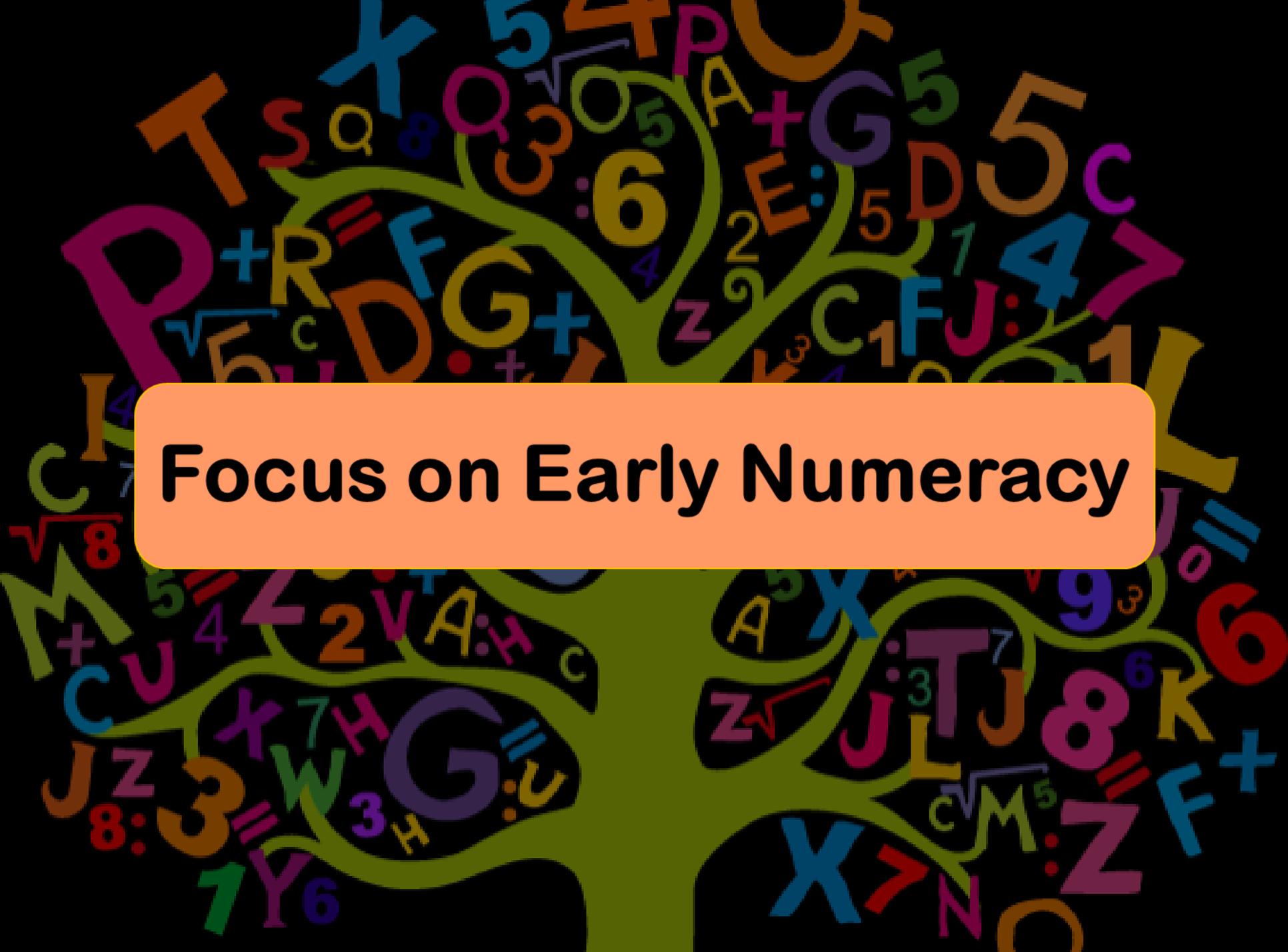
Instructional Practices Video



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
ga DOE.org



Website: <https://www.georgiastandards.org/Georgia-Standards/Pages/Looking-Inside-Mathematics-Classrooms.aspx>



Focus on Early Numeracy



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
ga.gov
gaedoe.org

Math Anxiety

- Timed Tests create an unhealthy anxiety for mathematics learners.
- *Research suggests timed tests cause math anxiety*
Jo Boaler, Stanford University

<https://bhi61nm2cr3mkdgk1dtaov18-wpengine.netdna-ssl.com/wp-content/uploads/2017/03/nctm-timed-tests.pdf>



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
ga.gov
gaDOE.org

Number Talks

- Number Talks is an effective strategy to help students develop a solid foundation in numeracy.

$$9 + 1$$

$$9 + 2$$

$$9 + 3$$

$$9 + 4$$

$$4 + 1$$

$$4 + 2$$

$$4 + 4$$

$$4 + 5$$

$$4 + 6$$

The Importance of Number Talks

Dr. Jo Boaler, Stanford University



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
gadoe.org





**FOCUS ON
CONCEPTUAL
UNDERSTANDING**



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
ga.gov
gaedoe.org

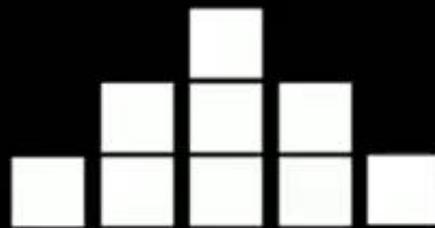
How do you learn mathematics?



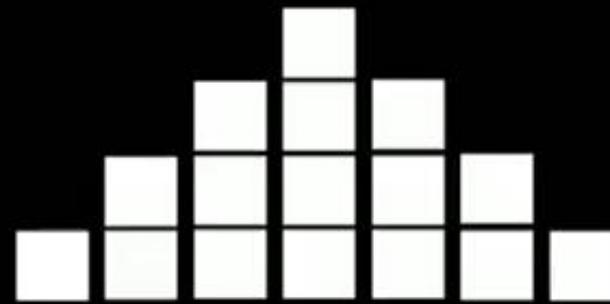
How do you see the shapes growing?



Case 1



Case 2



Case 3



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
[gadoe.org](http://ga.gov/gadoe)

Math Pattern Task

- Where can teachers go to get this type of supporting resources?
 - <http://www.mathtalks.net/>
 - <http://www.visualpatterns.org/>

Math Talks

- Math Talks is an effective strategy to help students conceptually understand the mathematics and communicate with other students

Pattern Talks

- Pattern Talks is also an effective strategy to help students see the beautiful interconnectedness of mathematical ideas to help make sense of the concepts.



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
gaode.org

Now let's look at what this looks like in the classroom based on the Georgia Standards of Excellence

Georgia Department of Education

Misconception



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
ga DOE.org

***Have you ever heard...
"Teaching the
frameworks provided by
the DOE are for the
Advanced kids."***

Georgia Department of Education

Misconception



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
ga DOE.org

***Have you ever heard...
"Our kids can't think
that way. It's too hard
for them."***

Georgia Department of Education

Misconception



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
gaode.org

***Have you ever heard...
“We use our textbook,
but our students are
not being successful.”***

Georgia Department of Education

NEW



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
gaode.org

Video Resources Available to Help Teachers Understand the Standards

www.georgiastandards.org

Georgia Department of Education

**How will
we
respond
when
students
do not
learn?**

Formative Assessment Lessons
(FALs)

GoFar

K-5 Intervention Tables

6-8 Remediation Resources

Foundations of Algebra
Interventions for Numeracy



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
ga DOE.org

**How will
we enrich
and extend
the
learning
for
students
who are
proficient?**

Extension activities embedded in the
Mathematics Frameworks

Additional Resources:

- [Illustrative Mathematics](#)
- [Graphing Stories](#)
- [Open Middle Problems](#)
- [3-Act Tasks](#)
- [Estimation 180](#)
- [101 questions](#)



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
gadoe.org

RESOURCES

Georgia Department of Education



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
gadoe.org

What resources can teachers use to teach the Georgia Standards of Excellence?

- Georgia Standards (GSO) – www.georgiastandards.org
- Grade Level Wikis
- Georgia Virtual School Open Source Material
<http://www.gavirtualllearning.org/Resources.aspx>
- GADOE Website: Curriculum Resources & Assessment Resources www.gadoe.org

Georgia Virtual Learning – FREE Resources



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
gaDOE.org

The screenshot shows a web browser window with the URL www.gavirtualllearning.org/Resources.aspx. The page header includes the Georgia Virtual Learning logo (Georgia Department of Education) and a navigation menu with links for PROGRAMS, STUDENTS, EDUCATORS, PARENTS, and RESOURCES. A search icon is also present. Below the navigation is a large image of several colorful books. The main content area is titled "Available Content" and is divided into three sections:

- Shared Resources**: Includes links for "Shared Resource Catalog" and "New Courses - Fall 2015".
- eSources Resources**: Includes links for "eSource Course Catalog" and "New Courses - Fall 2015".
- Shared**: Describes content available for anyone to view, aligned with Georgia Performance Standards. Includes a "Click here" link and a ReadSpeaker logo.
- eSource**: Describes content available to Georgia public schools by application only. Includes a "Click here for an application" link.

The eSource section also notes that the content includes complete courses aligned to Georgia Performance Standards, created using Softchalk Lesson Building software.

Georgia Department of Education



Richard Woods,
Georgia's School Superintendent
"Educating Georgia's Future"
ga.doe.org

Georgia DOE Math Team

Mr. Brooke Kline
Mathematics Program Specialist
Bkline@doe.k12.ga.us
Voicemail: (404) 657-9064

Lya R. Snell, Ph.D.
Mathematics Program Specialist
lsnell@doe.k12.ga.us
Voicemail: (404) 463-7087

Georgia Department of Education