What is the Same? What is Different?

Source: Brian Bushart
Where can I find the recording for this RLC?
To access the Remote Learning Chats (RLCs)...
2020 Remote Learning Chats

Starting the School Year: Developing Strong Relationships While Teaching Mathematics Conceptually

Click on the links below to view the Recordings and Presentations:
- K-5 RLC Starting the School Year
- K-5 RLC Starting the School Year Slide Deck
- 6-8 RLC Starting the School Year
- 6-8 RLC Starting the School Year Slide Deck
- High School RLC Starting the School Year
- High School RLC Starting the School Year Slide Deck

Mathematics Content Professional Learning

Click on the links below to view the Recordings and Content Presented:
- K-2 RLC Mathematics Content
- K-2 RLC Mathematics Content Slide Deck
- 3-5 RLC Mathematics Content Slide Deck
- 6-8 RLC Mathematics Content
- 6-8 Mathematics Content Slide Deck
- High School RLC Mathematics Content
- High School RLC Mathematics Content Slide Deck
GADOE Mathematics Resources
# Over 1300 Curated K-12 Remote Learning Resources

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2020 Guides for Effective Mathematics Instruction

Created to support schools during the COVID-19 pandemic, these mathematics toolkits provide Georgia's teachers and leaders with strategies to identify gaps in learning and evidence-based practices to address the identified gaps.

Click this icon for the grade level or course toolkit which includes an example diagnostic assessment, evidence-based practices, and a sample learning plan.

Click this icon for the grade level or course exemplar learning plan that models synchronous, asynchronous, and offline strategies to address learning gaps.
2020 Guide for Effective Mathematics Instruction

- **Big Idea**: Essential Knowledge and Skills
- **Success**: Formative and Summative Assessments
- **Examine**: Exemplar Diagnostic Tasks
- **Teach**: Grade Level/Course Specific Guidance
- **Link**: Research-Based Instructional Strategies

*Richard Woods, Georgia’s School Superintendent | Georgia Department of Education | Educating Georgia’s Future*
## Essential Knowledge and Skills for Mathematics

### High School

For a complete understanding of the essential knowledge and skills for Mathematics, read the Mathematics CCGE in its entirety.

The 88 Standards for Mathematical Practices should be integrated throughout all units of study and lessons.

### Coordinate Algebra (and CA Support)
- Integrate relationships between quantitative and geometric models.
- Analyze, graph, and solve linear equations and inequalities in one variable.
- Solve systems of linear equations and interpret solutions in context.
- Write, interpret, and use expressions and equations based on linear and exponential relationships.
- Use function notation to analyze, graph, interpret, compute, and compare linear and exponential relationships.
- Use regression analyses and descriptive statistics to interpret data.
- Integrate linear models.
- Experiment with transformations at this plane.
- Verify geometric similarity of figures in the coordinate plane using algebraic thinking, including interpreting distance as a sum of parallel and perpendicular sides.

### Analytic Geometry (and AG Support)
- Analyze and solve quadratic functions and use quadratic models to interpret relationships.
- Develop an understanding of congruence in terms of rigid motions.
- Use similarity and congruence to prove theorems.
- Apply similarity in right triangles to understand right triangle trigonometry.
- Investigate, geometric constructions.
- Use properties of angles and triangles to verify algebraic expressions and equations.
- Use functional relationships to analyze, graph, and interpret quadratic functions.
- Derive, model, and apply equations of circles.
- Model problems using circles and without coordinates.
- Find and analyze volume of solid figures.
- Verify geometric relationships of figures in the coordinate plane using algebraic thinking, including interpreting distance as well as slopes of parallel and perpendicular lines.

### Advanced Algebra (and AA Support)
- Draw inferences and conclusions based on data.
- Extend the laws of exponents to rational exponents.
- Analyze, solve, and interpret quadratic equations with complex solutions.
- Write, interpret, and use expressions, equations, and inequalities based on quadratic, polynomial, rational, radical, exponential, and logarithmic relationships.
- Graph different types of functions.
- Interpret the average rate of change of a function.

### Algebra I (and AI Support)
- Interpret relationships between quantitative and geometric models.
- Analyze, graph, and solve linear equations and inequalities in one variable.
- Solve systems of linear equations and interpret solutions in context.
- Use properties of rational and irrational numbers to verify expressions involving square roots to solve problems.
- Write, interpret, and use expressions and equations based on linear, exponential, and quadratic relationships.
- Analyze and solve quadratic functions and use quadratic models to interpret and solve problems.
- Use function notation to analyze, graph, interpret, and compare linear, exponential, and quadratic functions.
- Use regression analyses and descriptive statistics to interpret data.

### Geometry (and Geo Support)
- Develop an understanding of independence and conditional probability to solve problems.
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- Draw inferences and conclusions based on data.
- Extend the laws of exponents to rational exponents.
- Analyze, solve, and interpret quadratic equations with complex solutions.
- Write, interpret, and use expressions, equations, and inequalities based on quadratic, polynomial, rational, radical, exponential, and logarithmic relationships.
- Graph different types of functions.
- Interpret the average rate of change of a function.

### Algebra II (and AI Support)
- Draw inferences and conclusions based on data.
- Extend the laws of exponents to rational exponents.
- Analyze, solve, and interpret quadratic equations with complex solutions.
- Write, interpret, and use expressions, equations, and inequalities based on quadratic, polynomial, rational, radical, exponential, and logarithmic relationships.
- Graph different types of functions.
- Interpret the average rate of change of a function.
Anticipating Student Thinking

Interpreting Algebraic Expressions

1. Write an algebraic expression for each of the following:
   a. Subtract 2 from the product of 3 and \( b \).
   b. Subtract 2 from \( b \) and then multiply by 3.
   c. Divide \( b \) by 3 and then add 2.
   d. Divide the sum of \( b \) and 2 by 3.
   e. Square the product of 3 and \( b \).
   f. Multiply \( b \) by \( b \) and then multiply by 3.
## Evidence-Based, Research-Based Practices

### Evidence-Based Practices Overview

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Planning for Instruction

- Engage
- Explore
- Apply
- Reflect

- Synchronous
- Asynchronous
- Unplugged/offline

Instructional Design

Many of these activities have been adapted from an Illustrative Mathematics lesson titled, “Equivalent Equations”. Found here: https://curriculum.illustrativemathematics.org/HS/teachers/1/2/6/preparation.html

Engage

(include an evidence-based instructional strategy that can be used as an introduction that mentally engages students to capture their interest, provides an opportunity to communicate what they know, and allow them to connect what they know to new ideas)

- Synchronous: Presented like a Number Talk, write an equation on the board and have students think of an equivalent equation. They should be encouraged to remain quiet and think of multiple equivalent equations so that all students have time to think about their responses. Example: $6x + 9 = 12$. Responses might include: $2x + 3 = 4$, $3x + 4.5 = 6$, etc. After a few minutes, the teacher can record their responses and allow students to self-correct, listen to each other, and share strategies for finding equivalent equations. Extension: Ask students how they might represent the equation without using any numbers (i.e. pictorial representation). How do you know these equations are equivalent?

- Asynchronous
Using a tool such as Flipgrid, present an equation to the students and instruct them to respond with an equivalent equation. They should then respond to a classmate with questions about their strategy, comments about how their equations are similar or different, an explanation of how their equations are equivalent, etc.

- Unplugged/Offline
Consider having students keep a journal for daily math entries. The prompt for this day could be: Given the following equation, write as many equivalent equations as you can. How do you know when two equations are equivalent? How do you know when two equations are NOT equivalent? Support your response with at least three examples.

Explore

(include an evidence-based instructional strategy that allows students to engage in hands-on activities to explore the new concept/big idea at a deep level)

- Synchronous – SeeSaw 3-Act task by Graham Fletcher. Click here to read more about 3-Act tasks as a strategy for engaging students in more conceptual learning of mathematics.

- Asynchronous – The SeeSaw 3-Act task has been reworked into an online Desmos activity, click here.

- Unplugged/Offline – The SeeSaw 3-Act task has been adapted into an offline activity. Students can complete the activity like a worksheet. It would be great to encourage dialogue between the different questions, to whatever degree you have the ability to facilitate with your students.
NEW Resources

Back-to-School Resources

This toolkit was created for each grade level and course to support mathematics classroom teachers with the implementation of best practices in the remote learning environment. This was specifically created to support teaching professionals during the 2020 COVID-19 era.
NEW Resources

**embedded in each grade level guide**

Distance Learning Resources
Sample learning plans with exemplar diagnostic assessments, evidence-based practices, resources, plugged and unplugged activities, and ideas for differentiation and acceleration for each grade and course.
Integrated Instructional Supports for All Students

Integrated Instructional Supports for All Students provides resources for students, families, and teachers curated and developed by our Curriculum and Instruction Content Integration Specialists. A dedicated team member in each content area works with our Special Education Services and Supports to inform and coordinate efforts as we strive to educate the Whole Child.

New Resources

The Georgia Department of Education’s Content Integration Specialists are pleased to release content (Social Studies, ELA, Math, and Science) specific resources to serve the needs of all students participating in distance/virtual learning.

Getting Ready for K-3rd Guides

- As part of Georgia Home Classroom, the Georgia Department of Education (GaDOE) has identified key skills for children getting ready for kindergarten through third grade. These skills will help families understand what children have already learned and can expect to learn when they get back to school.

Contact Information

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Equity Instructional Planning Look For Document

• This document is to assist teachers in evaluating their lessons for equity during the planning process.

• This document can be found in the Teacher Resource Link (TRL) essential tool kit in the need to know bucket.

• It can also be found at the following link Look Fors document.
QUESTIONS????
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WE ARE HERE TO SERVE YOU!

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Important Websites to Obtain Additional Information

www.gadoe.org/mathematics Georgia Mathematics Program Updates  
www.edweb.net Professional Learning Communities  
www.georgiastandards.org Curriculum Resources