

# Georgia's K-12 Mathematics Standards Transition Support Guide

This document provides transition information and support for the initial year of implementation of Georgia's K-12 Mathematics Standards.

## TEACHER SUPPORT RESOURCE



# Georgia's K-12 Mathematics Standards

## Transition Support Guidance for Initial Implementation (2023-2024 SY)

The purpose of this document is to identify mathematics concepts and skills which have shifted from one grade level or course to a previous grade level or course with the adoption of Georgia's K-12 Mathematics Standards. A summary table is provided for each grade level and high school course. Additional details related to the standard alignment, rationale, and suggested clustering of concepts can be found for each grade level and course.

- **Kindergarten**
- **1<sup>st</sup> Grade**
- **2<sup>nd</sup> Grade**
- **3<sup>rd</sup> Grade**
- **4<sup>th</sup> Grade**
- **5<sup>th</sup> Grade**
- **6<sup>th</sup> Grade**
- **7<sup>th</sup> Grade**
- **8<sup>th</sup> Grade**
- **Algebra: Concepts & Connections**
- **Geometry: Concepts & Connections** (*for students who took GSE Coordinate Algebra*)
- **Geometry: Concepts & Connections** (*for students who took GSE Algebra I*)
- **Advanced Algebra: Concepts & Connections**
- **Precalculus**
- **High School 4<sup>th</sup> Course Options**

### Key Reference Documents :

[Standards Documents](#) | [Explanation of Changes Documents](#) | [Curriculum Maps](#)

**As you engage with the new standards, please consider the following key points:**

- Use the progressions, age appropriateness guardrails, decomposition of the standards through learning objectives or expectations, and evidence of student learning in all grade levels.
- Explore the embedded ways to help students master the fundamentals in numeracy development and reasoning in K-5 and build upon that foundation in 6-12.
- Build relevant pathways through the big ideas to engage students based on a foundation of part-whole reasoning and flexible thinking.
- Allow students using multiple strategies and approaches to solve problems based on what works best for them. There should be a strong communication of flexibility in strategy selection and approaches to solving mathematical problems.
- Promote the use of mathematical reasoning and sense-making through research-based, effective mathematics teaching practices in all grade levels and courses.
- Make mathematics learning fun and engaging while helping learners see the connection between mathematics and real-life phenomena.
- Use formative and summative assessment results to provide push in supports and continue to provide enriching learning opportunities using evidence-based interventions, resources and supports for learner variability.

# KINDERGARTEN THROUGH 5<sup>TH</sup> GRADE

## SUMMARY OF TRANSITION MATERIAL FOR YEAR 1 IMPLEMENTATION

The table below provides a summary of additional content that should be included during the initial implementation year(s) for the new mathematics standards; however, greater details, explanations, and specific standards references are provided on each grade level page. Click on each grade level for a detailed explanation of the additional mathematical topics to be woven into that course during the initial implementation year.

Grade Level	2023 - 2024
<b>Additional content to be included during initial implementation year:</b>	
<a href="#"><u>KINDERGARTEN</u></a>	<ul style="list-style-type: none"> <li>Place emphasis on intentionally incorporating mathematical modeling throughout all lessons aligned with all standards. (<a href="#">Mathematical Modeling Framework</a>)</li> <li>Place emphasis on intentionally incorporating the four-step statistical reasoning process. (<a href="#">Statistical Reasoning Framework</a>)</li> <li>Provide opportunities for students to explain, extend, and create repeating patterns with a repetition, not exceeding 4, and describe patterns involving the passage of time as a part of the new Patterning and Algebraic Reasoning big idea.</li> </ul>
<a href="#"><u>1<sup>st</sup> GRADE</u></a>	<ul style="list-style-type: none"> <li>Place emphasis on intentionally incorporating mathematical modeling throughout all lessons aligned with all standards. (<a href="#">Mathematical Modeling Framework</a>)</li> <li>Place emphasis on intentionally incorporating the four-step statistical reasoning process. (<a href="#">Statistical Reasoning Framework</a>)</li> <li>Provide opportunities for students to identify, describe, extend, and create repeating patterns, growing patterns, and shrinking patterns Patterning and Algebraic Reasoning big idea.</li> </ul>
<a href="#"><u>2<sup>nd</sup> GRADE</u></a>	<ul style="list-style-type: none"> <li>Place emphasis on intentionally incorporating mathematical modeling throughout all lessons aligned with all standards. (<a href="#">Mathematical Modeling Framework</a>)</li> <li>Place emphasis on intentionally incorporating the four-step statistical reasoning process. (<a href="#">Statistical Reasoning Framework</a>)</li> <li>Incorporate elapsed time (1.MDR.6) – include within Unit 7.</li> <li>Provide opportunities for students to identify, describe, extend, and create repeating patterns, growing patterns, and shrinking patterns Patterning and Algebraic Reasoning big idea.</li> </ul>
<a href="#"><u>3<sup>rd</sup> GRADE</u></a>	<ul style="list-style-type: none"> <li>Place emphasis on intentionally incorporating mathematical modeling throughout all lessons aligned with all standards. (<a href="#">Mathematical Modeling Framework</a>)</li> <li>Place emphasis on intentionally incorporating the four-step statistical reasoning process. (<a href="#">Statistical Reasoning Framework</a>) Elapsed Time (1.MDR.6 and 2.MDR.6) – include within Unit 5</li> <li>Incorporate lines of symmetry (2.GSR.7) – include within Unit 7.</li> </ul>
<a href="#"><u>4<sup>th</sup> GRADE</u></a>	<ul style="list-style-type: none"> <li>Place emphasis on intentionally incorporating mathematical modeling throughout all lessons aligned with all standards. (<a href="#">Mathematical Modeling Framework</a>)</li> <li>Place emphasis on intentionally incorporating the four-step statistical reasoning process. (<a href="#">Statistical Reasoning Framework</a>)</li> <li>Include lines of symmetry (2.GSR.7 and 3.GSR.6) – include within Unit 6</li> </ul>
<a href="#"><u>5<sup>th</sup> GRADE</u></a>	<ul style="list-style-type: none"> <li>Place emphasis on intentionally incorporating mathematical modeling throughout all lessons aligned with all standards. (<a href="#">Mathematical Modeling Framework</a>)</li> <li>Place emphasis on intentionally incorporating the four-step statistical reasoning process, specifically 5.MDR.7 – include within Unit 2. (<a href="#">Statistical Reasoning Framework</a>)</li> <li>Add mean (whole numbers and fractional values as data points) (5.MDR.7) – include within Unit 2</li> </ul>

New concepts have been added to all K-12 grade levels to specifically focus on [Mathematical Modeling](#) and [Statistical Reasoning](#). A specific emphasis on these concepts should begin during the initial implementation year to establish a strong foundation to carry the concepts through subsequent years.

## MIDDLE SCHOOL (6 - 8)

### SUMMARY OF TRANSITION MATERIAL FOR YEAR 1 IMPLEMENTATION

The table below provides a summary of additional content that should be included during the initial implementation year(s) for the new mathematics standards; however, greater details, explanations, and specific standards references are provided on each grade level page.

Click on each grade level for a detailed explanation of the additional mathematical topics to be woven into that course during the initial implementation year.

Grade Level	2023-2024
	Additional content to be included during initial implementation year:
<a href="#">6<sup>th</sup> GRADE</a>	<ul style="list-style-type: none"><li>• Mean as a Measure of Center, <i>visually and conceptually</i> (6.NR.1 &amp; 6.NR.2) – include within Unit 1 AND Unit 2</li><li>• Place emphasis on intentionally incorporating mathematical modeling throughout all lessons aligned with all standards. (<a href="#">Mathematical Modeling Framework</a>)</li><li>• Place emphasis on intentionally incorporating the four-step statistical reasoning process. (<a href="#">Statistical Reasoning Framework</a>)</li></ul>
<a href="#">7<sup>th</sup> GRADE</a>	<ul style="list-style-type: none"><li>• Mean Absolute Deviation, <i>conceptually</i> (7.PAR.4) – include within Unit 3</li><li>• Slope (7.PAR.4) – include within Unit 1</li><li>• Place emphasis on intentionally incorporating mathematical modeling throughout all lessons aligned with all standards. (<a href="#">Mathematical Modeling Framework</a>)</li><li>• Place emphasis on intentionally incorporating the four-step statistical reasoning process. (<a href="#">Statistical Reasoning Framework</a>)</li></ul>
<a href="#">8<sup>th</sup> GRADE</a>	<ul style="list-style-type: none"><li>• Mean Absolute Deviation, <i>conceptually</i> (8.FGR.6) – include within Unit 3</li><li>• Slope (7.PAR.4) – include within Unit 2</li><li>• Place emphasis on intentionally incorporating mathematical modeling throughout all lessons aligned with all standards. (<a href="#">Mathematical Modeling Framework</a>)</li><li>• Place emphasis on intentionally incorporating the four-step statistical reasoning process. (<a href="#">Statistical Reasoning Framework</a>)</li></ul>

New concepts have been added to all K-12 grade levels to specifically focus on [Mathematical Modeling](#) and [Statistical Reasoning](#). A specific emphasis on these concepts should begin during the initial implementation year to establish a strong foundation to carry the concepts through subsequent years.

# HIGH SCHOOL

## SUMMARY OF TRANSITION MATERIAL FOR YEAR 1 IMPLEMENTATION

The table below provides a summary of additional content that should be included during the initial implementation year(s) for the new mathematics standards; however, greater details, explanations, and specific standards references are provided on each grade level page.

Click on each course name for a detailed explanation of the additional mathematical topics to be woven into that course during the initial implementation years.

Course	2023 – 2024	2024 – 2025
<b>Additional content to be included during initial implementation years:</b>		
<a href="#"><u>Algebra: Concepts &amp; Connections</u></a>	<ul style="list-style-type: none"> <li>• Mean Absolute Deviation, <i>conceptually</i> (6.NR.2) – include within Unit 7</li> <li>• Expressions and Linear Equations (8.PAR.3 &amp; 8.PAR.4) – include within Unit 1</li> <li>• Solving Linear Inequalities (8.PAR.3) – include within Unit 2</li> <li>• Graphing Linear Functions (8.FGR.5) – include within Unit 4</li> <li>• Parallel and Perpendicular Lines (8.FGR.7) – included within Unit 8</li> </ul>	
<a href="#"><u>Geometry: Concepts &amp; Connections</u></a> <i>(for students who completed GSE Coordinate Algebra)</i>	<ul style="list-style-type: none"> <li>• Rational and Irrational Numbers (A.NR.5) – include within Unit 1</li> <li>• Quadratic Expressions and Equations (A.PAR.6) – include within Unit 1</li> </ul>	
<a href="#"><u>Geometry: Concepts &amp; Connections</u></a> <i>(for students who completed GSE Algebra I)</i>	<ul style="list-style-type: none"> <li>• Parallel and Perpendicular Lines (8.FGR.7) – included within Unit 2</li> <li>• Perimeter and Area (A.GSR.3) – include within Unit 2</li> </ul>	
<a href="#"><u>Advanced Algebra: Concepts &amp; Connections</u></a>	<ul style="list-style-type: none"> <li>• Rational and Irrational Numbers (Square Roots and Cube Roots (A.NR.5) – include within Unit 3</li> <li>• Quadratic Expressions and Equations (A.PAR.6) – include within Unit 4</li> <li>• Standard Deviation, <i>conceptually</i> (A.DSR.10) – include within Unit 1</li> <li>• Operations with Polynomials (G.PAR.2) – include within Unit 4</li> </ul>	<ul style="list-style-type: none"> <li>• Standard Deviation, <i>conceptually</i> (A.DSR.10) - include within Unit 1</li> </ul>
<a href="#"><u>Precalculus</u></a>	<ul style="list-style-type: none"> <li>• Linear Algebra and Matrices (AA.PAR.6) – include within Unit 5</li> <li>• Trigonometry &amp; The Unit Circle (AA.GSR.7) – include within Unit 2</li> </ul>	
<a href="#"><u>All 4<sup>th</sup> Core Mathematics Course Options</u></a>	<ul style="list-style-type: none"> <li>• See table on page 30 for summary information</li> </ul>	

New concepts have been added to all K-12 grade levels to specifically focus on [Mathematical Modeling](#) and [Statistical Reasoning](#). A specific emphasis on these concepts should begin during the initial implementation year to establish a strong foundation to carry the concepts through subsequent years.

# KINDERGARTEN TRANSITION INFORMATION

**The following additional content should be included in kindergarten during the initial implementation year (2023-2024).**

New concepts have been added to kindergarten with a focus on Mathematical Modeling and Statistical Reasoning. A specific emphasis on these concepts should begin during the initial implementation year to establish a strong foundation to carry the concepts through subsequent years.

## MATHEMATICAL MODELING

### Mathematical Modeling

- In Kindergarten, students apply mathematics to real-life situations and model real-life phenomena using:
  - relationship between numbers and
  - quantities up to 20,
  - counting and cardinality,
  - count sequences within 100,
  - place value understanding to compose
  - and decompose numbers 11-19,
  - numbers up to 20,
  - addition and subtractions within 10,
  - repeating patterns and time intervals,
  - physical and measurable attributes and
  - analysis of graphical displays of data,
  - two- and three- dimensional shapes

## DATA AND STATISTICAL REASONING

### Data and Statistical Reasoning

- As students engage with K.MDR.7, students should be provided with multiple learning experiences to create statistical investigative questions that can be answered by collecting, analyzing, and interpreting data with up to 10 data points.
- Students should be provided with multiple learning experiences to develop statistical investigative questions, collect, and organize their data with guidance. In Kindergarten, students should be able to use friendly language to explain their data and answer the overall question.
- Students should be able to display their data using objects and pictures. In later grades, students will represent data in pictographs and bar graphs. Limit category counts to be less than or equal to ten.

## PATTERNING AND ALGEBRAIC REASONING

The patterning and algebraic reasoning (PAR) big idea is a new concept being introduced as a part of the K-12 progression. Students should be able to explain, extend, and create repeating patterns with a repetition, not exceeding 4, and describe patterns involving the passage of time as a part of the new Patterning and Algebraic Reasoning big idea. The patterns related to time in Kindergarten should also be integrated with the Social Studies standard (SSKH3).

# FIRST GRADE TRANSITION INFORMATION

**The following additional content should be included in Grade 1 during the initial implementation year (2023-2024).**

New concepts have been added to first grade with a focus on Mathematical Modeling and Statistical Reasoning. A specific emphasis on these concepts should begin during the initial implementation year to establish a strong foundation to carry the concepts through subsequent years.

## MATHEMATICAL MODELING

- In 1st grade, students apply mathematics to real-life situations and model real-life phenomena using:
  - the count sequence to 100,
  - values to 120,
  - addition and subtraction within 20,
  - repeating, growing, and shrinking
  - patterns using operations and shapes,
  - composition of shapes,
  - attributes of shapes,
  - additions and subtraction within 100,
  - intervals of length and time, and
  - denominations of money.

## DATA AND STATISTICAL REASONING

- As students engage with 1.MDR.6, students should be provided with multiple learning experiences to create a statistical investigative question that can be answered using data involving numerical values within 20. Students should be able to collect, analyze, and interpret categorical data presented as picture graphs and bar graphs (with single-unit scales) with up to three categories from actual situations to answer the question posed.
- Students formulate a statistical investigative question to explore a realistic situation in their classroom. Students gather data from a variety of sources to answer the statistical investigative question posed. Students organize the data collected, represent the data on a table, and ask questions about the data generated. This expectation is limited to data with up to three categories presented in tables and charts.
- Students use tally marks and numerical values within 20 to organize and represent data. Students summarize the number of tally marks in each category.
- Students analyze and interpret categorical data on a provided pictograph or bar graph to answer the formulated statistical investigative question. On a picture graph, one symbol stands for a value of 1 at this grade level.

## PATTERNING AND ALGEBRAIC REASONING

- The patterning and algebraic reasoning (PAR) big idea is a new concept being introduced as a part of the K-12 progression. In first grade, students should be able to extend their understanding of patterns introduced through GSE to identifying, describing, extending, and creating repeating patterns, growing patterns, and shrinking patterns.



## SECOND GRADE TRANSITION INFORMATION

The following additional content should be included in Grade 2 during the initial implementation year (2023-2024).

New concepts have been added to second grade with a focus on Mathematical Modeling and Statistical Reasoning. A specific emphasis on these concepts should begin during the initial implementation year to establish a strong foundation to carry the concepts through subsequent years.

### MATHEMATICAL MODELING

- In 2<sup>nd</sup> grade, students should be provided with ongoing opportunities to apply mathematics to real-life situations and model real-life phenomena.

### DATA AND STATISTICAL REASONING

- As students engage with 2.MDR.6, students create statistical investigative questions that can be answered using data. Students collect, analyze, and interpret categorical data presented as picture graphs and bar graphs (with single-unit scales) with up to four categories from real situations to answer questions.
- Students should formulate a statistical investigative question to explore an authentic situation in their classroom.
- Students should collect data through the use of surveys and scientific observations and organize data using tables, tally marks, pictographs, and bar graphs representing a data set with no more than four categories.
- Students solve simple join, separate, and compare problems using information presented.

### PATTERNING AND ALGEBRAIC REASONING

- The patterning and algebraic reasoning (PAR) big idea is a new concept being introduced as a part of the K-12 progression. Students should be able to extend their understanding of patterns introduced through GSE to identifying, describing, extending, and creating repeating patterns, growing patterns.

### MEASUREMENT & DATA REASONING

The following content standards should be included in 2<sup>nd</sup> grade to ensure a smooth transition to the new standards for students.

#### Elapsed Time (1.MDR.6)

- 1.MDR.6** Use appropriate tools to measure, order, and compare intervals of length and time, as well as denominations of money to solve real-life, mathematical problems and analyze graphical displays of data to answer relevant questions.
- A specific learning objective for this standard will need to be addressed in second grade during the initial implementation year in connection with other learning objectives included in the specified unit of study for Grade 2.
  - 1.MDR.6.2** Tell and write time in hours and half-hours using analog and digital clocks and measure elapsed time to the hour on the hour using a predetermined number line. (*GSE Alignment: MGSE3.MD.1*)
    - Important Details:** This begins the progression of time and elapsed time in elementary school. Elapsed time is new for Grade 1 and Grade 2; therefore, during the initial implementation year, students in Grades 2 and 3 will need to be introduced to this idea.
    - This content should be included within **Unit 7: *Measuring Time and Money*** for Grade 2. This content can be taught in an integrated way while addressing standard 2.MDR.6 content in second grade to ensure a smooth transition of the new standards implementation.

The image below provides a visual for the additional content added to the suggested curriculum map for Grade 2.

Georgia's K-12 Mathematics Standards - GRADE 2 (INITIAL IMPLEMENTATION YEAR)				
Semester 2				
Unit 5	Unit 6	Unit 7	Unit 8	Unit 9
Representing Sums and Differences within 1,000	Exploring Geometry and Patterns	Measuring Time and Money	Reasoning with Equal Groups	Culminating Capstone Unit
<b>4 - 5 weeks</b>	<b>3 - 4 weeks</b>	<b>2 - 3 weeks</b>	<b>3 - 4 weeks</b>	<b>1 - 2 weeks</b>
2.NR.2 2.NR.1 2.PAR.4 2.MDR.5 2.MP.1-8	2.GSR.7 2.PAR.4 2.NR.2 2.MDR.5 2.MP.1-8	1.MDR.6 2.MDR.6 2.NR.2 2.PAR.4 2.MDR.5 2.MP.1-8	2.NR.3 2.PAR.4 2.NR.2 2.MP.1-8	ALL STANDARDS  2.MP.1-8

## THIRD GRADE TRANSITION INFORMATION

The following additional content should be included in Grade 3 during the initial implementation year (2023-2024).

New concepts have been added to third grade with a focus on Mathematical Modeling and Statistical Reasoning. A specific emphasis on these concepts should begin during the initial implementation year to establish a strong foundation to carry the concepts through subsequent years.

### MATHEMATICAL MODELING

- In 3<sup>rd</sup> grade, students should be provided with ongoing opportunities to apply mathematics to real-life situations and model real-life phenomena.

### DATA AND STATISTICAL REASONING

- As students engage with 3.MDR.5, students create statistical investigative questions that can be answered using data. Students collect, analyze, and interpret numerical and categorical data involving whole number values obtained from real situations to answer questions.
- Students solve problems involving the reading of bar graphs, pictographs, and dot plots, as well as measurements in ounces and pounds.
- Students gather data from a variety of sources to answer the statistical investigative question posed.
- Students explore data sets for categorical data which include several categories and determine the scales of the pictographs, bar graphs, and dot plots based on the data collected.
- Students create and analyze pictographs where one symbol may stand for a value greater than 1 which allows students to apply their understanding of single digit multiplication and division facts. Students use a ruler that is marked at halves and fourths only to create an evenly spaced number line for the dot plot.

### MEASUREMENT & DATA REASONING

The following content standards should be included in 3<sup>rd</sup> grade to ensure a smooth transition to the new standards for students.

#### Elapsed Time (1.MDR.6)

- **1.MDR.6** Use appropriate tools to measure, order, and compare intervals of length and time, as well as denominations of money to solve real-life, mathematical problems and analyze graphical displays of data to answer relevant questions.

A specific learning objective for this standard will need to be addressed in third grade during the initial implementation year in connection with other learning objectives included in the specified unit of study for Grade 3.

- **1.MDR.6.2:** Tell and write time in hours and half-hours using analog and digital clocks, and measure elapsed time to the hour on the hour using a predetermined number line. (*GSE Alignment: MGSE3.MD.1*)
  - **Important Details:** This begins the progression of time and elapsed time in elementary school. Elapsed time is new for Grade 1 and Grade 2; therefore, during the initial implementation year, students in Grades 2 and 3 will need to be introduced to this idea.
  - This content should be included within **Unit 5: Two-Step Problems and Time** for Grade 3. This content can be taught in an integrated way while addressing standard 3.MDR.5 content in third grade to ensure a smooth transition with the new standards implementation. This content will not be assessed on the End of Grade Georgia Milestones Assessment for Grade 4.

- **2.MDR.6** Solve real-life problems involving time and money.

A specific learning objective for this standard will need to be addressed in third grade during the initial implementation year in connection with other learning objectives included in the specified unit of study for Grade 3.

- **2.MDR.6.1** Tell and write time from analog and digital clocks to the nearest five minutes, and estimate and measure elapsed time using a timeline, to the hour or half hour on the hour or half hour. (*GSE Alignment: MGSE3.MD.1*)
  - **Important Details:** This extends the progression of time and elapsed time in elementary school from the concept established in Grade 1. Elapsed time is new for Grade 1 and Grade 2; therefore, during the initial implementation year, students in Grades 2 and 3 will need to be introduced to this idea.
  - This content should be included within **Unit 5: Two-Step Problems and Time** for Grade 3. This content can be taught in an integrated way while addressing standard 3.MDR.5 content in third grade to ensure a smooth transition with the new standards implementation.

<b>GEOMETRIC &amp; SPATIAL REASONING</b>
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The following content standards should be included in 3<sup>rd</sup> grade to ensure a smooth transition to the new standards for students.

**Lines of Symmetry (2.GSR.7)**

- **2.GSR.7** Draw and partition shapes and other objects with specific attributes and conduct observations of everyday items and structures to identify how shapes exist in the world.

A specific learning objective for this standard will need to be addressed in third grade during the initial implementation year in connection with other learning objectives included in the specified unit of study for Grade 3.

- **2.GSR.7.2** Identify at least one line of symmetry in everyday objects to describe each object as a whole. (*GSE Alignment: MGSE4.G.3*)
  - **Important Details:** This learning objective begins the progression of symmetry in elementary school. Therefore, during the initial implementation year, students in Grades 3 and 4 will need to be introduced to this idea.
  - This content should be included within **Unit 7: Connecting Length, Perimeter, and Area** for Grade 3. This content can be taught in an integrated way while addressing standard 3.GSR.6 content in third grade to ensure a smooth transition with the new standards implementation. This content will not be assessed on the End of Grade Georgia Milestones Assessment for Grade 3.

Georgia's K-12 Mathematics Standards - GRADE 3 (INITIAL IMPLEMENTATION YEAR)				
Semester 2				
Unit 5	Unit 6	Unit 7	Unit 8	Unit 9
Two-Step Problems and Time	Fractions as Numbers	Connecting Length, Perimeter, and Area	Two-Dimensional Shapes	Culminating Capstone Unit
<b>3 - 4 weeks</b>	<b>4 – 5 weeks</b>	<b>3 - 4 weeks</b>	<b>2 - 3 weeks</b>	<b>1 - 2 weeks</b>
1.MDR.6 2.MDR.6 3.PAR.2 3.PAR.3 3.MDR.5 3.MP.1-8	3.NR.4 3.MP.1-8	2.GSR.7 3.GSR.7 3.GSR.8 3.PAR.3 3.MDR.5 3.MP.1-8	3.GSR.6 3.MP.1-8	ALL STANDARDS  3.MP.1-8

## FOURTH GRADE TRANSITION INFORMATION

The following additional content should be included in Grade 4 during the initial implementation year (2023-2024).

New concepts have been added to fourth grade with a focus on Mathematical Modeling and Statistical Reasoning. A specific emphasis on these concepts should begin during the initial implementation year to establish a strong foundation to carry the concepts through subsequent years.

### MATHEMATICAL MODELING

- In 4<sup>th</sup> grade, students should be provided with ongoing opportunities to apply mathematics to real-life situations and model real-life phenomena.

### DATA AND STATISTICAL REASONING

- As students engage with 4.MDR.6, students create statistical investigative questions that can be answered using data. Students should be provided with numerous learning experience where they collect, analyze, and interpret data from real situations to answer questions using dot plots displaying numerical data to the nearest  $\frac{1}{8}$  of a unit. Through various learning experiences, students should be able to measure objects found in everyday life to collect data and use rulers to measure to the nearest  $\frac{1}{8}$ .
- Students should be able to determine the difference between representations for categorical data and numerical data presented.
- Students record observations they notice about the shape of the distribution using informal language such as spread out and/or grouped.

### GEOMETRIC & SPATIAL REASONING

The following content standards should be included in 4<sup>th</sup> grade to ensure a smooth transition to the new standards for students.

#### Lines of Symmetry (2.GSR.7)

- **2.GSR.7** Draw and partition shapes and other objects with specific attributes, and conduct observations of everyday items and structures to identify how shapes exist in the world.

A specific learning objective for this standard will need to be addressed in fourth grade during the initial implementation year in connection with other learning objectives included in the specified unit of study for Grade 4.

- **2.GSR.7.2** Identify at least one line of symmetry in everyday objects to describe each object as a whole. (*GSE Alignment: MGSE4.G.3*)
  - **Important Details:** This learning objective begins the progression of symmetry in elementary school. Therefore, during the initial implementation year, students in Grades 3 and 4 will need to be introduced to this idea. This content will not be assessed on the End of Grade Georgia Milestones Assessment for Grade 4.
  - This content should be included within **Unit 6: Reasoning with Shapes** Grade 4. This content can be taught in an integrated way while addressing standard 4.GSR.8 content in fourth grade to ensure a smooth transition with the new standards implementation.
- **3.GSR.6** Identify the attributes of polygons, including parallel segments, perpendicular segments, right angles, and symmetry.

A specific learning objective for this standard will need to be addressed in fourth grade during the initial implementation year in connection with other learning objectives included in the specified unit of study for Grade 4.

- **3.GSR.6.3** Identify lines of symmetry in polygons. (*GSE Alignment: MGSE4.G.3*)
  - **Important Details:** This learning objective begins the progression of symmetry in elementary school. Therefore, in the initial implementation year, students in Grades 3 and 4 will need to be introduced to this idea.

- This content should be included within **Unit 6: Reasoning with Shapes** Grade 4. This content can be taught in an integrated way while addressing standard 4.GSR.8 content in fourth grade to ensure a smooth transition with the new standards implementation. This content will not be assessed on the End of Grade Georgia Milestones Assessment for Grade 4.

The image below provides a visual for the additional content added to the suggested curriculum map for Grade 4.

Georgia's K-12 Mathematics Standards - GRADE 4 (INITIAL IMPLEMENTATION YEAR)			
Semester 2			
Unit 4	Unit 5	Unit 6	Unit 7
Investigating Fraction and Decimals	Building Conceptual Understanding of Angle Measurement	Reasoning with Shapes	Culminating Capstone Unit
<b>7 - 8 weeks</b>	<b>5 - 6 weeks</b>	<b>4 - 5 weeks</b>	<b>2 - 3 weeks</b>
4.NR.4 4.NR.5 4.MDR.6 4.MP.1-8	4.GSR.7 4.MP.1-8	2.GSR.7 3.GSR.6 4.GSR.8 4.MP.1-8	ALL STANDARDS 4.MP.1-8

## FIFTH GRADE TRANSITION INFORMATION

The following additional content should be included in Grade 5 during the initial implementation year (2023-2024).

### MATHEMATICAL MODELING

- In 5<sup>th</sup> grade, students should be provided with ongoing opportunities to apply mathematics to real-life situations and model real-life phenomena using:
  - the four operations with whole numbers and addition and subtraction of decimals and fractions,
  - numerical expressions, numerical patterns, and ordered pairs in the first quadrant of the coordinate plane,
  - customary and metric measurements,
  - analysis of graphical displays of data,
  - polygons, and
  - volume of right rectangular prisms.

### DATA AND STATISTICAL REASONING

- As students engage with 5.MDR.7, students create statistical investigative questions that can be answered by using quantitative (numerical) and categorical data. Students determine strategies for gathering data to answer questions. Students collect, analyze, and interpret data presented on dot plots and bar graphs from real situations to answer questions about the data distribution, spread, and center.
- Students generate questions about things they notice and wonder from an authentic situation. Based on the posed question(s), students create a plan that determines the appropriate population to survey and how to collect that data.
- Students collect and analyze both numerical data and categorical data from a variety of sources.
- Students create dot plots (line plots) with measurements in fractions of a unit ( $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{8}$ ).
- Students begin developing the concept of measures of center, which they will continue to explore in sixth grade. The mean formula is not an expectation in fifth grade. Instead, students explore the concept of mean visually and conceptually.
- **5.MDR.7** Solve problems involving customary measurements, metric measurements, and time and analyze graphical displays of data to answer relevant questions.
  - **5.MDR.7.2** Ask questions and answer them based on gathered information, observations, and appropriate graphical displays to solve problems relevant to everyday life. (*GSE Alignment: MGSE6.SP.3*)
    - **Important Details:** This learning objective begins the progression of analyzing measures of center as a foundation of future work studied in secondary grade levels. Therefore, during the initial implementation year, students in Grades 5 and 6 will need to be introduced to this concept.
    - This content should be developed for students through **Unit 2: Building Conceptual Understanding of Place Value Using Measurement and Data Reasoning** in Grade 5.
    - Special attention should be taken to ensure students develop a strong, visual, and conceptual understanding of mean in fifth grade to ensure a smooth transition with the new standards implementation in Grade 6 and beyond. The use of the mean formula is not an expectation in this grade level.

## SIXTH GRADE TRANSITION INFORMATION

The following additional content should be included in Grade 6 during the initial implementation year (2023-2024).

**MEASUREMENT & DATA REASONING**

**Mean as a Measure of Center, visually and conceptually (5.MDR.7)**

- **5.MDR.7** Solve problems involving customary measurements, metric measurements, and time and analyze graphical displays of data to answer relevant questions.

A specific learning objective for this standard will need to be addressed in sixth grade during the initial implementation year in connection with other learning objectives included in the specified units of study for Grade 6.

- **5.MDR.7.2** Ask questions and answer them based on gathered information, observations, and appropriate graphical displays to solve problems relevant to everyday life. (*GSE Alignment: MGSE6.SP.3*)
  - **Important Details:** This is the beginning of the progression of the concept of measures of center and will continue to be developed in 6th grade. The mean formula is not an expectation for this learning objective, so this concept should be explored visually and conceptually.
  - This content should be included within **Unit 1: Exploring Real-life Phenomena through Statistics AND Unit 2: Making Relevant Connections through Number System Fluency** in Grade 6. The first unit includes strictly whole numbers; therefore, students should be given the opportunity to explore the mean using data sets that include whole number values. In Unit 2, students may expand the data sets to include fractional and decimal values as a part of the data set. This content can be taught in an integrated way while addressing standards 6.NR.1 and 6.NR.2 content in sixth grade to ensure a smooth transition with the new standards implementation. Students should begin exploring the concept visually to develop a conceptual understanding prior to using the mean formula.

The image below provides a visual for the additional content added to the suggested curriculum map for Grade 6.

Georgia's K-12 Mathematics Standards - GRADE 6 (INITIAL IMPLEMENTATION YEAR)			
Semester 1			
Unit 1	Unit 2	Unit 3	Unit 4
Exploring Real-life Phenomena through Statistics	Making Relevant Connections through Number System Fluency	Investigating Rate, Ratio and Proportional Reasoning	Building a Conceptual Understanding of Expressions
<b>2 - 3 weeks</b>	<b>3 – 4 weeks</b>	<b>3 - 4 weeks</b>	<b>4 - 5 weeks</b>
<b>5.MDR.7</b> 6.NR.2 6.MP.1-8	<b>5.MDR.7</b> 6.NR.1 6.NR.2 6.MP.1-8	6.NR.4 6.MP.1-8	6.PAR.6 6.MP.1-8

## SEVENTH GRADE TRANSITION INFORMATION

The following additional content should be included in Grade 7 during the initial implementation year (2023-2024).

### NUMERICAL REASONING

#### Mean Absolute Deviation, *conceptually* (6.NR.2)

- **6.NR.2** Apply operations with whole numbers, fractions, and decimals within relevant applications.

A specific learning objective for this standard will need to be addressed in seventh grade during the initial implementation year in connection with other learning objectives included in the specified unit of study for Grade 7.

- **6.NR.2.2** Interpret numerical data to answer a statistical investigative question created. Describe the distribution of a quantitative (numerical) variable collected, including its center, variability, and overall shape. (*GSE Alignment: MGSE9-12.S.ID.2*)
  - **Important Details:** This concept was included in the GSE Algebra I and GSE Coordinate Algebra standards and is now placed in sixth grade. Therefore, during the initial implementation year, students in 7th grade, 8th grade, and Algebra: Concepts and Connections need to be introduced to this topic.
  - Students are expected to apply their understanding of absolute value in the context of mean absolute deviation as they describe variability of data. In addition, students summarize data sets and display distributions on various graphical displays.
  - The use of the mean absolute deviation formula is not an expectation in this grade level. Students should explore this concept visually and conceptually.
  - This content should be included within **Unit 3: Exploring Ratios and Proportional Relationships** for Grade 7. This concept can be taught in an integrated way with the following standard, 7.PAR.4, in seventh grade to ensure a smooth transition with the new standards implementation.

### PATTERNING AND ALGEBRAIC REASONING

#### Slope (7.PAR.4)

- **7.PAR.4** Recognize proportional relationships in relevant, mathematical problems; represent, solve, and explain these relationships with tables, graphs, and equations.

This concept is new to 7<sup>th</sup> grade. This specific learning objective for this standard will need to be addressed in seventh grade during the initial implementation year in connection with other learning objectives included in the specified unit of study for Grade 7.

- **7.PAR.4.7** Use similar triangles to explain why the slope,  $m$ , is the same between any two distinct points on a nonvertical line in the coordinate plane. (*GSE Alignment: MGSE8.EE.5*)
- **7.PAR.4.8** Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. (*GSE Alignment: MGSE8.EE.6*)
  - **Important Details:** This concept is new to 7<sup>th</sup> grade and was previously taught in 8<sup>th</sup> grade. Therefore, during the initial implementation year, special attention should be taken in Grade 7 to ensure students develop a deep understanding of this concept to ensure a smooth transition with the new standards implementation in Grade 8 and beyond.
  - This content is included in **Unit 1: Making Relevant Connections within The Number System** for Grade 7.



The image below provides a visual for the additional content added to the suggested curriculum map for Grade 7.

Georgia's K-12 Mathematics Standards - GRADE 7 (INITIAL IMPLEMENTATION YEAR)			
Semester 2			
Unit 3	Unit 4	Unit 5	Unit 6
Exploring Ratios and Proportional Relationships	Making Relevant Connections with Geometry	Investigating Probability	Culminating Capstone Unit
<b>8 – 9 weeks</b> <i>(split between Semester 1 and Semester 2)</i>	<b>4 – 5 weeks</b>	<b>4 – 5 weeks</b>	<b>1 – 2 weeks</b>
6.NR.2 7.PAR.4 7.MP.1-8	7.GSR.5 7.MP.1-8	7.PR.6 7.MP.1-8	ALL STANDARDS 7.MP.1-8

## EIGHTH GRADE TRANSITION INFORMATION

The following additional content should be included in Grade 8 during the initial implementation year (2023-2024).

### NUMERICAL REASONING

#### Mean Absolute Deviation, *conceptually* (6.NR.2)

- **6.NR.2** Apply operations with whole numbers, fractions and decimals within relevant applications.

A specific learning objective for this standard will need to be addressed in eighth grade during the initial implementation year in connection with other learning objectives included in the specified unit of study for Grade 8.

- **6.NR.2.2** Interpret numerical data to answer a statistical investigative question created. Describe the distribution of a quantitative (numerical) variable collected, including its center, variability, and overall shape. (*GSE Alignment: MGSE9-12.S.ID.2*)
  - **Important Details:** This concept was included in the GSE Algebra I and GSE Coordinate Algebra standards and is now placed in sixth grade. Therefore, during the initial implementation year, students in 7th grade, 8th grade, and Algebra: Concepts and Connections need to be introduced to this topic.
  - Students are expected to apply their understanding of absolute value in the context of mean absolute deviation as they describe variability of data. In addition, students summarize data sets and display distributions on various graphical displays.
  - This content should be included within **Unit 3: Investigating Data & Statistical Reasoning** for Grade 8. This concept can be taught in an integrated way with the following standard, 8.FGR.6, in eighth grade to ensure a smooth transition with the new standards implementation. The use of the mean absolute deviation formula is not an expectation in this grade level. Students should explore this concept visually and conceptually. This concept can be clustered with learning objectives 8.FGR.6.1-4 as an introduction to the progression.

#### Slope (7.PAR.4)

- **7.PAR.4** Recognize proportional relationships in relevant, mathematical problems; represent, solve, and explain these relationships with tables, graphs, and equations.

This concept is new to 7<sup>th</sup> grade. This specific learning objective for this standard will need to be addressed in both seventh grade and eighth grade during the initial implementation year in connection with other learning objectives included in the specified unit of study for Grade 8.

- **7.PAR.4.7** Use similar triangles to explain why the slope,  $m$ , is the same between any two distinct points on a nonvertical line in the coordinate plane. (*GSE Alignment: MGSE8.EE.5*)
- **7.PAR.4.8** Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. (*GSE Alignment: MGSE8.EE.6*)
  - **Important Details:** This concept is new to 7<sup>th</sup> grade and was previously taught in 8<sup>th</sup> grade. Therefore, during the initial implementation year, students should be provided with learning experiences to develop the concept of slope in Grade 8 to ensure students develop a deep understanding of this concept in preparation for their study of linear relationships and functions in the grade level.
  - This content can be incorporated into **Unit 2: Modeling Linear Relationships and Functions** for Grade 8.

The image below provides a visual for the additional content added to the suggested curriculum map for Grade 8.

Georgia's K-12 Mathematics Standards - GRADE 8 (INITIAL IMPLEMENTATION YEAR)		
Semester 1		
Unit 1	Unit 2	Unit 3
Investigating Linear Expressions, Equations, and Inequalities in One Variable	Modeling Linear Relationships & Functions	Investigating Data & Statistical Reasoning
<b>4 – 5 weeks</b>	<b>5 – 6 weeks</b>	<b>3 – 4 weeks</b>
8.PAR.3 8.MP. 1-8	<b>7.PAR.4</b> 8.PAR.4 8.FGR.5 8.MP.1-8	<b>6.NR.2</b> 8.FGR.6 8.MP.1-8

NOTE: These two standards (**6.NR.2** and **7.PAR.4**) should also be incorporated in the Enhanced Algebra: Concepts and Connections course for Grade 8 students in the related unit as identified above.

### Middle School and Enhanced Algebra: Concepts & Connections Course Transition Guidance

If the student completes has completed...	INITIAL IMPLEMENTATION YEAR	In 2024-2025, the student should take...	In 2025-2026, the student should take...	In 2026-2027, the student should take...	In 2027-2028, the student should take...	In 2028-2029, the student should take...
	In 2023-2024, the student should take....					
GSE Advanced/ Accelerated Grade 6/ 7A in 6 <sup>th</sup> grade	Grade 7 Mathematics*	Enhanced Algebra: Concepts & Connections	Geometry: Concepts & Connections in 9 <sup>th</sup> grade **	Enhanced Advanced Algebra and Precalculus: Concepts & Connections in 10 <sup>th</sup> grade	AP Calculus AB or AP Calculus BC in 11 <sup>th</sup> grade	A 4 <sup>th</sup> mathematics course option in 12 <sup>th</sup> grade (i.e., College-level Calculus or Statistics course)
GSE Advanced/ Accelerated Grade 7B/8 in 7 <sup>th</sup> grade*	Enhanced Algebra: Concepts & Connections	Geometry: Concepts & Connections in 9 <sup>th</sup> grade**	Enhanced Advanced Algebra and Precalculus: Concepts & Connections in 10 <sup>th</sup> grade	AP Calculus AB or AP Calculus BC in 11 <sup>th</sup> grade	A 4 <sup>th</sup> mathematics advanced calculus or statistics course option in 12 <sup>th</sup> grade (i.e., College-level Calculus or Statistics)	

\*Following completion of 7<sup>th</sup> grade mathematics, all students have the option to take either Grade 8 Mathematics or Enhanced Algebra: Concepts & Connections. The Enhanced Algebra: Concepts & Connections course will award core high school mathematics credit.

# ALGEBRA: CONCEPTS & CONNECTIONS

## TRANSITION INFORMATION

(Students completing Grade 8 Mathematics (GSE) in 2022-2023)

The following additional content should be included in Algebra: Concepts and Connections during the initial implementation year (2023-2024).

### NUMERICAL REASONING

#### Mean Absolute Deviation, conceptually (6.NR.2)

- **6.NR.2** Apply operations with whole numbers, fractions and decimals within relevant applications.

A specific learning objective for this standard will need to be addressed in the Algebra: Concepts and Connections during the initial implementation year in connection with other learning objectives included in the specified unit of study for the course.

- **6.NR.2.2** Interpret numerical data to answer a statistical investigative question created. Describe the distribution of a quantitative (numerical) variable collected, including its center, variability, and overall shape. (GSE Alignment: MGSE9-12.S.ID.2)
  - **Important Details:** This concept was included in the GSE Algebra I and GSE Coordinate Algebra standards and is now placed in sixth grade. Therefore, during the initial implementation year, students in 7th grade, 8th grade, and Algebra: Concepts and Connections need to be introduced to this topic.
  - Students are expected to apply their understanding of absolute value in the context of mean absolute deviation as they describe variability of data. In addition, students summarize data sets and display distributions on various graphical displays.
  - This content should be included within **Unit 7: Investigating Data** for Algebra: Concepts & Connections. This concept can be taught in an integrated way with the following standard, A.DSR.10, in Algebra to ensure a smooth transition with the new standards implementation. The use of the mean absolute deviation formula is not an expectation in this grade level. Students should explore this concept visually and conceptually. This concept can be clustered with learning objectives A.DSR.10.1 as an introduction to the progression involving standard deviation.

### PATTERNING AND ALGEBRAIC REASONING

#### Expressions and Linear Equations (8.PAR.3 and 8.PAR.4)

- **This Grade 8 Standard is foundational to Algebra: Concepts and Connections Standard A.FGR.2. It is important for high school teachers to conduct diagnostic and formative assessments to ensure students have an understanding of this content prior to beginning instruction on the high school content.**
  - **Important Details:** In Georgia's K-12 Mathematics Standards for Grade 8, students are expected to engage in a deeper study of solving equations as a process of reasoning and explain the reasoning, as well as graphs of linear equations in two variables as the set of all its solutions plotted in the coordinate plane linear equations and inequalities. Students use algebraic reasoning to create linear equations to model real-life phenomena and solve linear equations and inequalities, justifying their steps along the way. This concept has been moved from high school with GSE to Grade 8 with the new standards. Therefore, during the initial implementation year, students in Algebra: Concepts and Connections need to learn this topic prior to beginning Unit 1 in order to be prepared for the content presented in the new standards.
- **8.PAR.3** Create and interpret expressions within relevant situations. Create, interpret, and solve linear equations and linear inequalities in one variable to model and explain real phenomena. (GSE Alignment: MGSE9-12.A.CED.1, MGSE9-12.A.REI.1, MGSE9-12.A.REI.3, and MGSE9-12.A.CED.4)
  - **8.PAR.3.1, 8.PAR.3.2, 8.PAR.3.3, 8.PAR.3.4, 8.PAR.3.5 (equations), and 8.PAR.3.6** should be incorporated into Algebra: Concepts & Connections during the initial implementation year as students are modeling linear functions.

- **This content should be included within *Unit 1: Modeling Linear Functions***, during the initial implementation year, students in Algebra: Concepts and Connections need to learn this topic to be prepared for the content presented in the new standards. This content can be taught in an integrated way along with the content included in A.FGR.2 to ensure a smooth transition with the new standards implementation.
- **8.PAR.4** Show and explain the connections between proportional and nonproportional relationships, lines, and linear equations; create and interpret graphical mathematical models and use the graphical, mathematical model to explain real phenomena represented in the graph.
  - **8.PAR.4.2** Show and explain that the graph of an equation representing an applicable situation in two variables is the set of all its solutions plotted in the coordinate plane. (*GSE Alignment: MGSE9-12.A.REI.10*)
  - These topics were previously included in GSE Coordinate Algebra and GSE Algebra I. The concept is now included in Grade 8 with Georgia's K-12 Mathematics Standards. Therefore, this content should be taught prior to beginning ***Unit 1: Modeling Linear Functions*** for Algebra: Concepts and Connections. This concept can be taught before beginning work with linear functions through A.FGR.2 to ensure a smooth transition with the new standards implementation.

### **Solving Linear Inequalities (8.PAR.3)**

- **8.PAR.3** Create and interpret expressions within relevant situations. Create, interpret, and solve linear equations and linear inequalities in one variable to model and explain real phenomena.

A specific learning objective for this standard will need to be addressed in Algebra: Concepts & Connections during the initial implementation year in connection with other learning objectives included in the specified unit of study for this specific course.

- **8.PAR.3.5** Solve linear equations and inequalities in one variable with coefficients represented by letters and explain the solution based on the contextual, mathematical situation. (*GSE Alignment: MGSE9-12.A.REI.3*)
  - **Important Details:** In Georgia's K-12 Mathematics Standards for Grade 8, students are expected to engage in a deeper study of linear equations and inequalities. Students use algebraic reasoning to create linear equations to model real-life phenomena and solve linear equations and inequalities, justifying their steps along the way. This concept has been moved from high school with GSE to Grade 8 with the new standards. Therefore, during the initial implementation year, students in Algebra: Concepts and Connections need to learn this topic in order to be prepared for the content presented in the new standards.
  - **Students will need experience solving linear inequalities in one variable prior to engaging in solving inequalities in two variables.**
  - This content should be included within ***Unit 2: Analyzing Linear Inequalities*** for Algebra: Concepts and Connections. During the implementation year (Year 1), this concept can be taught prior to students engaging with A.PAR.4.1 in high school to ensure a smooth transition with the new standards implementation.

## FUNCTIONAL AND GRAPHICAL REASONING

### **Graphing Linear Functions (8.FGR.5)**

- **8.FGR.5** Describe the properties of functions to define, evaluate, and compare relationships, and use functions and graphs of functions to model and explain real phenomena. (*GSE Alignment: MGSE9-12.F.IF.4, MGSE9-12.F.IF.5 (domain), MGSE9-12.F.IF.7 (key features of graphs), and MGSE9-12.F.IF.7a (graphing linear)*)
  - **All learning objectives included in this standard (8.FGR.5.1 – 5.9)** will need to be addressed in Algebra: Concepts and Connections during the initial implementation year. This content should be included within ***Unit 4: Modeling and Analyzing Quadratic Functions*** for Algebra: Concepts and Connections. This concept can be taught prior to students engaging with A.PAR.6 to ensure a smooth transition with the new standards implementation.
- In Georgia's K-12 Mathematics Standards for Grade 8, students are expected to analyze graphs of linear functions and describe nonlinear functions using the properties and characteristics specific to linear functions. These concepts were previously taught in GSE Coordinate Algebra and GSE Algebra I. These concepts must be taught in Algebra: Concepts & Connections during the 2023-2024 Implementation Year ONLY in order to ensure that this cohort of students are exposed to the idea prior to matriculating to the next high school course.

## Slope Criteria for Parallel and Perpendicular Lines Using Systems of Linear Equations (8.FGR.7)

- **8.FGR.7** Justify and use various strategies to solve systems of linear equations to model and explain realistic phenomena.

These specific learning objectives for this standard will need to be addressed in Algebra: Concepts and Connections during the initial implementation year in connection with other learning objectives included in the specified unit of study for the course.

- **8.FGR.7.2** Show and explain that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because the points of intersection satisfy both equations simultaneously. (*GSE Alignment: MGSE9-12.A.REI.6*)
- **8.FGR.7.5** Create and compare the equations of two lines that are either parallel to each other, perpendicular to each other, or neither parallel nor perpendicular. (*GSE Alignment: MGSE9-12.G.GPE.5*)
  - **Important Details:** In Georgia’s K-12 Mathematics Standards for Grade 8, students are expected to analyze the slope criteria for parallel and perpendicular lines. This concept was included in the GSE Coordinate Algebra and GSE Geometry standards and is now placed in eighth grade. Therefore, during the initial implementation year, students in Algebra: Concepts and Connections need to be introduced to this topic.
  - This content should be included within **Unit 8: Algebraic Connections to Geometric Concepts** for the Algebra: Concepts and Connections Course. This concept can be taught in an integrated way with the following standard, A.GSR.3 and learning objective A.GSR.3.1. to ensure a smooth transition with the new standards implementation.

The image below provides a visual for the additional content added to the suggested curriculum map for this new course.

<b>Georgia’s K-12 Mathematics Standards ALGEBRA: CONCEPTS &amp; CONNECTIONS (INITIAL IMPLEMENTATION YEAR ONLY)</b>								
<b>Semester 1</b>				<b>Semester 2</b>				
Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9
Modeling Linear Functions	Analyzing Linear Inequalities	Investigating Rational and Irrational Numbers	Modeling and Analyzing Quadratic Functions	Modeling and Analyzing Exponential Expressions & Equations	Analyzing Exponential Functions	Investigating Data	Algebraic Connections to Geometric Concepts	Culminating Capstone Unit
<b>3 – 4 weeks</b>	<b>1 – 2 weeks</b>	<b>1 – 2 weeks</b>	<b>6 – 7 weeks</b>	<b>2 – 3 weeks</b>	<b>4 – 5 weeks</b>	<b>3 – 4 weeks</b>	<b>2 – 3 weeks</b>	<b>1 – 2 weeks</b>
8.PAR.3 8.PAR.4 A.FGR.2 A.MM.1 A.MP.1-8	8.PAR.3 A.PAR.4 A.MM.1 A.MP.1-8	A.NR.5 A.MM.1 A.MP.1-8	8.FGR.5 A.PAR.6 A.FGR.7 A.MM.1 A.MP.1-8	A.PAR.8 A.MM.1 A.MP.1-8	A.FGR.9 A.MM.1 A.MP.1-8	6.NR.2 A.DSR.10 A.MM.1 A.MP.1-8	8.FGR.7 A.GSR.3 A.MM.1 A.MP.1-8	All standards A.MM.1 A.MP.1-8

### Special Teacher Notes:

The highlighted standards above show which additional standards should be incorporated into each specified unit during the initial year of implementation of Georgia’s K-12 Mathematics Standards. This applies to the 2023-2024 School Year (Initial Implementation Year) ONLY. After Year 1, the Grade 8 content will no longer need to be included in the high school Algebra: Concepts & Connections course.

This content will not be assessed on the End of Course Georgia Milestones Assessment for HS Algebra: Concepts & Connections course. However, it is a necessary prerequisite for the exponential and quadratic functions content that will be assessed.

# GEOMETRY: CONCEPTS & CONNECTIONS TRANSITION INFORMATION

*For students who completed GSE Coordinate Algebra*

The following additional content should be included in Geometry: Concepts and Connections during the initial implementation year (2023-2024) for students who completed GSE Coordinate Algebra.

## NUMERICAL REASONING

### Rational and Irrational Numbers, Square Roots and Cube Roots (A.NR.5)

- **A.NR.5:** Investigate rational and irrational numbers and rewrite expressions involving square roots and cube roots. (*GSE Alignment: MGSE9-12.N.RN.2*)
  - **Important Details:** Students previously studied rational and irrational numbers, square roots, and cube roots in GSE Analytic Geometry. This topic is now being covered in Algebra: Concepts and Connections. Therefore, students in Geometry: Concepts and Connections will need to learn this concept in order to ensure a smooth transition to the new standards.
  - This content should be included within **Unit 1: Polynomial Expressions**. This content can be taught prior to the content included in G.PAR.2.

## PATTERNING AND ALGEBRAIC REASONING

### Quadratic Expressions and Equations (A.PAR.6)

- **A.PAR.6:** Build quadratic expressions and equations to represent and model real-life phenomena; solve quadratic equations in mathematically applicable situations. (*GSE Alignment: MGSE9-12.A.SSE.3*)
  - **Important Details:** Students previously studied quadratic expressions and equations in GSE Analytic Geometry. This topic is now being covered in Algebra: Concepts and Connections. Therefore, students will miss this topic if it is not taught in Geometry during the implementation year.
  - **A.PAR.6.1** and **A.PAR.6.2** should be incorporated into the Geometry: Concepts and Connections course as students are investigating polynomial expressions. (NOTE: The remaining concepts from this standard will be taught in Advanced Algebra Unit 4.)
  - This content should be included within **Unit 1: Polynomial Expressions**. This content can be taught in an integrated way along with the content included in G.PAR.2.



# GEOMETRY: CONCEPTS & CONNECTIONS

## TRANSITION INFORMATION

### *for students who completed GSE Algebra I*

The following additional content should be included in Geometry: Concepts and Connections during the initial implementation year (2023-2024) for students who completed GSE Algebra I.

#### FUNCTIONAL AND GRAPHICAL REASONING

##### Slope Criteria for Parallel and Perpendicular Lines Using Systems of Linear Equations (8.FGR.7)

- **8.FGR.7** Justify and use various strategies to solve systems of linear equations to model and explain realistic phenomena.

These specific learning objectives for this standard will need to be addressed in Algebra: Concepts and Connections during the initial implementation year in connection with other learning objectives included in the specified unit of study for the course.

- **8.FGR.7.2** Show and explain that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because the points of intersection satisfy both equations simultaneously. (*GSE Alignment: MGSE9-12.A.REI.6*)
- **8.FGR.7.5** Create and compare the equations of two lines that are either parallel to each other, perpendicular to each other, or neither parallel nor perpendicular. (*GSE Alignment: MGSE9-12.A.REI.6 and MGSE9-12.G.GPE.5*)
  - **Important Details:** In Georgia's K-12 Mathematics Standards for Grade 8, students are expected to analyze the slope criteria for parallel and perpendicular lines. This concept was included in the GSE Coordinate Algebra and GSE Geometry standards and is now placed in eighth grade. Therefore, during the initial implementation year, students in Algebra: Concepts and Connections need to be introduced to this topic.
  - This content should be included within **Unit 2: Geometric Foundations, Constructions, and Proof** for Geometry: Concepts and Connections. This concept can be taught in an integrated way along with the following standard, G.GSR.4, specifically clustered with G.GSR.4.4, to ensure a smooth transition with the new standards implementation.

#### GEOMETRIC AND SPATIAL REASONING

##### Using Coordinates to Determine Perimeter and Area (A.GSR.3)

- **A.GSR.3** Solve problems involving distance, midpoint, slope, area, and perimeter to model and explain real-life phenomena.

These specific learning objectives for this standard will need to be addressed in Geometry: Concepts and Connections during the initial implementation year in connection with other learning objectives included in the specified unit of study for the course.

- **A.GSR.3.1** Solve real-life problems involving slope, parallel lines, perpendicular lines, area, and perimeter. (*GSE Alignment: MGSE9-12.G.GPE.6 and MGSE9-12.G.GPE.7*)
- **A.GSR.3.2** Apply the distance formula, midpoint formula, and slope of line segments to solve real-world problems. (*GSE Alignment: MGSE9-12.G.GPE.4*)
  - **Important Details:** In Georgia's K-12 Mathematics Standards, students are expected to solve problems involving distance, midpoint, slope, area, and perimeter to model and explain real-life phenomena. This concept was included in the GSE Coordinate Algebra and GSE Geometry standards and is now placed in Algebra: Concepts and Connections with the new standards. Therefore, during the initial implementation year, students in Geometry: Concepts and Connections need to be introduced to this topic.
  - This content should be included within **Unit 2: Geometric Foundations, Constructions, and Proof** for Geometry: Concepts and Connections. This concept can be taught in an integrated way along with the following standard, G.GSR.4, specifically clustered with G.GSR.4.1 and G.GSR.4.2, to ensure a smooth transition with the new standards implementation.



The image below provides a visual for the additional content added to the suggested curriculum map for this new course.

Georgia's K-12 Mathematics Standards – GEOMETRY: CONCEPTS & CONNECTIONS (INITIAL IMPLEMENTATION YEAR)	
Semester 1 (Additions for Year 1 of Implementation)	
Unit 1	Unit 2
Polynomial Expressions	Geometric Foundations, Construction and Proof
2 – 3 weeks	3 – 4 weeks
A.NR.5 A.PAR.6 G.PAR.2 G.MP.1-8 G.MM.1	8.FGR.7 A.GSR.3 G.GSR.4 G.MM.1 G.MP.1-8

**\*\*NOTE: Students who completed GSE Accelerated Coordinate Algebra/ Analytic Geometry A OR Accelerated Algebra I/ Geometry A should advance to Geometry: Concepts & Connections during the 2023-2024 school year.**

# ADVANCED ALGEBRA: CONCEPTS & CONNECTIONS

## TRANSITION INFORMATION

The following additional content should be included in *Advanced Algebra: Concepts and Connections* during the initial implementation year (2023-2024).

### NUMERICAL REASONING

#### Rational and Irrational Numbers (Square Roots and Cube Roots) (A.NR.5)

- **A.NR.5:** Investigate rational and irrational numbers and rewrite expressions involving square roots and cube roots. (*GSE Alignment: MGSE9-12.N.RN.2*)
  - **A.NR.5.2** should be incorporated into the *Advanced Algebra: Concepts and Connections* course as students are rewriting radical expressions as expressions and exploring the properties of radical expressions.
  - **Important Details:** Students previously studied rational and irrational numbers, square roots, and cube roots in *GSE Analytic Geometry*. This topic is now being covered in *Algebra: Concepts and Connections*. Therefore, students in *Advanced Algebra: Concepts and Connections* will need to learn this concept in order to ensure a smooth transition to the new standards.
  - This content should be included within **Unit 3: Radical Functions**. This content can be taught in an integrated way along with AA.FGR.4 (specifically clustered with learning objectives AA.FGR.4.1).

### PATTERNING AND ALGEBRAIC REASONING

#### Quadratic Expressions and Equations (A.PAR.6)

- **A.PAR.6:** Build quadratic expressions and equations to represent and model real-life phenomena; solve quadratic equations in mathematically applicable situations. (*GSE Alignment: MGSE9-12.A.SSE.3, MGSE9-12.A.CED.1, MGSE9-12.A.CED.2, MGSE9-12.A.REI.4, MGSE9-12.F.IF.7, MGSE9-12.F.IF.7a, MGSE9-12.F.IF.8a, and MGSE9-12.F.LE.3*)
  - **Important Details:** Students previously studied quadratic expressions and equations in *GSE Analytic Geometry*. This topic is now being covered in *Algebra: Concepts and Connections*. Therefore, students will miss this topic if it is not taught in *Geometry* during the implementation year.
  - **A.PAR.6.3** and **A.PAR.6.4** should be incorporated into the *Advanced Algebra: Concepts and Connections* course as students are modeling polynomial functions.
  - This content should be included within **Unit 4: Modeling Polynomial Functions**. This content can be taught in an integrated way along with the content included in AA.FGR.5 to ensure a smooth transition with the new standards implementation.
  - **NOTE:** The first two learning objectives from this standard, A.PAR.6.1 and A.PAR.6.2, will be taught in *Geometry Unit 2*.

#### Operations with Polynomials (G.PAR.2)

- **G.PAR.2:** Interpret the structure of polynomial expressions and perform operations with polynomials within a geometric framework. (*GSE Alignment: MGSE9-12.A.APR.1*)
  - **Important Details:** Students previously studied this topic in *GSE Advanced Algebra/Algebra II*. This topic is now being covered in *Geometry: Concepts and Connections* within the new standards. Therefore, students will miss this topic if it is not taught in *Advanced Algebra: Concepts and Connections* during the implementation year.
  - **G.PAR.2.2** and **G.PAR.2.3** should be incorporated into the *Advanced Algebra: Concepts and Connections* course as students are modeling polynomial functions.
  - This content should be included within **Unit 4: Modeling Polynomial Functions**. This content can be taught in an integrated way along with the content included in AA.FGR.5 to ensure a smooth transition with the new standards implementation.

**DATA AND STATISTICAL REASONING**

**Standard Deviation, conceptually – This needs to be incorporated for the first TWO (2) implementation years. (A.DSR.10)**

- **A.DSR.10** Collect, analyze, and interpret univariate quantitative data to answer statistical investigative questions that compare groups to solve real-life problems; Represent bivariate data on a scatter plot and fit a function to the data to answer statistical questions and solve real-life problems.

A specific learning objective for this standard will need to be addressed in the Advanced Algebra: Concepts and Connections during the initial implementation year in connection with other learning objectives included in the specified unit of study for the course.

- **A.DSR.10.1** Use statistics appropriate to the shape of the data distribution to compare center (median and mean) and variability (interquartile range, standard deviation) of two or more distributions by hand and using technology. (*GSE Alignment: MGSE9-12.S.ID.2*)
  - **Important Details:** This concept was included in the GSE Advanced Algebra/ Algebra II course and is now placed as an expectation in Algebra: Concepts and Connections with Georgia’s K-12 Mathematics Standards. Therefore, during the first two implementation years (2023-2024 AND 2024-2025 school years), students in Advanced Algebra: Concepts and Connections need to explore this topic to ensure a continuous progression of learning.
  - Students are expected to apply their understanding of absolute value in the context of mean absolute deviation as they describe variability of data using the standard deviation. Students are expected to build upon their knowledge of mean absolute deviation to interpret the variability of data using the standard deviation. The expectation is for students to delve into the interpretation of statistics, rather than pure computation of statistics.
  - This content should be included within **Unit 1: Descriptive and Inferential Statistics** for Advanced Algebra: Concepts & Connections. This concept can be taught in an integrated way with the following standard, AA.DSR.2, in Advanced Algebra to ensure a smooth transition with the new standards implementation. The standard deviation for data points should be explored conceptually. The standard deviation formula is not an expectation in this course. Students should explore this concept visually and conceptually.

<b>Georgia’s K-12 Mathematics Standards ADVANCED ALGEBRA: CONCEPTS AND CONNECTIONS</b>							
<b>SEMESTER 1</b>				<b>SEMESTER 2</b>			
<b>Unit 1</b>	<b>Unit 2</b>	<b>Unit 3</b>	<b>Unit 4</b>	<b>Unit 5</b>	<b>Unit 6</b>	<b>Unit 7</b>	<b>Unit 8</b>
Descriptive and Inferential Statistics	Exponential and Logarithmic Functions	Radical Functions	Modeling Polynomial Functions	Investigating Linear Algebra and Matrices	Trigonometry and the Unit Circle	Rational Functions	Culminating Capstone Unit
<b>5 – 6 weeks</b>	<b>5 – 6 weeks</b>	<b>3 – 4 weeks</b>	<b>4 – 5 weeks</b>	<b>2 – 3 weeks</b>	<b>3 – 4 weeks</b>	<b>2 – 3 weeks</b>	<b>1 – 2 weeks</b>
AA.DSR.2 AA.MM.1 AA.MP.1-5	AA.FGR.3 AA.MM.1 AA.MP.1-8	<b>A.NR.5</b> AA.FGR.4 AA.MM.1 AA.MP.1-8	<b>A.PAR.6</b> <b>G.PAR.2</b> AA.FGR.5 AA.MM.1 AA.MP.1-8	AA.PAR.6 AA.MM.1 AA.MP.1,2,4,5,6,7	AA.GSR.7 AA.MM.1 AA.MP.1-8	AA.FGR.8 AA.MM.1 AA.MP.1,2,4,5,7	ALL STANDARDS AA.MP.1-8

# PRECALCULUS TRANSITION INFORMATION

The following additional content should be included in Precalculus during the initial implementation year (2023-2024).

## PATTERNING & ALGEBRAIC REASONING

### Linear Algebra and Matrices (AA.PAR.6)

- **AA.PAR.6:** Represent data with matrices, perform mathematical operations, and solve systems of linear equations leading to real-world linear programming applications. (GSE Alignment: *MGSE9-12.N.VM.6–12 and MGSE9-12.A.REI.8-9*)
  - **Important Details:** Students previously studied linear programming and matrices in GSE Precalculus. This topic is now being covered in Advanced Algebra: Concepts and Connections. Therefore, students will miss this topic if it is not taught in Precalculus during the implementation year.
  - **AA.PAR.6.1, AA.PAR.6.2, AA.PAR.6.3, and AA.PAR.6.4** should be incorporated into the Precalculus course as students are engaging with understanding vectors.
  - This content should be added as an introduction to **Unit 5: Modeling with Vector Quantities**. This content can be taught in an integrated way along with the content included in PC.AGR.6 to ensure a smooth transition with the new standards implementation.

## DATA & STATISTICAL REASONING

The newly developed Precalculus course was designed to focus on concepts that provide a solid foundation in preparation for future calculus courses. It is highly recommended that students take Precalculus concurrently with Statistical Reasoning or AP Statistics to further develop a foundation of statistical literacy. Students enrolled in Precalculus for the first time during 2023-2024, will miss experiences with Probabilistic Reasoning, specifically **G.PR.10: Solve problems involving the probability of compound events to make informed decisions; interpret expected value and measures of variability to analyze probability distributions.**, taught in the new Geometry: Concepts and Connections course. Additionally, students will miss opportunities to explore several topics within Data and Statistical Reasoning, including **AA.DSR.2: Communicate descriptive and inferential statistics by collecting, critiquing, analyzing, and interpreting real-world data.**, taught in the new Advanced Algebra: Concepts and Connections course.

To ensure there is no gap in the learning trajectory for students, these concepts would be learned by students while taking the Statistical Reasoning or AP Statistics courses.

## GEOMETRIC & SPATIAL REASONING

### Trigonometry & The Unit Circle (AA.GSR.7)

- **AA.GSR.7:** Develop an introductory understanding of the unit circle; solve trigonometric equations using the unit circle. (GSE Alignment: *MGSE9-12.F.TF.1 - 4*)
  - **Important Details:** Students previously studied this topic in GSE Advanced Algebra/Algebra II. This topic is now being covered in Geometry: Concepts and Connections within the new standards. Therefore, students will miss this topic if it is not taught in Advanced Algebra: Concepts and Connections during the implementation year.
  - **AA.GSR.7.1 and AA.GSR.7.2** should be incorporated into the Precalculus course as students are modeling trigonometric expressions and functions.
  - This content should be included within **Unit 2: Modeling with Trigonometric Expressions and Functions**. This content can be taught in an integrated way along with the content included in PC.FGR.3 to ensure a smooth transition with the new standards implementation.

**Georgia's K-12 Mathematics Standards  
PRECALCULUS**

SEMESTER 1			SEMESTER 2			
Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 8
Modeling with Rational and Piecewise-Defined Functions	Modeling with Trigonometric Expressions and Functions	Applying Trigonometric Identities and Equations	Modeling with Conic Sections and Polar Equations	Modeling with Vector Quantities	Modeling with Sequences and Series	Culminating Capstone Unit
4 – 5 weeks	5 – 6 weeks	4 – 5 weeks	4 – 5 weeks	4 – 5 weeks	4 – 5 weeks	1 – 2 weeks
PC.FGR.2 PC.MM.1 PC.MP.1-8	<b>AA.GSR.7</b> PC.FGR.3 PC.MM.1 PC.MP.1-8	PC.AGR.4 PC.MM.1 PC.MP.1-8	PC.GSR.5 PC.MM.1 PC.MP.1-8	<b>AA.PAR.6</b> PC.AGR.6 PC.MM.1 PC.MP.1-8	PC.PAR.7 PC.MM.1 PC.MP.1-8	ALL STANDARDS PC.MP.1-8 PC.MM.1

**\*\*NOTE:** Students are encouraged to enroll in AP Statistics or Statistical Reasoning to engage with the content from G.PR.10 and AA.DSR.2 that the students during the first year of implementation would have missed with the transition.

**Enhanced Advanced Algebra and Precalculus: Concepts & Connections Course Transition Guidance**

If the student completes has completed...	INITIAL IMPLEMENTATION YEAR	In 2024-2025, the student should take...	In 2025-2026, the student should take...	In 2026-2027, the student should take...	In 2027-2028, the student should take...	In 2028-2029, the student should take...
	In 2023-2024, the student should take...					
GSE Accelerated Coordinate Algebra/ Analytic Geometry A OR Accelerated Algebra I/ Geometry A in 8 <sup>th</sup> grade	Geometry: Concepts & Connections in 9 <sup>th</sup> grade**	Enhanced Advanced Algebra and Precalculus: Concepts & Connections in 10 <sup>th</sup>	AP Calculus AB or AP Calculus BC in 11 <sup>th</sup> grade	A 4 <sup>th</sup> mathematics course option in 12 <sup>th</sup> grade (i.e., College-level Calculus or Statistics)		
GSE Accelerated Coordinate Algebra/ Analytic Geometry A OR Accelerated Algebra/ Geometry A in 9 <sup>th</sup> grade	Geometry: Concepts & Connections in 10 <sup>th</sup> grade**	Enhanced Advanced Algebra and Precalculus: Concepts & Connections in 11 <sup>th</sup>	A 4 <sup>th</sup> mathematics course option in 12 <sup>th</sup> grade (i.e., AP Statistics, AP Calculus AB or AP Calculus BC)			
GSE Accelerated Analytic Geometry B/ Advanced Algebra OR GSE Accelerated Geometry B/ Algebra II in 9 <sup>th</sup> grade	Precalculus: Concepts & Connections AND AP Statistics in 10 <sup>th</sup> grade	AP Calculus AB or AP Calculus BC in 11 <sup>th</sup> grade	A 4 <sup>th</sup> mathematics advanced calculus course option in 12 <sup>th</sup> grade (i.e., College-level Calculus or Statistics)			
GSE Accelerated Analytic Geometry B/ Advanced Algebra OR Accelerated Geometry B/ Algebra II in 10 <sup>th</sup> grade	Precalculus: Concepts & Connections AND AP Statistics in 11 <sup>th</sup> grade	A 4 <sup>th</sup> mathematics course option in 12 <sup>th</sup> grade (i.e., AP Statistics, AP Calculus AB or AP Calculus BC)				

\*\*Following completion of Geometry: Concepts & Connections, all students have the option to take either Advanced Algebra: Concepts & Connections or Enhanced Advanced Algebra and Precalculus: Concepts & Connections.

## 4<sup>TH</sup> MATHEMATICS COURSES TRANSITION INFORMATION

The following considerations should be implemented in each high school fourth core mathematics course during the initial implementation year (2023-2024). With these changes, all fourth core mathematics courses have been approved by the Technical College System of Georgia (TCSG) and the Academic Committee on Mathematical Subjects (ACMS) at the University System of Georgia (USG).

COURSE	TRANSITION DETAILS
<b>Advanced Financial Algebra</b>	<p><b>NEW COURSE</b> – This course should replace Math of Finance beginning in 2023-2024 SY. This course is significantly different from Mathematics of Finance. Schools who offered Mathematics of Finance in the past should switch to this new course offering beginning with the 2023-2024 school year. All standards in this course have been updated. The new course standards should completely replace the previous GSE standards beginning with the 2023-2024 school year. Teachers should look closely at the new standards to make sense of the content expected within the course and begin implementation in Fall 2023.</p> <p>Additionally, time should be spent helping students develop a conceptual understanding of statistical reasoning and mathematical modeling throughout the course.</p>
<b>Advanced Finite Mathematics</b>	<p>All standards in this course have been updated. The new course standards should completely replace the previous GSE standards beginning with the 2023-2024 school year. Teachers should look closely at the new standards to make sense of the content expected within the course and begin implementation in Fall 2023.</p> <p>Additionally, time should be spent helping students develop a conceptual understanding of statistical reasoning and mathematical modeling throughout the course.</p>
<b>Advanced Mathematical Decision Making</b>	<p>All standards in this course have been updated. The new course standards should completely replace the previous GSE standards beginning with the 2023-2024 school year. Teachers should look closely at the new standards to make sense of the content expected within the course and begin implementation in Fall 2023.</p> <p>Additionally, time should be spent helping students develop a conceptual understanding of statistical reasoning and mathematical modeling throughout the course.</p>
<b>AP Precalculus</b>	<p><b>NEW COURSE – effective Fall 2023</b></p> <p>The content in this course is based on College Board expectations. Mathematical modeling should be incorporated throughout the course to assist students with reasoning and sense-making related to the concepts presented in the course and on the AP exam in preparation for post-secondary learning and experiences.</p> <p><b>Students enrolled in Enhanced Advanced Algebra and Precalculus: Concepts &amp; Connections may be eligible to take this AP exam.</b></p>
<b>AP Calculus (AB &amp; BC)</b>	<p>The content in this course is based on College Board expectations. Mathematical modeling should be incorporated throughout the course to assist students with reasoning and sense-making related to the concepts presented in the course and on the AP exam in preparation for post-secondary learning and experiences.</p>
<b>AP Statistics</b>	<p>The content in this course is based on College Board expectations. Mathematical modeling should be incorporated throughout the course to assist students with reasoning and sense-making related to the concepts presented in the course and on the AP exam in preparation for post-secondary learning and experiences.</p> <p><b>Students enrolled in Precalculus should be encouraged to take AP Statistics as a concurrent elective to accommodate the probability and statistics transition material gap caused from these standards being moved from Precalculus to Advanced Algebra or Geometry with the new standards (see page 27 for additional details).</b></p>
<b>Calculus</b>	<p>All standards in this course have been updated. The new course standards should completely replace the previous GSE standards beginning with the 2023-2024 school year. Teachers should look closely at the</p>

	<p>new standards to make sense of the content expected within the course and begin implementation in Fall 2023.</p> <p>Additionally, time should be spent helping students understand the Calculus content through mathematical modeling. Intentional connections should also be made to help students develop statistical reasoning through Calculus-based experiences.</p>
<b>College Readiness Mathematics (Mathematics Capstone Course)</b>	<p><b>New Required Capstone Experience – beginning in 2023-2024 SY</b></p> <p>All standards in this course have been updated. The new course standards should completely replace the previous GSE standards beginning with the 2023-2024 school year. Teachers should look closely at the new standards to make sense of the content expected within the course and begin implementation in Fall 2023.</p> <p>Additionally, time should be spent helping students develop a conceptual understanding of statistical reasoning and mathematical modeling throughout the course.</p>
<b>Differential Equations</b>	<p>All standards in this course have been updated. The new course standards should completely replace the previous GSE standards beginning with the 2023-2024 school year. Teachers should look closely at the new standards to make sense of the content expected within the course and begin implementation in Fall 2023.</p> <p>Additionally, time should be spent helping students develop a conceptual understanding of statistical reasoning and mathematical modeling through statistical experiences involving differential equations.</p>
<b>Engineering Calculus</b>	<p>All standards in this course have been updated. The new course standards should completely replace the previous GSE standards beginning with the 2023-2024 school year. Teachers should look closely at the new standards to make sense of the content expected within the course and begin implementation in Fall 2023.</p> <p>Additionally, time should be spent helping students develop a conceptual understanding of statistical reasoning and mathematical modeling through engineering experiences that involve statistics and data analysis.</p>
<b>History of Mathematics</b>	<p>This is now a full credit course. The History of Mathematics half-credit bearing course will be retired beginning with the 2023-2024 school year.</p> <p>All standards in this course have been updated. The new course standards should completely replace the previous GSE standards beginning with the 2023-2024 school year. Teachers should look closely at the new standards to make sense of the content expected within the course and begin implementation in Fall 2023.</p> <p>Additionally, time should be spent helping students develop a conceptual understanding of statistical reasoning and mathematical modeling throughout the course.</p>
<b>Linear Algebra with Computer Science Applications</b>	<p><b>NEW COURSE OFFERING</b></p> <p>This is a new course released as a result of the recent mathematics standards adoption on August 26, 2021. Schools may begin offering this course for students interested in exploring mathematical modeling through linear algebra and computer science applications. Students are eligible to take this course upon completion of the Precalculus course.</p> <p>Throughout this course, time should be spent helping students develop a conceptual understanding of statistical reasoning and mathematical modeling throughout the course.</p>
<b>Mathematics of Industry and Government</b>	<p>All standards in this course have been updated. The new course standards should completely replace the previous GSE standards beginning with the 2023-2024 school year. Teachers should look closely at the new standards to make sense of the content expected within the course and begin implementation in Fall 2023.</p> <p>Additionally, time should be spent helping students develop a conceptual understanding of statistical reasoning and mathematical modeling throughout the course.</p>
<b>Multivariable Calculus</b>	<p>All standards in this course have been updated. The new course standards should completely replace the previous GSE standards beginning with the 2023-2024 school year. Teachers should look closely at the new standards to make sense of the content expected within the course and begin implementation in Fall 2023.</p>



	Additionally, time should be spent helping students develop a conceptual understanding of statistical reasoning and mathematical modeling throughout the course.
<b>Statistical Reasoning</b>	<p>All standards in this course have been updated. The new course standards should completely replace the previous GSE standards beginning with the 2023-2024 school year. Teachers should look closely at the new standards to make sense of the content expected within the course and begin implementation in Fall 2023.</p> <p>Additionally, time should be spent helping students develop a conceptual understanding of statistical reasoning and mathematical modeling throughout the course.</p>

### Special Notes:

- ✓ The Advanced Mathematical Topics course has been removed from the high school course directory beginning in 2023-2024.
- ✓ Technical College Readiness Mathematics is designated as an ACCUPLACER® Prep Support course for students interested in pursuing Dual Enrollment Option B in Georgia.
- ✓ Foundations of Algebra content aligns as an intervention support for middle school. No major changes have been made to this course. Local districts have flexibility on how to best utilize this course to meet students' needs.
- ✓ There are new co-requisite support courses available for Algebra: Concepts & Connections, Geometry: Concepts & Connections, and Advanced Algebra: Concepts & Connections.