Mathematics: Geometry *Draft*

In Geometry, instructional time should focus on four critical areas:

Area 1- Congruence, Proof, and Constructions:
 a. In this unit, students establish triangle congruence criteria, based on analyses of rigid motions and formal constructions.

Area 2- Similarity, Proof, and Trigonometry:
 a. Students apply their earlier experience with dilation and proportional reasoning to build a formal understanding of similarity.

Area 3- Extending to Three Dimensions:
 a. Students' experience with two-dimensional and three-dimensional objects is extended to include informal explanations of circumference, area and volume formulas.

Area 4- Connecting Algebra and Geometry through Coordinates:
 a. Building on their work with the Pythagorean theorem in 8th grade to find distances, students use a rectangular coordinate system to verify geometric relationships, including properties of special triangles and quadrilaterals and slopes of parallel and perpendicular lines, which relates back to work done in the first course.

Area 5- Circles With and Without Coordinates:
 a. In this unit students prove basic theorems about circles, such as a tangent line is perpendicular to a radius, inscribed angle theorem, and theorems about chords, secants, and tangents dealing with segment lengths and angle measures.

The clusters of Geometry that belong to the Major Work of the grade are:

 a. 912.G-CO.2 and 3 clusters
 b. 912.G-SRT.1, 2, and 3 clusters
 c. 912.G-GPE.2
 d. 912.G-MG.1

COMMON CORE SHIFTS FOR MATHEMATICS

STUDENT ACHIEVEMENT PARTNERS

ACHIEVETHECORE.ORG

1 **Focus** strongly where the Standards focus

2 **Coherence: Think** across grades, and link to major topics within grades

3 **Rigor:** In major topics, pursue with equal intensity: **conceptual understanding**, procedural skill and fluency, and **application**

Web links for Great Resources

All links listed below have been used to find the additional resources and formative assessments as listed in the blueprints. If you need additional, then you may use the links listed below to find more.

https://www.illustrativemathematics.org/ - A website giving tasks aligned directly to the standards. Search by grade level, then standard.

http://www.cpalms.org/Public/ - A website that gives each course description, all standards and standard description as well as lessons and tasks aligned to each standard.

http://map.mathshell.org – A website that gives lessons, mini tasks, and assessments aligned to clusters of standards. Great for finding lessons to create coherence.

www.engageny.org – A website with modules and lessons designed to teach the 3 math shifts with the math practice standards as aligned to the new math standards.

https://www.georgiastandards.org/Pages/default.aspx - A website that has units for each grade level and course with projects and Dan Meyers 3 act tasks aligned to the new math standards.

Mathematics: Geometry *Draft*

The **Mathematical Practice Standards** describe the expertise that mathematics teachers should develop in their students. Teachers should consciously plan for aligned instruction with 1-2 practice standards embedded in each lesson.

Student Friendly Mathematical Practice Statements

MP.1.1 Make sense of problems and persevere in solving them.

- Make a plan!
- Try different approaches when your problem is hard.
- Solve your problem in more than one way.
- Check whether your solution makes sense.

MP.2.1 Reason abstractly and quantitatively.

- Explain the meanings of the numbers, words, pictures, symbols, and objects you and others use.

MP.3.1 Construct viable arguments and critique the reasoning of others.

- Explain both what to do and why it works.
- Work to make sense of others' mathematical thinking.

MP.4.1 Model with mathematics.

- Apply math to real-world situations.
- Use models such as graphs, drawings, tables, symbols, numbers, and diagrams to solve problems.

MP.5.1 Use appropriate tools strategically.

- Choose appropriate tools for your problem.
- Use mathematical tools correctly and efficiently.
- Estimate and use what you know to check the answers you find using tools.

MP.6.1 Attend to precision.

- Communicate your mathematical thinking clearly and precisely.
- Use the level of precision you need for your problem.
- Be accurate when you count, measure, and calculate.

MP.7.1 Look for and make use of structure.

- Find, extend, analyze, and create patterns.
- Use patterns and structures to solve problems.

MP.8.1 Look for and express regularity in repeated reasoning.

- Use patterns and structures to create and explain rules and shortcuts.
- Use properties, rules, and shortcuts to solve problems.
- Reflect on your thinking before, during, and after you solve a problem.
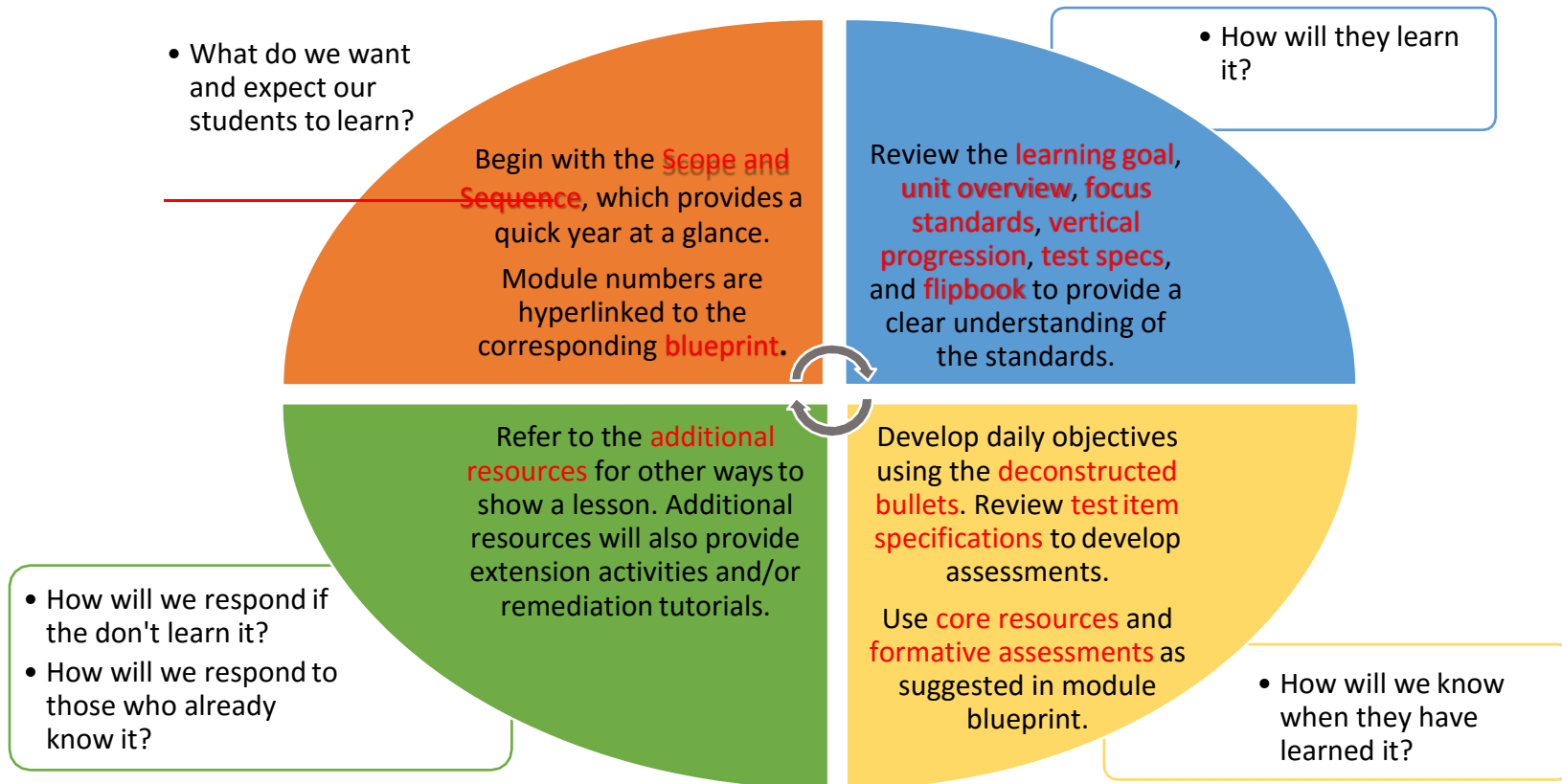
Mathematics: Geometry *Draft*

In order for students to be College and Career ready and prepared with 21st Century skills, it is important for them to have multiple opportunities to speak, listen, read, and write across content. The following are the speaking and listening standards as well as the reading and writing standards that should be integrated into the math curriculum.

Speaking and Listening	Reading
LAFS.910.SL.1.1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. b. Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, and presentation of alternate views), clear goals and deadlines, and individual roles as needed. c. Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions. d. Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented. **LAFS.910.SL.1.2** Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source. **LAFS.910.SL.1.3** Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence. **LAFS.910.SL.2.4** Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.	**LAFS.910.RST.1.3** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. **LAFS.910.RST.2.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. **LAFS.910.RST.3.7** Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
	Writing
	LAFS.68.WHST.1.1 Write arguments focused on *discipline-specific content.* a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns. c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from or supports the argument presented. **LAFS.910.WHST.2.4** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. **LAFS.910.WHST.3.9** Draw evidence from informational texts to support analysis, reflection, and research.

English Language Development
ELD.K12.ELL.MA.1 English language learners communicate information, ideas and concepts necessary for academic success in the content area of Mathematics. **ELD.K12.ELL.SI.1** English language learners communicate for social and instructional purposes within the school setting.

Mathematics: Geometry *Draft*

The following flow map provides the sequence for using the curriculum documents as you plan for aligned instruction. It is **recommended that as your teams plan collaboratively, you begin by looking at the big picture of the unit.** Once you have the big picture of the unit, you will want to use the unit sequence/textbook correlation to plan your daily lessons and objectives, always reflecting on alignment of the standards.

- What do we want and expect our students to learn?

- How will they learn it?

Begin with the ~~Scope and Sequence~~, which provides a quick year at a glance.

Module numbers are hyperlinked to the corresponding blueprint.

Review the learning goal, unit overview, focus standards, vertical progression, test specs, and flipbook to provide a clear understanding of the standards.

Refer to the additional resources for other ways to show a lesson. Additional resources will also provide extension activities and/or remediation tutorials.

Develop daily objectives using the deconstructed bullets. Review test item specifications to develop assessments.

Use core resources and formative assessments as suggested in module blueprint.

- How will we respond if the don't learn it?
- How will we respond to those who already know it?

- How will we know when they have learned it?

Mathematics: Geometry *Draft*

Each Unit correlates with a Unit in the adopted text book for the course. A date range has been given for each Unit. The date range has an extra day or two to allow for assessing the students.

Geometry Standards Quick Guide

	Week 1 and Week 2			Week 3 thru Week 6					Week 7 thru Week 9		Week 10 thru Week 12	
Units	Unit 1 Transformations and Congruence			Unit 2 Lines, Angles, and Triangles					Unit 3 Quadrilaterals and Coordinate Proof		Unit 4 Similarity	
Module Name	Tools of Geometry	Transformations and Symmetry	Congruent Figures	Lines and Angles	Triangle Congruence Criteria	Applications of Triangle Congruence	Properties of Triangles	Special Segments in Triangles	Properties of Quadrilaterals	Coordinate Proof Using Slope and Distance	Similarity and Transformations	Using Similar Triangles
Focus Standards	G-CO.1.1 G-CO.1.2 G-CO.1.5 G-CO.3.9 G-CO.4.12 G-GPE.2.4	G-CO.1.1 G-CO.1.2 G-CO.1.3 G-CO.1.4 G-CO.1.5 G-CO.2.6 G-CO.4.12 G-MG.1.3	G-CO.1.5 G-CO.2.6 G-CO.2.7	G-CO.3.9 G-GPE.2.5	G-CO.2.7 G-CO.2.8	G-CO.4.12 G-CO.4.13 G-SRT.2.5	G-CO.3.10 G-SRT.2.5	G-C.1.3 G-CO.3.10	G-CO.3.11 G-SRT.2.5	G-GPE.2.5 G-GPE.2.4 G-CO.3.11 G-GPE.2.7	G-SRT.1.1a G-SRT.1.2 G-SRT.1.3	G-SRT.2.4 G-GPE.2.6 G-SRT.2.5
Math Practice	MP.5.1 MP.6.1 MP.8.1	MP.5.1 MP.7.1	MP.2.1 MP.3.1 MP.5.1	MP.2.1 MP.3.1 MP.5.1	MP.2.1 MP.3.1 MP.4.1 MP.7.1	MP.3.1 MP.7.1	MP.3.1 MP.5.1 MP.8.1	MP.2.1 MP.3.1 MP.5.1 MP.6.1	MP.2.1 MP.3.1 MP.5.1 MP.6.1 MP.7.1	MP.1.1 MP.6.1 MP.7.1	MP.4.1 MP.5.1 MP.6.1	MP.5.1 MP.8.1

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	Week 13 thru Week 14	Week 15 thru Week 16			Week 17 thru Week 18		
Units	Unit 5 Trigonometry	Unit 6 Properties of Circles			Unit 7 Measurement and Modeling in Two and Three Dimensions		
Module Name	Trigonometry with Right Triangles	Angles and Segments in Circles	Arc Length and Sector Area	Equations of Circles and Parabolas	Volume Formulas	Visualizing Solids	Modeling and Problem Solving
Focus Standards	G-SRT.3.6 G-SRT.3.7 G-SRT.3.8	G-C.1.2 G-C.1.3	G-GMD.1.1 G-C.1.1 G-C.2.5	G-GPE.1.1	G-GMD.1.1 G-MG.1.2	G-GMD.2.4 G-MG.1.1	G-GMD.1.3 G-MG.1.1 G-MG.1.2 G-MG.1.3
Math Practice	MP.2.1 MP.4.1	MP.2.1 MP.3.1 MP.4.1	MP.4.1 MP.7.1 MP.8.1	MP.3.1 MP.6.1	MP.2.1 MP.4.1	MP.2.1 MP.4.1	MP.2.1 MP.4.1