

HOUSTON COUNTY SCHOOLS MATHEMATICS DEPARTMENT

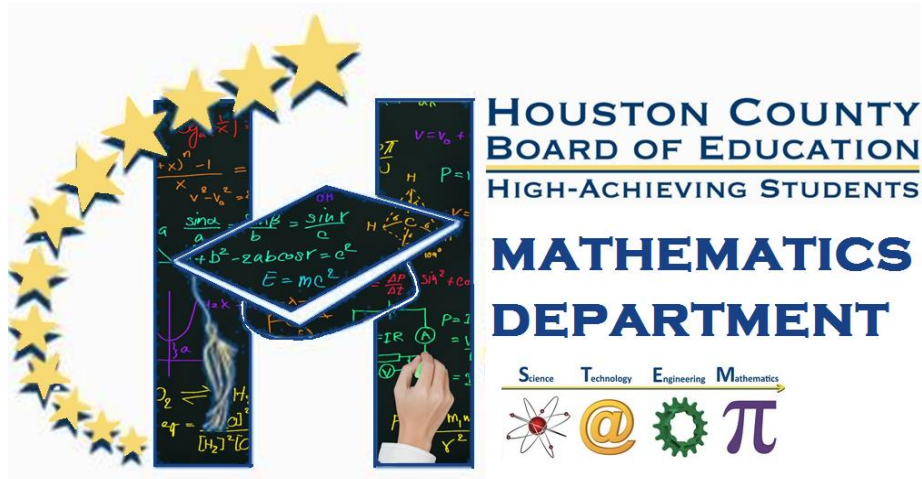
GEOMETRY 2020-2021

Houston County's system-wide initiatives center around building fully functional, intensely focused professional learning communities in our schools.

This initiative includes a focus on learning which clarifies and monitors essential learning.

Not all content in a given grade or course is emphasized equally in the standards, nor should it be. Some clusters require greater emphasis than others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. More time in these areas may also be necessary for students to meet the demands of the Georgia Milestones assessments.

To say that some standards have greater emphasis is **not** to say that anything in the standards can safely be neglected in instruction! Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade. This new guide not only gives calendar pacing at the unit level, but also pacing at the standard level and one of three levels of content priority, listed below.



PACING GUIDE & TEACHER PLANNER

Math teachers from every middle school in Houston County were invited to meet to identify "Essential Standards." Teachers considered the content expectations for future units within their grade, for future grades, on state assessments, and in other content areas to determine which standards were "Major," "Supporting," or "Additional." Their designations are color-coded within the list of standards as below and the included calendar shows approximate within-unit time allocations by standard or cluster.

Essential

Supporting

***Additional**

On SharePoint, we amended course materials (including lesson plans, study guides, assessments, and POD's) to reflect the content of greatest emphasis for this math course because of their prioritization of standards.

This document shows where students and teachers should spend the large majority of their time in order to meet the expectations of the standards. It includes a standard-by-standard calendar for teachers to use to plan and allocate teaching/learning time appropriately.

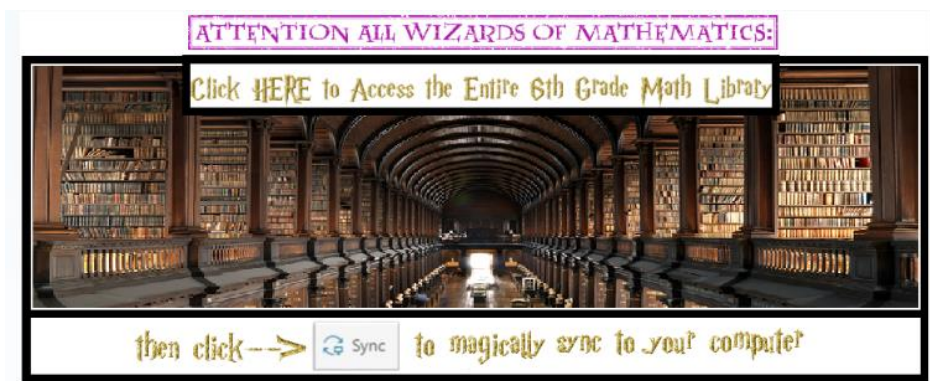
What resources are available for me?

What's on your SharePoint Course page?	<ul style="list-style-type: none">• Unit Plans• "I Can" Statements with Examples• Unit Assessments• Daily PODs• Lessons and Tasks• Assessment Banks (<i>instructions for ExamView banks after the calendars</i>)• Milestones Resources including Mock Assessments• HRW Teacher/Student Instructions• And much more
Student Weeblys	http://hcbemath.weebly.com/

How do I sync the mathematics material to my file library on my desktop?

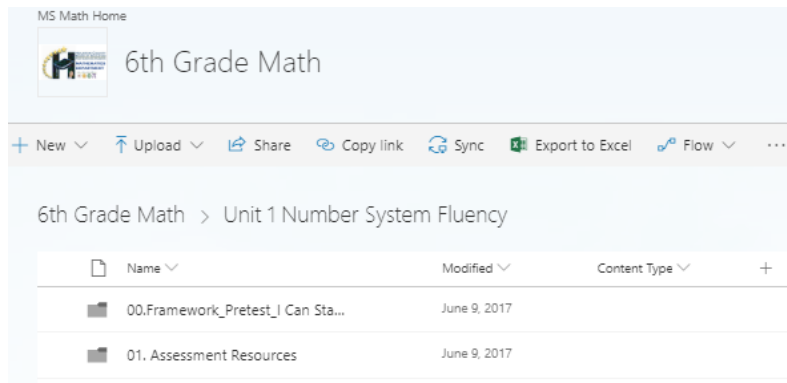
From Office 365, navigate to > SharePoint > Departments > Teaching & Learning > Math > Grade Band > Course Home.

1. Navigate to your course home on SharePoint and click the icon below.

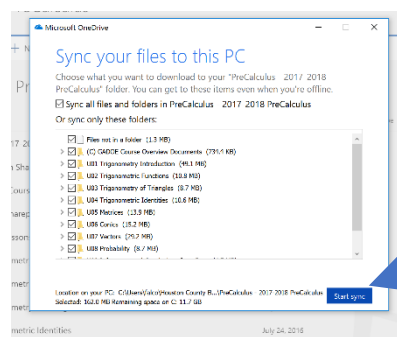


2. You are now in your course's document library. Click the Sync Button.

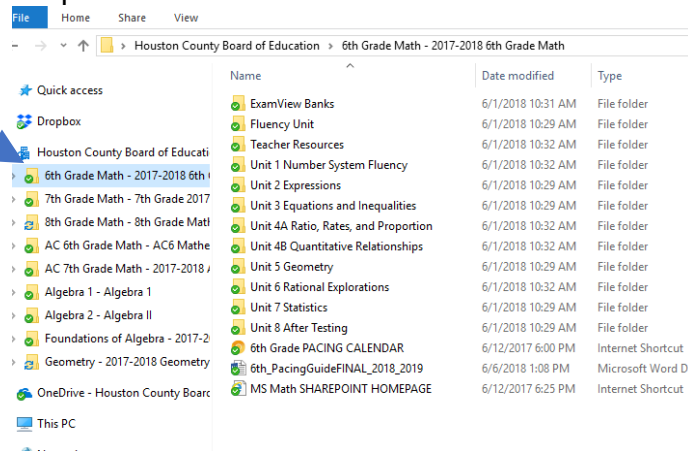




3. A window will open and all the folders in this library should be checked. Keep them checked and choose Start sync. ***Note, you may encounter two screens before this in which you choose ALLOW and then must SIGN IN with your HCBE email.



4. After a few seconds, you will get notified that the files are syncing to your Houston County BOE One Drive and the files will be located in your file library. These files work like Dropbox and are updated in real time as changes are made by Dr. Rape or Jennifer Farrow. BE SURE YOU SEE GREEN CHECK MARK. This means it is synced and your files are updated. If you open at a later date and do not see your checkmark, repeat this process.



NOTE*** These files are locked for editing and saving to these folders. You may open, edit, and save to your personal files in another file location.

NOTE**** ExamView Tests will NOT open directly from the Houston County Board of Education File Folders. To open, right-click copy and right-click save to a folder on your desktop or My Documents. Then, open the file from this location. A PDF of each test is available for you to preview

Geometry Unit 1 – Transformations on the Coordinate Plane

1 st Semester	
August 4 - December 18	
September 7 (Labor Day Holiday); October 13-16 (Fall Holiday); November 11 (Veteran's Day); November 23-27 (Thanksgiving Holiday)	

Geometry Georgia Standards of Excellence

2020-2021 Pacing Guide

¹Essential

²Supporting

*Additional

1.1 Geometry Definitions & Undefined Terms (≈ 2 days)

¹G.CO.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

^μ Know precise definitions of undefined terms of Geometry - include angle, circle, perpendicular line, parallel line, point, line, plane, segment, ray, angle, distance along a line, distance around a circular arc

^μ Model undefined terms of geometry definitions

1.2 Experiment with Transformations and Sequences of Transformations in the Coordinate Plane (≈ 8 days)

¹G.CO.2 Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

²G.CO.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

²G.CO.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

¹G.CO.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

^μ { Rotation (in 90° increments around points other than origin)

^μ { Reflection (across any horizontal, vertical line and $y=x$ and $y=-x$)

^μ { Translation (horizontal or vertical)

^μ Dilation (very basic - move images around on coordinate plane, recognize that if size has changed, it's not an isometry, notice if it changed proportionally, or if it is neither isometric nor a dilation).

^μ Use varied methods - transparency, tracing paper, technology, and draw transformations

^Σ Describe rotations and reflections that carry a shape "onto" itself – specific shapes listed in standard.

^Σ Define rotation, reflections, and translations using words, angles, circles, perpendicular lines, parallel lines, and line segments

Notes:

a) Dilating an image about a point with a particular scale factor is NOT in this unit (found in unit 2E).

b) Distance formula and midpoint formula are technically taught in Unit 5...If students need lengths of segments on the coordinate plane, they can use the Pythagorean Theorem or counting/estimation strategies. However, it may be easier to use some of the HMH test bank questions if you go ahead and teach it now...your choice. Teach now and review the two formulas in Unit 5 or wait and avoid questions that need distance formula.

c) **NOTATION IS CRITICAL!** Use precise transformation notation and language. $f(x, y) \rightarrow (y, -x)$ for example, is the notation the state uses to show a reflection across the line $y=-x$. If a point is moved right 5 and down 2, it would be noted $(x, y) \rightarrow (x + 5, y - 2)$.

This unit should take approximately **2.5 weeks**.

Geometry Unit 1 – Transformations on the Coordinate Plane *SUGGESTED PACING CALENDAR*

Monday	Tuesday	Wednesday	Thursday	Friday
Aug 3	Aug 4	Aug 5	Aug 6	Aug 7
Pre-Planning	U1.C1	U1.C1	U1.C2	U1.C2
	Geometry Definitions & Undefined Terms		Experiment with Transformations and Sequences of Transformations in the Coordinate Plane →	
	First Day of School			
Aug 10	Aug 11	Aug 12	Aug 13	Aug 14
U1.C1	U1.C2	U1.C2	U1.C2	U1.C2
Experiment with Transformations and Sequences of Transformations in the Coordinate Plane →				
Aug 17	Aug 18	Aug 19	Aug 20	Aug 21
U1.C2	U1 Review/Test	U1 Review/Test		

Geometry Unit 2A – REASONING

(PART OF UNIT 2: Similarity, Congruence, and Proofs)

1st Semester

August 4 - December 18

September 7 (Labor Day Holiday); October 13-16 (Fall Holiday); November 11 (Veteran's Day); November 23-27 (Thanksgiving Holiday)

Geometry Georgia Standards of Excellence

2020-2021 Pacing Guide

Essential

Supporting

Additional

2A.1 Properties of Equality (~2 days)

The HCBE County-wide Geometry Collaborators added this as a bridge into geometric proof because students need to understand how to think about proof, even though GA State standards for this unit fail to include (assume) these essential understandings. To understand how to prove geometric theorems, students begin by proving and justifying steps for algebraic equations. Students use the logical rules that allow them to balance, manipulate, and solve equations to prepare them to prove geometrically.

Understand that algebraic proof is the process of stating mathematical fact and justifying every statement with a property.

Use the Properties of Equality (Below) to prove algebraic equation solving.

PROPERTIES OF EQUALITY	
(" $\in \mathbb{R}$ " is the mathematical expression which means "is an element of the set of all Real Numbers.")	
Addition Property of Equality	\rightarrow IF $a=b$ THEN $a+c=b+c$
Additive Identity Property	\rightarrow IF $a \in \mathbb{R}$, THEN $a+0=a$
Additive Inverse Property	\rightarrow IF $a \in \mathbb{R}$, $a+(-a)=0$
Division Property of Equality	\rightarrow IF $a, b, c \in \mathbb{R}$, $c \neq 0$, and $a=b$, THEN $\frac{a}{c} = \frac{b}{c}$
Multiplication Property of Equality	\rightarrow IF $a=b$ THEN $ac=bc$
Subtraction Property of Equality	\rightarrow IF $a=b$ THEN $a-c=b-c$
Transitive Property of Equality	\rightarrow IF $a=b$ and $b=c$ THEN $a=c$
Reflexive Property of Equality	\rightarrow IF $a \in \mathbb{R}$, THEN $a=a$
Symmetric Property of Equality	\rightarrow IF $a, b \in \mathbb{R}$ and $a=b$, THEN $b=a$
Transitive Property of Equality	\rightarrow IF $a, b, c \in \mathbb{R}$ and $a=b$ and $b=c$, THEN $a=c$
PROPERTIES OF REAL NUMBER OPERATIONS (below, $a, b, c \in \mathbb{R}$)	
Associative Property of Addition	$\rightarrow (a+b)+c = a+(b+c)$
Associative Property of Multiplication	$\rightarrow (ab)c = a(bc)$
Commutative Property of Addition	$\rightarrow a+b = b+a$
Commutative Property of Multiplication	$\rightarrow ab = ba$
Distributive Property	$\rightarrow a(b+c) = ab+ac$ AND $a(b-c) = ab-ac$
Multiplicative Identity Property	$\rightarrow 1 \cdot a = a$
Multiplicative Inverse Property	$\rightarrow a \cdot \frac{1}{a} = 1$ ($a \neq 0$)
Substitution Property	\rightarrow IF $a=b$ THEN either may be substituted for the other
Zero Product Property	\rightarrow IF $a \cdot b = 0$ THEN $a=0$, or $b=0$ or both $a, b=0$

Note: In the chart, " \in " is a mathematical set symbol that means "is an element of." For instance, if you want to say that the number 6 is an element of the set of all real numbers (\mathbb{R}), you could write: " $6 \in \mathbb{R}$."

2A.2 Logic, Conjectures, and Conditional Statements (~3 days)

Similar to concept 1, the HCBE Geometry County-wide Collaboration determined that the ideas listed below are implied in all proof standards found in GSE Geometry. While not explicitly stated, they are necessary for students to know and do in order in order for students to understand what they are allowed to assume ("given") and what they must prove, an understanding of rules of logical argument is necessary.

Rewrite statements of fact as "IF-THEN" (conditional) statements (ex: triangles have three sides \rightarrow If triangle, then has three sides)

Understand the "IF" is the given (hypothesis), the "THEN" is what is to be proven (conclusion).

State the Inverse, Converse, and Contrapositive of any statement and how original statement=contrapositive, inverse=converse.

Understand that proving a statement false requires only one counterexample.

State and use the Law of Syllogism, State and use the Law of Detachment.

2A.3 Definition and Properties of Congruence, Figure Marking, Postulates, and Theorems (~2 day)

Similar to concepts 1 and 2, the ideas listed below are implied (and NEEDED!) in all proof standards found in GSE Geometry, but they are not explicitly stated. Students are introduced to the definition of congruence and congruence markings found on geometric figures (hash marks/arc marks for congruent segments and angles, respectively). Students extend their understanding of properties of equality to the properties of congruence, and understand the difference between definitions, postulates, and theorems.

Students understand the difference between "congruent" and "equal" in theory, in writing, and in speech, transitioning between the two with ruler/protractor postulates and definition of congruence.

Mark a figure with appropriate (differentiated where appropriate) congruence marks.

Given a congruence statement, students can draw and mark congruent parts of the congruent figures appropriately, identifying \cong attributes of the figures. (For instance, if quadrilateral $ABCE \cong$ quadrilateral $MNOPQ$, $\angle A \cong \angle M$ and $\overline{AC} \cong \overline{MO}$). Conversely students can translate markings from a figure into a congruence statement.

Congruence is Reflexive, Symmetric, and Transitive.

Note: An understanding that congruent figures have congruent corresponding parts is important in this unit. This is more like "CPCFC."

This sub-unit should take approximately 1.5 week.

Monday	Tuesday	Wednesday	Thursday	Friday
Aug 17	Aug 18	Aug 19	Aug 20	Aug 21
			U2A.1	U2A.1
			Properties of Equality - Proof	
Aug 24	Aug 25	Aug 26	Aug 27	Aug 28
U2A.2	U2A.2	U2A.2	U2A.3	U2A.3
Logic, Conjectures, and Conditional Statements			Defn, Properties of Congruence	

Geometry Unit 2B – PROOF WITH LINES, SEGMENTS, AND ANGLES THEOREMS

(PART OF UNIT 2: *Similarity, Congruence, and Proofs*)

1 st Semester		
August 4 - December 18		
September 7 (Labor Day Holiday); October 13-16 (Fall Holiday); November 11 (Veteran's Day); November 23-27 (Thanksgiving Holiday)		

Essential

Geometry Georgia Standards of Excellence

2020-2021 Pacing Guide

Supporting

*Additional

2B.1 THEOREMS ABOUT SEGMENTS- (Ruler postulate, Seg. Addition Postulate, Midpoint Theorem) (≈3 days)

G.CO.9 Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.

G.CO.12 Make formal geometric constructions

- Understand the Ruler Postulate which says every segment can be measured/has a measure.
- Understand the Segment Addition Postulate, use to solve combo algebra/geometry problems.
- Understand the Midpoint theorem and use midpoint theorem to solve combo algebra/geometry problems.
- Justify steps of a combo algebra/geometry problem using definitions, theorems, and postulates.

CONSTRUCTION Copy a line segment

CONSTRUCTION Bisect a line segment (perpendicular bisector)

Note: For algebra/geometry combo problems, students should attend to precision by re-reading the problem given to ensure that they have answered the question being asked. Oftentimes, after finding "x" they must plug back into an expression to find a segment measure!

2B.2 THEOREMS ABOUT ANGLES - Protractor Postulate, Angle Addition Postulate, Vertical Angles, Supplements, Complements, Vertical Pairs, and others. See Plan. (≈4 days)

G.CO.9 Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.

G.CO.12 Make formal geometric constructions

- Understand the Protractor Postulate which says every angle can be measured/has a measure.
- Understand the Angle Addition Postulate, use to solve combo algebra/geometry problems.
- Understand the Angle Bisector theorem and use this theorem to solve combo algebra/geometry problems.
- Prove that Vertical angles are congruent.
- Understand Complements and Supplements, use their sums to solve problems.
- Justify steps of a combo algebra/geometry problem using definitions, theorems, and postulates above (in addition to those in prior units).

CONSTRUCTION Copy an angle

CONSTRUCTION Bisect an angle

Note: For algebra/geometry combo problems, students should attend to precision by re-reading the problem given to ensure that they have answered the question being asked. Oftentimes, after finding "x" they must plug back into an expression to find an angle measure!

2B.3 THEOREMS ABOUT PARALLEL LINES - Using parallel lines and Corresponding Angles Postulate, prove theorems about other parallel line theorems when two parallel lines are cut by a transversal. (≈5 days)

G.CO.9 Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.

G.CO.12 Make formal geometric constructions

- Identify corresponding angles formed when two parallel lines are cut by a transversal, understand and use the Corresponding Angles Postulate,
- Name the other angle relationships for angles formed when two parallel lines are cut by a transversal.
- Prove the
 - Alternate Interior Angles Theorem
 - Consecutive (a.k.a. "Same Side") Interior Angles Theorem,
 - Alternate Exterior Angles Theorem, and
 - Consecutive (a.k.a. "Same Side") Exterior Angles Theorem,
- Use the above theorems in addition to those in prior units) to calculate angle measures formed by two parallel lines cut by a transversal.
- Solve algebra/geometry combo problems and justify the steps.

CONSTRUCTION Parallel through a point not on the line **CONSTRUCTION** Perpendicular through a point

CONSTRUCTION Perpendicular from a point on the line

This sub-unit should take approximately 2.5 weeks.

Geometry Unit 2B – PROOF LINES, SEGMENTS, AND ANGLES *SUGGESTED PACING CALENDAR*

Monday	Tuesday	Wednesday	Thursday	Friday
Aug 31	Sept 1	Sept 2	Sept 3	Sept 4
U2B.1	U2B.1	U2B.1	U2B.2	U2B.2
Theorems about Segments			Theorems about Angles→	
Sept 7	Sept 8	Sept 9	Sept 10	Sept 11
	U2B.2	U2B.2	U2B.3	U2B.3
<i>Labor Day</i>	Theorems about Angles, cont'd		Theorems about Parallel Lines→	
Sept 14	Sept 15	Sept 16	Sept 17	Sept 18
U2B.3	U2B.3	U2B.3	REVIEW/TEST – FIRST HALF OF UNIT 2 (2A&2B)	
Theorems about Parallel Lines, cont'd				

Geometry Unit 2C – PROOF WITH TRIANGLES

(PART OF UNIT 2: *Similarity, Congruence, and Proofs*)

1 st Semester		
August 4 - December 18		
September 7 (Labor Day Holiday); October 13-16 (Fall Holiday); November 11 (Veteran's Day); November 23-27 (Thanksgiving Holiday)		

Essential

Geometry Georgia Standards of Excellence

2020-2021 Pacing Guide

Supporting

*Additional

2C.1 Types of Triangles, Angles within Triangles (**≈3 days**)

G.CO.9 Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; (that says) points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.

G.CO.10 Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180 degrees; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.

***CONSTRUCTION G.CO.12** Make formal geometric constructions

Know the Definitions and identify the following parts of triangles: Exterior Angles, Remote Exterior Angles, Interior Angles, Sides, and Vertices

Utilize proper triangle notation (the Δ symbol).

Identify the following types of triangles that by angle measures: Acute, Obtuse, Equiangular, and Right (including legs and hypotenuse) Triangles.

Identify the following types of triangles that by side measures: Equilateral, Scalene, and Isosceles Triangles (including isosceles' legs and base).

Know and prove the Angle Sum Theorem.

Know and prove that in any triangle, there cannot be more than one right angle.

Know and prove that in an obtuse triangle, there cannot be more than one obtuse angle

Know and prove that the sum of the acute angles in a right triangle always sum to 90° .

Know and prove the Third Angle Theorem: (In two different Δ 's, if two \angle 's of one Δ are \cong to two \angle 's of the other Δ , then the third \angle 's are \cong also.

Know and prove the Exterior Angle Theorem: In a triangle, the measure of an exterior is equal to the sum of its remote interior angles.

***CONSTRUCTION** Construct an equilateral triangle

***CONSTRUCTION** Copy a triangle

2C.2 PROVING TRIANGLES CONGRUENT TO ONE ANOTHER (**≈8 days**)

G.CO.8 Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions. (Extend to include HL and AAS.)

G.SRT.5 Use congruence and-similarity criteria for triangles to solve problems and to prove relationships in geometric figures

Utilize proper triangle notation and vertex-ordering in stating that two triangles are congruent using the fact that Corresponding Parts of Congruent Triangles are Congruent (CPCTC in stating and writing triangle congruence statements)

Know what "included side" and "included angle" means.

Know and use the SSS, SAS, AAS, and ASA Postulates to determine the congruence of triangles.

Know and use the HL and LL postulate to determine the congruence of right triangles.

Know and prove the Isosceles Triangle Theorem (a.k.a. Base Angles Theorem) and its converse (*understand the use of an auxiliary line in this proof*)

Know and prove theorem that Equilateral Triangles are Equiangular and the converse.

2C.3 SPECIAL SEGMENTS WITHIN TRIANGLES AND POINTS OF CONCURRENCY (**≈2 day**)

G.SRT.5 Use congruence and-similarity criteria for triangles to solve problems and to prove relationships in geometric figures

***CONSTRUCTION G.CO.12** Make formal geometric constructions

Find the Incenter of Triangle by constructing all 3 Angle Bisectors know that the incenter is the center of the inscribed circle

Find the Orthocenter of Triangle by constructing all 3 Altitudes

Find Circumcenter of Triangle by constructing all 3 Perpendicular Bisectors and know that the circumcenter is the center of the circumscribed circle.

Find Centroid of Triangle by constructing all 3 Medians and know that the centroid is the center of balance of a triangle.

***CONSTRUCTION** Median of a $\Delta \rightarrow$ ***CONSTRUCTION** Centroid of a Δ

***CONSTRUCTION** Altitude of a $\Delta \rightarrow$ ***CONSTRUCTION** Orthocenter of a Δ

***CONSTRUCTION** \angle bisector of a $\Delta \rightarrow$ ***CONSTRUCTION** Incenter of a Δ ***CONSTRUCTION** Find the center of a \odot

***CONSTRUCTION** \perp bisector of a $\Delta \rightarrow$ ***CONSTRUCTION** Circumcenter of a Δ ***CONSTRUCTION** \odot through three points

This sub-unit should take approximately **3 weeks**. **TEST AT THE END OF THIS UNIT.**

Geometry Unit 2C – PROOFS WITH TRIANGLES *SUGGESTED PACING CALENDAR*

Monday	Tuesday	Wednesday	Thursday	Friday
Sept 21	Sept 22	Sept 23	Sept 24	Sept 25
U2C.1	U2C.1	U2C.1	U2C.2	U2C.2
Types of Triangles, Angles in Triangles			Proving Triangles Congruent to One Another →	
Sept 28	Sept 29	Sept 30	Oct 1	Oct 2
U2C.2	U2C.2	U2C.2	U2C.2	U2C.2
Proving Triangles Congruent to One Another, cont'd →				
Oct 5	Oct 6	Oct 7	Oct 8	Oct 9
U2C.3	U2C.3	REVIEW/TEST – UNIT 2C		In-service
Special Segments in Δ 's				
Oct 12	Oct 13	Oct 14	Oct 15	Oct 16
FALL BREAK	FALL BREAK	FALL BREAK	FALL BREAK	FALL BREAK

Geometry Unit 2D – PROOF WITH QUADRILATERALS

(PART OF UNIT 2: *Similarity, Congruence, and Proofs*)

1 st Semester	
August 4 - December 18	
September 7 (Labor Day Holiday); October 13-16 (Fall Holiday); November 11 (Veteran's Day); November 23-27 (Thanksgiving Holiday)	

Essential

Geometry Georgia Standards of Excellence

2020-2021 Pacing Guide

Supporting

*Additional

2D.1 DEFINITIONS AND PROPERTIES OF QUADRILATERALS (*≈3 days*)

Refresh students' understandings of quadrilaterals' definitions, their relationships (sets, subsets)

Utilize the definitions of different quadrilaterals only, understand that the properties farther down the "family tree" include all properties in the direct "lineage."

Recognize that by extending the sides of a quadrilateral, two lines cut by a transversal are created, and that theorems can be proven using properties of parallel lines and properties of congruent triangles.

μ P-GRAM DEFINITION: If a quadrilateral is a parallelogram, the opposite sides are parallel.

μ RECTANGLE DEFINITION: A rectangle is a parallelogram with four right angles.

μ RHOMBUS DEFINITION: A rhombus is a parallelogram with four congruent sides.

μ SQUARE DEFINITION: A square is a parallelogram with four congruent sides and four right angles.

Note: While knowing that trapezoids, kites, and "no name" quadrilaterals exist is important, the standards for this unit do not mention trapezoids or kites at all.

2D.2 THE RESULTING THEOREMS ABOUT QUADRILATERALS (including PROOF) (*≈5days*)

G.SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

G.CO.11 Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.

μ Use the properties of parallel lines and congruent triangles to prove the following theorems:

μ P-GRAM: If a quadrilateral is a parallelogram, the opposite sides are congruent. (*specifically mentioned in standard*)

μ P-GRAM: If a quadrilateral is a parallelogram, the opposite angles are congruent. (*specifically mentioned in standard*)

Σ P-GRAM: If a quadrilateral is a parallelogram, the consecutive angles are supplementary.

μ P-GRAM: If a quadrilateral is a parallelogram, the diagonals bisect each other. (*specifically mentioned in standard*)

Σ P-GRAM: If a quadrilateral is a parallelogram, the diagonals form two congruent triangles.

Σ P-GRAM CONVERSE: If both pairs of opposite sides of a quadrilateral are parallel, the quadrilateral is a parallelogram.

Σ P-GRAM CONVERSE: If both pairs of opposite sides of a quadrilateral are congruent, the quadrilateral is a parallelogram.

Σ P-GRAM CONVERSE: If both pairs of opposite angles of a quadrilateral are congruent, the quadrilateral is a parallelogram.

Σ P-GRAM CONVERSE: If the consecutive angles of a quadrilateral are supplementary, the quadrilateral is a parallelogram.

Σ P-GRAM CONVERSE: If the diagonals of a quadrilateral bisect each other, the quadrilateral is a parallelogram.

Σ P-GRAM CONVERSE: If the diagonals of a quadrilateral form two congruent triangles, the quadrilateral is a parallelogram.

Σ P-GRAM CONVERSE: If one pair of sides of a quadrilateral is BOTH parallel and \cong , the quadrilateral is a parallelogram.

Σ RECTANGLE: If a parallelogram has one right angle it is a rectangle

μ RECTANGLE (& CONVERSE): A p-gram is a rectangle if and only if its diagonals are \cong . (*specifically mentioned in standard*)

Σ RHOMBUS: If a parallelogram has two consecutive sides congruent, it is a rhombus.

Σ RHOMBUS (& CONVERSE): A parallelogram is a rhombus if and only if each diagonal bisects a pair of opposite angles.

Σ RHOMBUS (& CONVERSE): A parallelogram is a rhombus if and only if the diagonals are perpendicular.

Σ SQUARE: A quadrilateral is a square if and only if it is a rhombus and a rectangle.

This sub-unit should take approximately **2weeks**.

Geometry Unit 2D – PROOF WITH QUADRILATERALS *SUGGESTED PACING CALENDAR*

Monday	Tuesday	Wednesday	Thursday	Friday
Oct 19	Oct 20	Oct 21	Oct 22	Oct 23
U2D.1	U2D.1	U2D.1	U2D.2	U2D.2
Properties of Quadrilaterals			Quad Proofs	
Oct 26	Oct 27	Oct 28	Oct 29	Oct 30
U2D.2	U2D.2	U2D.2	REVIEW/TEST – UNIT 2D	
Proving Theorems about Quadrilaterals				

Geometry Unit 2E – SIMILARITY and DILATION TRANSFORMATIONS

(PART OF UNIT 2: *Similarity, Congruence, and Proofs*)

1 st Semester	
August 4 - December 18	
September 7 (Labor Day Holiday); October 13-16 (Fall Holiday); November 11 (Veteran's Day); November 23-27 (Thanksgiving Holiday)	

Essential

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Supporting

*Additional

2E.1 SIMILAR POLYGONS (*≈7 days*)

G.SRT.2 Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain, using similarity transformations, the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

G.SRT.3 Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

G.SRT.4 Prove theorems about triangles WITH SIMILARITY. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, (and its converse); the Pythagorean Theorem using triangle similarity.

G.SRT.5 Use ~~congruence~~ and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

μ "In terms of similarity transformations" in the standard means students prove/show themselves that two figures are similar on the coordinate plane by seeing if distances are proportional.

μ Prove/show AA triangle similarity based on the definition of similar

μ Students answer the question (about figures including triangles) "Are they similar?" and verify using proportions and angle measures.

μ Students find missing sides/angles in similar figures, especially triangles

2E.2 RIGID vs. NON-RIGID TRANSFORMATIONS : DILATIONS (*≈5 days*)

G.SRT.1 Verify experimentally the properties of dilations given by a center and a scale factor.

a) The dilation of a line not passing through the center of the dilation results in a parallel line and leaves a line passing through the center unchanged.

b) The dilation of a line segment is longer or shorter according to the ratio given by the scale factor

* CONSTRUCTION G.CO.12 Make formal geometric constructions

μ Students will dilate a given figure from a center point with a particular scale factor.

μ Given a dilation already performed, students will identify the center and scale factor.

* - CONSTRUCTION Midsegment of a triangle

Unit 1 addressed dilations superficially to show a contrast between rigid transformations, proportional transformations (dilations) and non-proportional transformations.

This sub-unit should take approximately 3 weeks.

Geometry Unit 2E – SIMILARITY and DILATION TRANSFORMATIONS SUGGESTED PACING CALENDAR

Monday	Tuesday	Wednesday	Thursday	Friday
Nov 2	Nov 3	Oct 4	Oct 5	Nov 6
U2E.1	U2E.1	U2E.1	U2E.1	U2E.1
Similar Polygons →				
Nov 9	Nov 10	Nov 11	Nov 12	Nov 13
U2E.2	U2E.2	Veteran's Day	U2E.2	U2E.2
Rigid vs. Non-Rigid Transformations and Dilations cont'd			Rigid vs. Non-Rigid Transformations and Dilations cont'd →	
Nov 16	Nov 17	Nov 18	Nov 19	Nov 20
U2E.2	U2E.2	U2E.2	REVIEW/TEST – UNIT 2E	
Rigid vs. Non-Rigid Transformations and Dilations cont'd →				
Thanksgiving Break				

Geometry Unit 3 – RIGHT TRIANGLE TRIGONOMETRY

1st Semester

August 4 - December 18

September 7 (Labor Day Holiday); October 13-16 (Fall Holiday); November 11 (Veteran's Day); November 23-27 (Thanksgiving Holiday)

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¹Essential

²Supporting

*Additional

3.1 DISCOVER TRIG RATIOS WITH SIMILAR TRIANGLES (*≈2 days*)

¹G.SRT.6 Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

¹G.SRT.7 Explain and use the relationship between the sine and cosine of complementary angles.

μ Discover/prove that similar triangles have the same side ratios

μ Define the three trig ratios $S = \frac{O}{H}$ $C = \frac{A}{H}$ $T = \frac{O}{A}$

μ Recognize that the $\sin(\theta) = \cos(90 - \theta)$

μ Set up trig equations for right triangles

μ Use calculator in "degree" mode to generate trig ratios

Note: Use θ as a variable frequently – the EOC will use θ . Students need to recognize that " θ " is just a variable, like " x ."

3.2 USING TRIG FUNCTIONS TO SOLVE RIGHT TRIANGLES + APPLICATIONS (*≈6 days*)

¹G.SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

μ Understand that for $\triangle ABC$, side a is opposite $\angle A$, side b is opposite $\angle B$, & side c is opposite $\angle C$

μ Solve right triangles for missing angles and sides

μ Define the three trig ratios $S = \frac{O}{H}$ $C = \frac{A}{H}$ $T = \frac{O}{A}$

μ Use special right triangles (45° - 45° - 90° and 30° - 60° - 90°)

μ Use trigonometry to solve real-world problems like angles of elevation/depression

This sub-unit should take approximately **2 weeks**.

Geometry Unit 3 – RIGHT TRIANGLE TRIGONOMETRY *SUGGESTED PACING CALENDAR*

Monday	Tuesday	Wednesday	Thursday	Friday
Nov 23	Nov 24	Nov 25	Nov 26	Nov 27
Thanksgiving BREAK	Thanksgiving BREAK	Thanksgiving BREAK	Thanksgiving BREAK	Thanksgiving BREAK
Nov 30	Dec 1	Dec 2	Dec 3	Dec 4
U3.1	U3.1	U3.2	U3.2	U3.2
Discovering Trig Ratios		Using Trig Ratios to Solve Right Triangles and Real World Problems→		
Dec 7	Dec 8	Dec 9	Dec 10	Dec 11
U3.2	U3.2	U3.2	U3.2	U3.2
Using Trig Ratios to Solve Right Triangles and Real World Problems				
Dec 14	Dec 15	Dec 16	Dec 17	Dec 18
FIRST SEMESTER FINALS REVIEW		FIRST SEMESTER FINAL EXAMS		

Geometry Unit 4 – CIRCLES AND VOLUME

2nd Semester		
January 5 - May 26		
January 18 (MLK Holiday); February 15 (President's Day Holiday); February 16 (Student Holiday) March 29-April 2 (Spring Break)		
Geometry Georgia Standards of Excellence		2020-2021 Pacing Guide
ⓂEssential	ⓂSupporting	*Additional
4.1 ANGLE RELATIONSHIPS IN CIRCLES (≈5 days) & 4.2 SEGMENT RELATIONSHIPS IN CIRCLES (≈4 days)		
Ⓜ G.C.1 Understand that all circles are similar. Ⓜ G.C.2 Identify and describe relationships among inscribed angles, radii, chords, tangents, and secants. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle. Ⓜ G.C.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle. Ⓜ Find measures of angles created by intersections of secants, tangents, and chords with a circle or with radii or diameters of a circle. See image in unit plan– theorems are also explicitly stated in unit plan. Ⓜ Find lengths of segments created by intersections of secants, tangents, and chords with a circle or with radii or diameters of a circle. See image and theorems in unit plan.		
4.3 ARC LENGTH & SECTOR AREA OF CIRCLES (≈5 days)		
* G.GMD.1 Give informal arguments for geometric formulas. a. Give informal arguments for the formulas of the circumference of a circle and area of a circle using dissection arguments and informal limit arguments. Ⓜ G.C.5 Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector. * Make sense of the circumference and circle area formulas Ⓜ Define/calculate radians as a proportion: $\frac{\text{radian measure}}{\text{circumference of the unit circle } (2)(\pi)(1)} = \frac{\text{angle measure in degrees}}{360}$; then solve. Ⓜ Calculate arc length as a proportion: $\frac{\text{arc length}}{\text{circumference of the circle } (2)(\pi)(r)} = \frac{\text{angle measure in degrees}}{360}$; then solve. Ⓜ Calculate sector area as a proportion: $\frac{\text{sector area}}{\text{area of the circle } (\pi)(r)^2} = \frac{\text{angle measure in degrees}}{360}$; then solve.		
4.4 VOLUMES OF ALL 3-D SHAPES (≈3 days)		
* G.GMD.1 Give informal arguments for geometric formulas. b. Give informal arguments for the formulas for volume of a cylinder, pyramid, and cone using Cavalieri's Principle * G.GMD.2 Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures. Ⓜ G.GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. Ⓜ G.MG.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot). * Make sense of the volume formulas for cylinder, pyramid, sphere, and cone by “cutting” into 1 unit slices. Ⓜ Know and use volume formulas for cylinder, pyramid, sphere, and cone – compose these figures together, subtract the volume of solid voids, set up proportions similar to arc length and sector area to find volumes of wedges or wedge-shaped voids within solids for given angle measures. See images in unit plan. Ⓜ Use proportion to calculate density from a sample. For example, if you know the volume of a rectangular prism-shaped box and that it holds 18 golf balls, you can set up a proportion of golf balls to volume of each “container.” This will give a good estimate of how many golf balls it takes to fill up the bed of a truck.		
4.5 3-D VISUALIZATION & DESIGN (≈2 days)		
Ⓜ G.MG.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios). Ⓜ G.GMD.4 Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects. Ⓜ Visualize, draw/represent, identify, and calculate the area of the 2-D shapes formed by planar cross sections through solid figures. Visualize, draw/represent, identify and calculate the volumes of rotation formed by rotating a two dimensional figure around an axis. See images in unit plan. Ⓜ Apply geometric methods there are a multitude of geometric methods that could be used. Below are some examples-images of these examples can be found in the unit plan. Geometric Method example 1: estimate volumes of irregularly-shaped solids by decomposing them into solids with known formulas. Geometric Method example 2: estimate the area under a curve by summing rectangles or trapezoids Geometric Methods example 3: maximize area or volume given restraints like fencing or box material.		
This unit should take approximately 4 weeks.		

GEOMETRY UNIT 4 – CIRCLES AND VOLUME SUGGESTED PACING CALENDAR

Monday	Tuesday	Wednesday	Thursday	Friday
Jan 4	Jan 5	Jan 6	Jan 7	Jan 8
CHRISTMAS	Right Trig Unit Review			
Jan 11	Jan 12	Jan 13	Jan 14	Jan 15
U4.1	U4.1	U4.1	U4.1	U4.1
Angle Relationships in Circles, cont'd				
Jan 18	Jan 19	Jan 20	Jan 21	Jan 22
MLK HOLIDAY	U4.2	U4.2	U4.2	U4.2
	Segment Relationships in Circles			
Jan 25	Jan 26	Jan 27	Jan 28	Jan 29
U4.3	U4.3	U4.3	U4.3	U4.3
Arc Length cont'd & Sector Area Volumes of 3-D Shapes→				
Feb 1	Feb 2	Feb 3	Feb 4	Feb 5
U4.4	U4.4	U4.4	U4.5	U4.5
Volumes of 3-D Shapes, cont'd			3-D Visualization and Design	
Feb 8	Feb 9	Feb 10	Feb 11	Feb 12
U4 REVIEW/TEST				

Geometry Unit 5 – GEOMETRIC AND ALGEBRAIC CONNECTIONS

2nd Semester

January 5 - May 26

January 18 (MLK Holiday); February 15 (President's Day Holiday); February 16 (Student Holiday) March 29-April 2 (Spring Break)

Geometry Georgia Standards of Excellence

2020-2021 Pacing Guide

¹Essential

²Supporting

*Additional

5.1 DISTANCE, MIDPOINT, AND PARTITIONING A DIRECTED LINE SEGMENT (**≈3 days**)

¹**G.GPE.6** Find the point on a directed line segment between two given points that partitions the segment in a given ratio.

²**G.GPE.7** Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

✖ Prove distance formula

Σ Use distance formula to find the length of a segment,

✖ Use midpoint formula

✖ Use partitioning formulas to partition a directed line segment.

5.2 SLOPE CRITERIA FOR PARALLEL AND PERPENDICULAR LINES (**≈3 days**)

¹**G.GPE.5** Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

μ Write the equations of a line parallel or perpendicular to a given line or to a line with a given slope

μ Prove slopes same for parallel, and that slopes' product is -1 for perpendicular

μ **Honors teachers** - include point-slope form to prepare students for calculus.

5.3 PROVE GEOMETRIC THEOREMS ALGEBRAICALLY (**≈7 days**)

¹**G.GPE.4** Use coordinates to prove simple geometric theorems algebraically. *For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point $(1, \sqrt{3})$ lies on the circle centered at the origin and containing the point $(0, 2)$. (Focus on quadrilaterals, right triangles, and circles.)*

μ Given points and using slope and lengths of segments, identify type of geometric shape using definitions, postulates, and theorems found in sections: 2.C.1 (triangles' definitions), 2.C.2 (identifying congruent triangles) 2.D.2 (quadrilaterals' attributes), and 4.1 (attributes of circles)

5.4 EQUATIONS OF CIRCLES (**≈6 days**)

¹ **G.GPE.1** Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

μ Students will complete the square to put general form circle equations into vertex form. *Students should have learned completing the square in Algebra 1 - most will need a review, though. Was not a focus of Algebra 1.*

μ Students will identify center and radius of a circle and graph the circle.

μ Students will tell if a given point is on a circle or not.

This unit should take approximately 4 weeks.

GEOMETRY UNIT 5 – GEOMETRIC/ALGEBRAIC CONNECTIONS *SUGGESTING PACING CALENDAR*

Monday	Tuesday	Wednesday	Thursday	Friday
Feb 8	Feb 9	Feb 10	Feb 11	Feb 12
		U5.1	U5.1	U5.1
		Distance, Midpoint, and Partitioning a Directed Line Segment		
Feb 15	Feb 16	Feb 17	Feb 18	Feb 19
PRESIDENTS DAY	INSERVICE	U5.2	U5.2	U5.2
		Slope Criteria, Parallel and Perpendicular Lines		
Feb 22	Feb 23	Feb 24	Feb 25	Feb 26
U5.3	U5.3	U5.3	U5.3	U5.3
Prove Geometric Theorems Algebraically on the Coordinate Plane →				
Mar 1	Mar 2	Mar 3	Mar 4	Mar 5
U5.3	U5.3	U5.4	U5.4	U5.4
Prove Geo on the Coordinate Plane, cont'd		Equations of Circles →		
Monday	Tuesday	Wednesday	Thursday	Friday
Mar 8	Mar 9	Mar 10	Mar 11	Mar 12
U5.4	U5.4	U5.4	U5 REVIEW/TEST	
Equations of Circles →				

Geometry Unit 6 – APPLICATION OF PROBABILITY

2nd Semester	
January 5 - May 26	
January 18 (MLK Holiday); February 15 (President's Day Holiday); February 16 (Student Holiday) March 29-April 2 (Spring Break)	
Geometry Georgia Standards of Excellence	2020-2021 Pacing Guide
¹ Essential	² Supporting
	*Additional

6.1 VENN DIAGRAMS, INTERSECTION, UNION, AND COMPLEMENTS OF SETS (≈3 days)
² S.CP.1 Describe categories of events as subsets of a sample space using unions, intersections, or complements of other events (<i>or, and, not</i>).
6.2 INDEPENDENT & DEPENDENT EVENTS USING \times, $+$, $-$ CONDITIONAL PROBABILITY (≈4 days)
¹ S.CP.2 Understand that if two events A and B are independent, the probability of A and B occurring together is the product of their probabilities, and that if the probability of two events A and B occurring together is the product of their probabilities, the two events are independent. ¹ S.CP.3 Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$. Interpret independence of A and B in terms of conditional probability; that is the conditional probability of A given B is the same as the probability of A and the conditional probability of B given A is the same as the probability of B. ² S.CP.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. <i>For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.</i> ¹ S.CP.6 Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in context. ¹ S.CP.7 Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answers in context.
6.3 FREQUENCY TABLES, FINDING PROBABILITY USING FREQUENCY TABLES (≈6 days)
¹ S.CP.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. <i>For example, use collected data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.</i>
This unit should take approximately 3 weeks .

GEOMETRY UNIT 6 – APPLICATION OF PROBABILITY *SUGGESTING PACING CALENDAR*

Monday	Tuesday	Wednesday	Thursday	Friday
Mar 15	Mar 16	Mar 17	Mar 18	Mar 19
U6.1	U6.1	U6.1	U6.2	U6.2
Venn Diagrams, Intersection and Union			Indep and Dep Events, Cond Probability→	
Mar 22	Mar 23	Mar 24	26 25	Mar 26
U6.2	U6.2	U6.3	U6.3	U6.3
Indep and Dep Events, Cond Probability cont'd		Finding Probability from Frequency Tables →		
Mar 29	Mar 30	Mar 31	Apr 1	Apr 2
SPRING BREAK	SPRING BREAK	SPRING BREAK	SPRING BREAK	SPRING BREAK
Apr 5	Apr 6	Apr 7	Apr 8	Apr 9
U6.3	U6.3	U6.3	U6 REVIEW/TEST	
Finding Probability from Frequency Tables				
Apr 12	Apr 13	Apr 14	Apr 15	Apr 16
GA MILESTONES EOC REVIEW WEEK				
Apr 19	Apr 20	Apr 21	Apr 22	Apr 23
Milestones Begin 😊!				

POST-EOC SUGGESTIONS TO PREPARE FOR GEOMETRY:

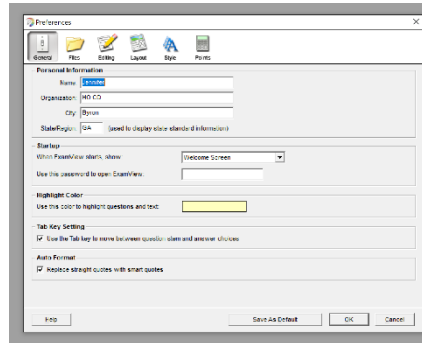
1. REVIEW FACTORING (GCF AND QUADRATIC TRINOMIAL)
2. PRACTICE SOLVING ALL TYPES OF EQUATIONS
3. PRACTICE GRAPHING ALL TYPES OF EQUATIONS
4. GIVE MOCK GEOMETRY EOC AGAIN



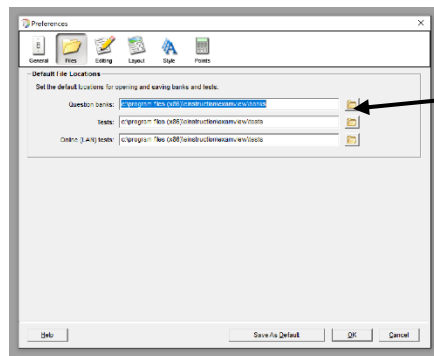
How to Make ExamView Banks Easily Accessible

Open ExamView Test Generator

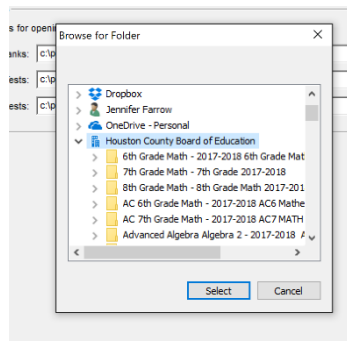
1. After closing the welcome menu, choose the EDIT tab. Select “Preferences”



2. In this window, choose “Files” and then the file folder icons next to Question banks.



3. Navigate to the location of the course materials on your computer -Houston County Board of Education Synced Files. Highlight and select. Click OK.



4. Now when you go to create a test and select questions, ExamView will default to this location. ExamView Banks are located in the ExamView folder and in each Unit's Assessment folder.

