Winslow Township School District
Mathematics Curriculum – Geometry
Unit 1

Overview	Standards for Mathematical Content		Unit Focus	Standards for Mathematical Practice
Unit 1 **Congruence and Constructions**	● G.CO.A.1 ● G.CO.A.2 ● G.CO.A.3 ● G.CO.A.4 ● G.CO.A.5	● G.CO.B.6 ● G.CO.B.7 ● G.CO.B.8 ● G.CO.D.12 ● G.CO.D.13	● Experiment with transformations in the plane ● Understand congruence in terms of rigid motions ● Make geometric constructions	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively.
Unit 1: *Suggested Open Educational Resources*	G.CO.A.1 Defining Parallel Lines G.CO.A.1 Defining Perpendicular Lines G.CO.A.2 Horizontal Stretch of the Plane G.CO.A.3 Seven Circles II G.CO.A.3 Symmetries of rectangles G.CO.A.4 Defining Rotations G.CO.A.5 Showing a triangle congruence		G.CO.B.7 Properties of Congruent Triangles G.CO.B.8 Why does SAS work? G.CO.B.8 Why does SSS work? G.CO.B.8 Why does ASA work? G.CO.D.12 Bisecting an angle G.CO.D.12 Angle bisection and midpoints of line segments G.CO.D.13 Inscribing an equilateral triangle in a circle	MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning

Winslow Township School District

Mathematics Curriculum – Geometry

Unit 1

Curriculum Unit 1		Standards	Pacing	
			Days	Unit Days
Unit 1 **Congruence and Constructions**	• G.CO.A.1 • G.CO.A.2 • G.CO.A.3 • G.CO.D.12	Use the undefined notion of a point, line, distance along a line and distance around a circular arc to develop definitions for angles, circles, parallel lines, perpendicular lines and line segments. Represent transformations in the plane using transparencies, describe and explain transformations as functions, and compare rigid transformations to dilations, horizontal stretches and vertical stretches Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself, and identify lines of symmetry. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).	10	45
	• G.CO.B.6 • G.CO.B.7 • G.CO.B.8 • G.CO.D.12 • G.CO.D.13 • G.CO.A.4 • G.CO.A.5	Use rigid transformations to determine and explain congruence of geometric figures. Show and explain that two triangles are congruent by using corresponding pairs of sides and corresponding pairs of angles, and by using rigid motions (transformations). Show and explain how the criteria for triangle congruence extend from the definition of congruence in terms of rigid motion.	20	
	• G.CO.D.12 • G.CO.D.13	Make formal constructions using a variety of tools (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.) and methods.	10	
		Assessment, Re-teach and Extension	5	

Winslow Township School District
Mathematics Curriculum – Geometry
Unit 1

Unit 1 Geometry		
Content Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills**

● G.CO.A.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.	MP.6 Attend to precision.	Concept(s):
		● Point, line, plane, distance along a line, and distance around a circular arc as indefinable notions
		Students are able to:
		● use point, line, distance along a line and/or distance around a circular arc to give a precise definition of
		  – angle;
		  – circle (the set of points that are the same distance from a single point - the center);
		  – perpendicular line (two lines are perpendicular if an angle formed by the two lines at the point of intersection is a right angle);
		  – parallel lines (distinct lines that have no point in common);
		  – and line segment.
		Learning Goal 1: Use the undefined notion of a point, line, distance along a line and distance around a circular arc to develop definitions for angles, circles, parallel lines, perpendicular lines and line segments.

● G.CO.A.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).	MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): ● Transformations as functions (e.g. F(P) is the image of point P created by transformation F). Students are able to: ● represent transformations with transparencies and geometry software. ● describe transformations as functions (points defining the pre-image as the input and the points defining the image as the output). ● describe a transformation F of the plane as a rule that assigns to each point P in the plane a point F(P) of the plane. ● compare rotations, reflections, and translations to a horizontal stretch, vertical stretch and to dilations, distinguishing preserved distances and angles from those that are not preserved. Learning Goal 2: Represent transformations in the plane using transparencies, describe and explain transformations as functions, and compare rigid transformations to dilations, horizontal stretches and vertical stretches.

Winslow Township School District
Mathematics Curriculum – Geometry
Unit 1

● G.CO.A.3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): No new concept(s) introduced Students are able to: ● identify lines of symmetry when performing rotations and/or reflections on rectangles, parallelograms, trapezoids and regular polygons. ● describe the rotations and reflections that carry rectangles, parallelograms, trapezoids and regular polygons onto itself. Learning Goal 3: Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself, and identify lines of symmetry.
● G.CO.A.4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	MP.6 Attend to precision.	Concept(s): ● Impact of transformations on figures in the plane. Students are able to: ● develop formal mathematical definitions of a rotation, reflection, and translation. Learning Goal 4: Develop formal definitions of rotations, reflections, and translations.
● G.CO.A.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.	MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): No new concept(s) introduced Students are able to: ● draw the transformed figure using, graph paper, tracing paper, and/or geometry software given a geometric figure and a rotation, reflection, or translation. ● identify the sequence of transformations required to carry one figure onto another. Learning Goal 5: Draw transformed figures using graph paper, tracing paper, and/or geometry software and identify a sequence of transformations required in order to map one figure onto another.
● G.CO.B.6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.	MP.3 Construct viable arguments and critique the reasoning of others.	Concept(s): ● Congruence in terms of rigid motion Students are able to: ● predict the outcome of a transformation on a figure. ● given a description of the rigid motions, transform figures. ● given two figures, decide if they are congruent by applying rigid motions. Learning Goal 6: Use rigid transformations to determine and explain congruence of geometric figures.
● G.CO.B.7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.	MP.2 Reason abstractly and quantitatively. MP.6 Attend to precision.	Concept(s): ● Triangle congruence in terms of rigid motion Students are able to: ● given that two triangles are congruent based on rigid motion, show that corresponding pairs of sides and angles are congruent.

	MP.7 Look for and make use of structure.	● given that corresponding pairs of sides and angles of two triangles are congruent, show, using rigid motion (transformations) that they are congruent. Learning Goal 7: Show and explain that two triangles are congruent by using corresponding pairs of sides and corresponding pairs of angles, and by using rigid motions (transformations).
● G.CO.B.8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.	MP.2 Reason abstractly and quantitatively. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): ● Criteria for triangle congruence Students are able to: ● show and explain the criteria for Angle-Side-Angle triangle congruence. ● show and explain the criteria for Side-Angle-Side triangle congruence. ● show and explain the criteria for Side-Side-Side triangle congruence. ● explain the relation of the criteria for triangle congruence to congruence in terms of rigid motion. Learning Goal 8: Show and explain how the criteria for triangle congruence extend from the definition of congruence in terms of rigid motion.

● G.CO.D.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.*
● G.CO.D.13. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.
	MP.3 Construct viable arguments and critique the reasoning of others.
	
	MP.5 Use appropriate tools strategically.
	
	MP.6 Attend to precision.
		Concept(s):
		● Congruence underlies formal constructions.
		Students are able to:
		● perform formal constructions using a variety of tools and methods including:
		  – copying a segment;
		  – copying an angle;
		  – bisecting a segment;
		  – bisecting an angle;
		  – constructing perpendicular lines;
		  – constructing the perpendicular bisector of a line segment;
		  – constructing a line parallel to a given line through a point not on the line;
		  – constructing an equilateral triangle;
		  – constructing a square;
		  – and constructing a regular hexagon inscribed in a circle.
		● identify the congruencies underlying each construction.
		Learning Goal 9: Make formal constructions using a variety of tools (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.) and methods.

Unit 1 Geometry	
District/School Formative Assessment Plan	**District/School Summative Assessment Plan**
Pre-Assessment, Quizzes Exit Tickets Daily Monitoring Linkit!	Unit Benchmark Linkit! Diagnostic
Focus Mathematical Concepts	

Common Misconceptions:

- G.CO.A.1
- G.CO.A.2
- G.CO.A.3
- G.CO.A.4
- G.CO.A.5

The terms "mapping" and "under" are used in special ways when studying transformations. A translation is a type of transformation that moves all the points in the object in a straight line in the same direction.

Students should know that not every transformation is a translation.

Students sometimes confuse the terms "transformation" and "translation."

- G.CO.B.6
- G.CO.B.7
- G.CO.B.8

Some students may believe:

That combinations such as SSA or AAA are also a congruence criterion for triangles. Provide counterexamples for this misconception.

That all transformations, including dilations, are rigid motions. Provide counterexamples for this misconception.

That any two figures that have the same area represent a rigid transformation. Students should recognize that the areas remain the same, but preservation of side and angle lengths determine that the transformation is rigid.

That corresponding vertices do not have to be listed in order; however, it is useful to stress the importance of listing corresponding vertices in the same order so that corresponding sides and angles can be easily identified and that included sides or angles are apparent.

- G.CO.D.12
- G.CO.D.13

Some students may believe that a construction is the same as a sketch or drawing. Emphasize the need for precision and accuracy when doing constructions. Stress the idea that a compass and straightedge are identical to a protractor and ruler. Explain the difference between measurement and construction.

Winslow Township School District

Mathematics Curriculum – Geometry

Unit 1

District/School Tasks	District/School Primary and Supplementary Resources and Technology Integration
PARCC Released Items http://www.parcc-assessment.org/released-items **NJDOE Digital Item Library** https://nj.digitalitemlibrary.com/home **NJSLA Mathematics Evidence Statements** https://docs.google.com/spreadsheets/d/18M5r1jk4P729fTpAlWAzrw1gE6tken233I-Yk0U712M/edit#gid=554025491 **LinkIt! Form A, B, & C**	**Textbook** **IXL** https://www.ixl.com/ **Khan Academy** https://www.khanacademy.org/ **HS Flip Book:** http://community.ksde.org/Default.aspx?tabid=5646 **North Carolina Wikispaces** http://maccss.ncdpi.wikispaces.net/ **PARCC Educational Resources** http://www.parcc-assessment.org/assessments/test-design/mathematics/math-test-specifications-documents **Diversity, Equity & Inclusion Educational Resources** https://www.nj.gov/education/standards/dei/

Instructional Best Practices and Exemplars	
1. Identifying similarities and differences	6. Cooperative learning
2. Summarizing and note taking	7. Setting objectives and providing feedback
3. Reinforcing effort and providing recognition	8. Generating and testing hypotheses
4. Homework and practice	9. Cues, questions, and advance organizers
5. Nonlinguistic representations	10. Manage response rate

Vocabulary				
acute angle	corresponding parts	input	parallelogram	regular polygon
adjacent angles	dilation	inscribed	perpendicular	regular hexagon
angle	distance	line	perpendicular lines	right angle
center of a circle	distance from a point to a line	line of reflection	point	rigid motion
circle	equilateral polygon	line of symmetry	preimage	rotation
circular arc	equilateral triangle	line segment	rectangle	segment
corresponding angles	horizontal stretch	parallel lines	reflection	square
corresponding sides	image	parallel planes		

9.1 Personal Financial Literacy, 9.2 Career Awareness, Exploration, Preparation and Training & 9.4 Life Literacies and Key Skills

9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).

9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

9.4.12.TL.3: Analyze the effectiveness of the process and quality of collaborative environments.

The implementation of the 21st Century skills and standards for students of the Winslow Township District is infused in an interdisciplinary format in a variety of curriculum areas that include, English language Arts, Mathematics, School Guidance, Social Studies, Technology, Visual and Performing Arts, Science, Physical Education and Health, and World Language.: Additional opportunities to address 9.1, 9.2 & 9.4:

Philadelphia Mint

https://www.usmint.gov/learn/kids/resources/educational-standards

Different ways to teach Financial Literacy.

https://www.makeuseof.com/tag/10-interactive-financial-websites-teach-kids-money-management-skills/

Suggested Modifications for Special Education/504

Students with special needs: The students' needs will be addressed on an individual and grade level using a variety of modalities. Accommodations will be made for those students who need extra time to complete assignments. Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Physical expectations and modifications, alternative assessments, and scaffolding strategies will be used to support this learning. The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered.

☐ Provide the opportunity to re-take tests
☐ Modify activities/assignments/projects/assessments
☐ Breakdown activities/assignments/projects/assessments into manageable units
☐ Additional time to complete activities/assignments/projects/assessments
☐ Provide an option for alternative activities/assignments/projects/assessments
☐ Modify Content
☐ Modify Amount
☐ Small Group Intervention/Remediation

☐ Individual Intervention/Remediation
☐ Additional Support Materials
☐ Guided Notes
☐ Graphic Organizers
☐ Adjust Pacing of Content
☐ Increase one on one time
☐ Peer Support
☐ Other Modifications for Special Education:

Winslow Township School District

Mathematics Curriculum – Geometry

Unit 1

Suggested Modifications for At-Risk Students
Formative and summative data will be used to monitor student success. At first signs of failure, student work will be reviewed to determine support. This may include parent consultation, basic skills review and differentiation strategies. With considerations to UDL, time may be a factor in overcoming developmental considerations

☐ Provide the opportunity to re-take tests	☐ Modify Content
☐ Increase one on one time	☐ Modify Amount
☐ Oral prompts can be given	☐ Adjust Pacing of Content
☐ Using visual demonstrations, illustrations, and models	☐ Small Group Intervention/Remediation
☐ Give directions/instructions verbally and in simple written format	☐ Individual Intervention/Remediation
☐ Peer Support	☐ Additional Support Materials
☐ Modify activities/assignments/projects/assessments	☐ Guided Notes
☐ Additional time to complete activities/assignments/projects/assessments	☐ Graphic Organizers
☐ Provide an option for alternative activities/assignments/projects/assessments	☐ Other Modifications for Students At-Risk:

Suggested for English Language Learners	Suggested Modifications for Gifted Students
All WIDA Can Do Descriptors can be found at this link: https://wida.wisc.edu/teach/can-do/descriptors ☐ Grades 9-12 WIDA Can Do Descriptors: 　　☐ Listening ☐ Speaking 　　☐ Reading ☐ Writing 　　☐ Oral Language Students will be provided with accommodations and modifications that may include: • Relate to and identify commonalities in mathematics studies in student's home country • Assist with organization • Use of computer • Emphasize/highlight key concepts • Teacher Modeling • Peer Modeling • Label Classroom Materials - Word Walls	Students excelling in mastery of standards will be challenged with complex, high level challenges related to the topic. • Raise levels of intellectual demands • Require higher order thinking, communication, and leadership skills • Differentiate content, process, or product according to student's readiness, interests, and/or learning styles • Provide higher level texts • Expand use of open-ended, abstract questions • Critical and creative thinking activities that provide an emphasis on research and in-depth study • Enrichment Activities/Project-Based Learning/ Independent Study Additional Strategies may be located at the links: ❖ Gifted Programming Standards ❖ Webb's Depth of Knowledge Levels and/or Revised Bloom's Taxonomy ❖ REVISED Bloom's Taxonomy Action Verbs

Winslow Township School District

Mathematics Curriculum – Geometry

Unit 1

Suggested Activities	
☐ Do Now/Warm-Up	☐ Centers
☐ Whole Group	☐ Intervention/Remediation
☐ Small Groups	☐ Projects
☐ Guided Practice	☐Academic Games
☐ Independent Practice	☐ Other Suggested Activities:

Interdisciplinary Connections

Big Ideas Real-Life STEM Videos and Performance Tasks
Interdisciplinary Connections: ELA
 NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
NJSLSA.W2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content
NJSLSA.L1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking
SL.9-10.4: Present information, findings and supporting evidence clearly, concisely and logically. The content, organization, development and style are appropriate to task, purpose and audience.
NJSLSA.L6: Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.

Integration of Computer Science and Design Thinking NJSLS 8

8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms.
8.1.12.AP.2: Create generalized computational solutions using collections instead of repeatedly using simple variables.
8.1.12.AP.8: Evaluate and refine computational artifacts to make them more usable and accessible.
8.2.12.ETW.2: Synthesize and analyze data collected to monitor the effects of a technological product or system on the environment. • 8.2.12.ETW.3: Identify a complex, global environmental or climate change issue, develop a systemic plan of investigation, and propose an innovative sustainable solution.