Englewood Public School District
Geometry
First Marking Period

Unit 1: Geometric Terms, Proofs, and Parallel Lines

Overview: During this unit, students will gain an understanding of basic geometric terms and proofs and learn about the relationships between angles when parallel lines are cut by a transversal.

Time Frame: 43 to 47 Days

Enduring Understandings:
- *Nets can be used to make solid figures.*
- *Isometric drawings and orthographic drawings can be used to show attributes of figures.*
- *Undefined terms such as point, line, and plane can be represented with visual drawings.*
- *A postulate is a truth without a formal proof.*
- *Segments can be measured with and without a coordinate grid.*
- *Protractors can be used to measure angles.*
- *Patterns can lead to conjectures.*
- *Solving equations is similar to proofs.*
- *Geometric relationships can be proved using given information, definitions, properties, postulates and theorems.*
- *Parallel lines have the same slope whereas perpendicular lines have negative reciprocal slopes.*
- *Triangle-Angle Sum Theorem states that all three angles in a triangle add to 180 degrees.*
- *Equations of lines can be written using slope-intercept form or point-slope form.*

Essential Questions:
- *How can you represent a three dimensional figure with a two-dimensional drawn?*
- *What are the building blocks of geometry?*
- *How can you describe the attributes of a segment or angle?*
- *How can you make a conjecture and prove that it is true?*
- *How do you prove that two lines are parallel?*
- *What is the sum of the measures of the angles of a triangle?*
- *How do you write an equation of a line in the coordinate plane?*

Standards	Topics and Objectives	Activities	Resources	Assessments
MP1, MP3, MP4, MP5, MP6, MP7 **N-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.** **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.** **G-CO.C.9 Prove theorems about lines and angles.** **G-CO.C.10 Prove theorems about triangles.** **G-CO.C.11** **G-CO.D.12 Make formal geometric constructions with a variety of tools and methods** **G-CO.D.13 Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.** **G-GPE.B.5 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems** **G-GPE.B.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.** **G-MG.A.3 Use volume formulas for cylinders,**	**Topics** Points, lines, planes, angle pairs, constructions, midpoints, midpoint and distance in the coordinate plane, perimeter, circumference, area, proving angles congruent, parallel and perpendicular lines Twenty-First Century Themes and Skills include: • The Four C's **Objectives** Students will • Make nets and drawings of three dimensional figures • Understand basic terms and postulates in geometry • Find and compare lengths of segments and angles • Identify special angle pairs and use their relationships to find angle measures • Make basic constructions using a compass and protractor • Find the midpoint of a segment • Find the distance between two points in the coordinate plane • Find the perimeter or circumference and area of basic shapes • Use inductive reasoning to make conjectures • Recognize conditional statements and their parts • Write converses, inverses,	Standards Solution Common Core Geometry Lessons: • Special Angle Relationships • Parallel and Perpendicular Lines on a Coordinate Plane • Defining the Foundations of Geometry Defining Parallel Lines https://www.illustrativemathematics.org/content-standards/HSG/CO/A/1/tasks/1543 Defining Perpendicular Lines https://www.illustrativemathematics.org/content-standards/HSG/CO/A/1/tasks/1544 Angle Bisections and Midpoints of a Line Segment https://www.illustrativemathematics.org/content-standards/HSG/CO/D/12/tasks/1320 Bisecting an Angle https://www.illustrativemathematics.org/content-standards/HSG/CO/D/12/tasks/1083 Construction of Perpendicular Bisector https://www.illustrativemathematics.org/content-standards/HSG/CO/D/12/tasks/966 Origami Equilateral Triangle https://www.illustrativemathem	Pearson Realize Chapters 1, 2, 3 Standards Solution Common Core Lessons Illustrative Mathematics https://www.illustrativemathematics.org/ National Library of Virtual Manipulatives http://nlvm.usu.edu/ Alabama Learning Exchange http://alex.state.al.us/search.php?fa_submit=ALLPLANS Arizona Math Flipbook http://www.azed.gov/azcommoncore/files/2012/11/high-school-ccss-flip-book-usd-259-2012.pdf NYC Department of Education http://schools.nyc.gov/default.htm Mathematics Assessment Project http://map.mathshell.org/ Texas Instruments https://education.ti.com/en/us/home Desmos https://teacher.desmos.com/ Worksheets for every topic: http://kutasoftware.com/free.html	**Formative Assessments:** Textbook Pages 41, 75, 76, 105, 133, 134, 181, 211, 212 Math journal (NJSLSA.R1, NJSLSA.W2, NJSLSA.L1, SL.9-10.4, NJSLSA.L6) **Summative Assessments:** Multiple choice / short answer assessments (CRP2, CRP4, CRP8) Chapter quizzes/tests • Pearson Realize • MathXL Grade 10 Geometry Common Core Assessment 1, Standards Solution **Benchmark Assessment:** Common Formative Assessment **Alternative Assessments:** Learning centers: each learning center focuses on a different type of problem (9.3.ST.2, 9.3.ST-ET.5)

pyramids, cones, and spheres to solve problems.	and contrapositives of conditionals • Write bi-conditionals and recognize good definitions • Use the law of detachment and law of syllogism • Connect reasoning in algebra and geometry • Prove and apply theorems about angles • Identify relationships between figures in space • Identify angles formed by two lines and a transversal • Prove theorems about parallel lines • Use properties of parallel lines to find angle measures • Determine if two lines are parallel • Relate parallel and perpendicular lines • Use parallel lines to prove a theorem about triangles • Find measures of angles of a triangle • Construct parallel and perpendicular lines • Graph and write linear equations • Relate slope to parallel and perpendicular lines	atics.org/content-standards/HSG/CO/D/12/tasks/1486 Origami Regular Octagon https://www.illustrativemathematics.org/content-standards/HSG/CO/D/12/tasks/1487 Geoboard-Circular http://nlvm.usu.edu/en/nav/frames_asid_285_g_4_t_3.html?open=activities&from=category_g_4_t_3.html Human Angles http://alex.state.al.us/lesson_view.php?id=33088 The Geometry Around Us http://alex.state.al.us/lesson_view.php?id=32420 Parallel Photography http://alex.state.al.us/lesson_view.php?id=27471 Creating Parallel Lines and Transversals https://education.ti.com/en/us/activity/detail?id=25B0DA6D34F543A19AC0207EE8C8DBF1&ref=/en/us/activity/search/advanced EOC: Are they Special Angles? https://education.ti.com/en/us/activity/detail?id=EEBE06C3E87043208347C34E03C594A5&ref=/en/us/activity/search/advanced	(CRP2, CRP4, CRP8, 9.3.ST.2, 9.3.ST-ET.5) Algebra assessments, interactive, videos, games, lessons, homework: https://www.opened.com/search?area=mathematics&grade=9&offset=0&resource_type=interactive-assessment (CRP2, CRP4, CRP8, 9.3.ST.2, 9.3.ST-ET.5, 8.1.12.A.3) Algebra common core worksheets: https://www.ixl.com/math/algebra-1 (CRP2, CRP4, CRP8, 9.3.ST.2, 9.3.ST-ET.5) Khan Academy – videos, lessons, assessments www.khanacademy.org (CRP2, CRP4, CRP8, CRP11, 9.3.ST.2, 9.3.ST-ET.5, 8.1.12.A.3) Worksheets / assessment items for all topics based on standards: http://jmap.org/JMAP_RESOURCES_BY_TOPIC.htm#AI (CRP2, CRP4, CRP8, 9.3.ST.2, 9.3.ST-ET.5)	Create posters illustrating the main objectives of the unit (CRP6)

Back to the Basics
https://education.ti.com/en/us/activity/detail?id=3CCC50D8B57F42F6B2D6323DEE135CB1&ref=/en/us/activity/search/advanced

Exploring Perpendicular and Angle Bisectors
https://education.ti.com/en/us/activity/detail?id=8E6B7727CBC64CDE8D0A7EB10169CD6C&ref=/en/us/activity/search/advanced

Angle Relationships
https://education.ti.com/en/us/activity/detail?id=13A0EC8AF99A46B8999A37F1D03AEB1F&ref=/en/us/activity/search/advanced

Measuring Segments and Angles
https://education.ti.com/en/us/activity/detail?id=E1624FFF70134A28B3BF5DE7CDB35788&ref=/en/us/activity/search/advanced

Lines, Transversals, and Angles
https://teacher.desmos.com/activitybuilder/custom/56fd6cb1bfa5cb4206f88f5f

Everything you need to know about math journals:
https://thecornerstoneforteachers.com/math-journals/
(NJSLSA.R1, NJSLSA.W2, NJSLSA.L1, SL.9-10.4, NJSLSA.L6)

Additional texts:
www.newsela.com
www.readworks.org
www.commonlit.org

Key Vocabulary:
Angle bisector, congruent segments, construction, isometric drawing, linear pair, net, orthographic drawing, perpendicular bisector, postulate, segment bisector, supplementary angles, vertical angles, bi-conditional, conclusion, conditional, conjecture, contrapositive, converse, deductive reasoning, hypothesis, inductive reasoning, inverse, negation, theorem, alternate exterior angles, alternate interior angles, corresponding angles, exterior angles of a polygon, parallel lines, same-side interior angles, skew lines, transversal

Accommodations and Modifications:

Students with special needs: Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. 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. Additional staff should be included so all students can fully participate in the standards associated with this curriculum.

ELL/ESL students: Students will be supported according to the recommendations for "can do's" as outlined by WIDA - https://www.wida.us/standards/CAN_DOs/

Students at risk of school failure: 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. More time will be made available with a certified instructor to aid students in reaching the standards.

Gifted and Talented Students: Students excelling in mastery of standards will be challenged with complex, high level challenges.

English Language Learners:	**Special Education:**	**At-Risk:**	**Gifted and Talented:**
• Teaching modeling • Peer modeling • Word walls • Give directions in small steps and in as few words as possible	• Utilize modifications & accommodations delineated in the students' IEP • Work with paraprofessional • Work with a partner • Shorten assignments to	• Use visual demonstrations, illustrations and models • Give directions / instructions verbally and in simple written format • Peer support	• Inquiry based instruction • Independent study • Higher order thinking skills • Adjusting the pace of the lessons

• Provide visual aids • Group similar problems together • Repeat directions when necessary • Provide a vocabulary list with definitions • Use of alge-tiles when needed • Use of number line when needed	focus on mastery or key concepts • Maintain adequate space between desks • Keep workspaces clear of unrelated materials • Provide fewer problems to attain passing grades • Tape a number line to the student's desk • Create a math journal that they can use during class, on assignments and (if teacher allows) on assessments • Provide extra time to complete a task when needed • Provide definitions of different graphs / charts with illustrations • Allow tests to be taken in a separate room • Allow students to use a calculator when appropriate • Divide test into small sections of similar questions or problems • Use of alge-tiles when needed • Use of number line when needed	• Increased one – on – one time • Teachers may modify instructions by modeling what the student is expected to do • Instructions may be printed out in large print and hung up for the students to see during the time of the lesson • Review behavior expectations and make adjustments • Create a math journal that they can use during class, on assignments and (if teacher allows) on assessments • Allow students to complete an independent project as an alternative test • Use of alge-tiles when needed • Use of number line when needed	• Real world scenarios • Student driven instruction • Allow students to complete an independent project as an alternative test

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.

21st Century Standards

9.2.12.C.1: Review career goals and determine steps necessary for attainment.
9.2.12.C.2: Modify Personalized Student Learning Plans to support declared career goals.
9.3.ST.2: Use technology to acquire, manipulate, analyze and report data.
9.3.ST-ET.5: Apply the knowledge learned in STEM to solve problems.

Career Ready Practices:

CRP2: Apply appropriate academic and technical skills
CRP4: Communicate clearly and effectively and with reason
CRP6: Demonstrate creativity and innovation
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them
CRP11: Use technology to enhance productivity

Technology Standards:

8.1.12.A.3: Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.

Major **Supporting** **Additional** (Identified by PARCC Model Content Frameworks)