Unit 1: Points, Lines, Planes, and Angles

Content Area: **Mathematics**
Course(s): **Geometry, Honors Geometry**
Time Period: **September**
Length: **2 weeks**
Status: **Published**

Unit Overview

- Classify a polygon to find the area and perimeter.
- Find and compute the measures of different types of angles.
- Find the distance between two points using the distance formula.
- Introduce Pythagorean Theorem and relation to distance formula.
- Sketch various examples of intersections of lines and planes.
- Solve problems using angle pair relationships.
- Use a compass and or midpoint formula to find or construct angle and segment bisectors.
- Use formulas to solve real-life application problems involving perimeter, area, and circumference.

Enduring Understandings

- Geometric figures can be described and compared through measurement.
- Spatial relationships can be clearly described with geometric properties.
- Various relationships exist between geometric figures. These relationships can be illustrated verbally, visually, and symbolically.

Essential Questions

- How are plane figures measured and compared?
- How are undefined terms incorporated in geometric properties?
- Where in the real world are geometric relationships found?

Student Learning Objectives

- To draw representations of points, lines, and planes
- To find distances
- To name angles and find their measures
- To recognize what you can conclude from a diagram
- To use postulates and theorems relating points, lines, and planes
- To use symbols for lines, segments, rays, and distances
- To use the segment addition postulate and the angle addition postulate
- To use the term equidistant

- To use the terms collinear, coplanar, and intersection
- To use the undefined terms point, line, and plane

Standards

MA.K-12.1	Make sense of problems and persevere in solving them. Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.
MA.K-12.3	Construct viable arguments and critique the reasoning of others. Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments. Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

MA.G-MG	Modeling with Geometry
	Geometry

Indicators

MA.G-MG.A	Apply geometric concepts in modeling situations
MA.G-MG.A.1	Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder). Although there are many types of geometry, school mathematics is devoted primarily to plane Euclidean geometry, studied both synthetically (without coordinates) and analytically (with coordinates). Euclidean geometry is characterized most importantly by the Parallel Postulate, that through a point not on a given line there is exactly one parallel line. (Spherical geometry, in contrast, has no parallel lines.) During high school, students begin to formalize their geometry experiences from elementary and middle school, using more precise definitions and developing careful proofs. Later in college some students develop Euclidean and other geometries carefully from a small set of axioms. An understanding of the attributes and relationships of geometric objects can be applied in diverse contexts—interpreting a schematic drawing, estimating the amount of wood needed to frame a sloping roof, rendering computer graphics, or designing a sewing pattern for the most efficient use of material.

Lesson Titles

- Angles and their measure
- Distance
- Points, Lines, and Planes

Career Readiness, Life Literacies & Key Skills

WRK.9.2.12.CAP.3	Investigate how continuing education contributes to one's career and personal growth.
TECH.9.4.2.CI.2	Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).
TECH.9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
TECH.9.4.2.DC.3	Explain how to be safe online and follow safe practices when using the internet (e.g., 8.1.2.NI.3, 8.1.2.NI.4).
TECH.9.4.2.TL.2	Create a document using a word processing application.
TECH.9.4.2.TL.3	Enter information into a spreadsheet and sort the information.

Inter-Disciplinary Connections

LA.RL.9-10.1	Cite strong and thorough textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferentially, including determining where the text leaves matters uncertain.

LA.RI.9-10.1	Accurately cite strong and thorough textual evidence, (e.g., via discussion, written response, etc.) and make relevant connections, to support analysis of what the text says explicitly as well as inferentially, including determining where the text leaves matters uncertain.
LA.RST.9-10.4	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.
LA.RI.9-10.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper).
LA.WHST.9-10.1.E	Provide a concluding paragraph or section that supports the argument presented.
LA.L.9-10.6	Acquire and use accurately 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 considering a word or phrase important to comprehension or expression.
ARCH.9-12.9.4.12.B.(1).3	Integrate structural, environmental, safety, building envelope, and building service systems in the design of buildings and structures.

Instructional Strategies. Learning Activities. and Levels of Blooms/DOK:

- Intro. Angles
- Intro. Distance between two points
- Intro. Lines
- Intro. Lines
- Intro. Midpoints
- Intro. Planes
- Intro. points
- Intro. Postulates
- Intro. Postulates and theorems relating points, lines and planes
- Intro. Rays
- Intro. Segments
- Intro. Theorems
- Review anticipatory Set
- Review Homework
- Review Quiz
- Review Standardized testing warmup
- students will take a quiz on planes & angles
- students will take a quiz on points & lines
- students will take a unit test on points, lines planes & angles

Modifications:

ELLs Modifications

- 1:1 testing
- Group students
- Offer alternate/or modify assessments
- Tutoring during Delsea One
- Use graphic organizer

IEP - 504 modifications

- providing study guides that don't lead the student to study too much extraneous information (less unnecessary details)/scaffolded study guides
- students could use calculator and/or other math tools (x grids, chips, etc)
- teaching the main ideas/concepts (limiting not needed details)to be taught and repeating them in several different ways over several different days (goal is 7 different ways same concept for students with learning disabilities)
- Tutoring during Delsea One

At Risk Modifications

- Additional help during tutoring/Delsea One/Academic Enrichment
- Retesting
- Speaking to students privately when redirecting behaviors
- study guides
- Tutoring during Delsea One

Alternative Assessments

Performance tasks

Project-based assignments

Problem-based assignments

Presentations

Benchmark Assessment

Skills-based assessment- math practice

Formative Assessment

- closure angle bisector
- closure midpoint distance postulate
- journal write
- pass out of class
- think-pair-share
- warm up distance formula
- warm up segment addition postulate

Summative Assessment

- Alternate Assessment
- Marking Period Assessment
- Test- Angles, classify and measure, Add postulate and bisector
- Test-Points, lines, rays, segments, Add postulate, midpoint and distance

Resources & Technology

Resources and Materials

- Geometry Text Book- McDougal – Littell
- Manipulatives
- Protractor
- Ruler
- Study Guide and Practice Sheet – Glencoe/McGraw Hill
- Teacher Created worksheets
- Teacher Generated worksheets

Technology

- Geometer sketchpad

- Mathxl
- Smart Board
- Ti-84 calculator
- Videos

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.