Unit 01 - Basics of Geometry

Content Area: **Mathematics**
Course(s):
Time Period: **Marking Period 1**
Length: **2-3 weeks**
Status: **Published**

Brief Summary of Unit

In this chapter, students will achieve and exhibit with excellence how to understand basic terms and postulates of geometry, find and compare lengths of segments, find and compare the measures of angles, and identify special angle pairs and use their relationships to find angle measures.

Revision Date: July 2024

Standards

Students will analyze geometric designs which connects to various cultures. Embracing the diversity within society incorporates the following:

Amistad Commission

This unit also reflects the goals of the Department of Education and the Amistad Commission including the infusion of the history of Africans and African-Americans into the curriculum in order to provide an accurate, complete, and inclusive history regarding the importance of of African-Americans to the growth and development of American society in a global context.

Asian American and Pacific Islander History Law

This unit includes instructional materials that highlight the history and contributions of Asian Americans and Pacific Islanders in accordance with the New Jersey Student Learning Standards in Social Studies.

New Jersey Diversity and Inclusion Law

In accordance with New Jersey’s Chapter 32 Diversity and Inclusion Law, this unit includes instructional materials that highlight and promote diversity, including:

economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and

sexual orientation, race and ethnicity, disabilities, and religious tolerance.

9.2.12.CAP.3	Investigate how continuing education contributes to one's career and personal growth.
9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.
L.KL.9–10.2.A	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.
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.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.GPE.B.7	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.
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).
SL.PE.11–12.1.A	Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.

Essential Questions

- How do you construct a segment, or its congruent segment?
- How do you construct an angle and how can these skills be applied in careers such as engineering?
- How do you find the distance of a segment?
- How do you find the midpoint of a segment?
- How do you name and classify an angle?
- How do you solve a linear pair or vertical angles?
- What are complimentary, supplementary, and adjacent angles?
- What is a polygon? And how do you find its perimeter and area?
- What is an angle bisector? How do you add angles together?
- What is the difference between defined terms and undefined terms?

Enduring Understandings

- Find midpoints and lengths of segments.
- Identify and use pairs of angles using real world applications.
- Measure, construct, and describe angles using real world applications.

- Understanding the properties of line segments supports accurate geometric constructions and solving real-world measurement challenges.
- Use defined terms and undefined terms to explore and solve geometric problems.

Students Will Know

- How to construct segments and angles.
- How to measure segments and angles.
- How to use formulas in the coordinate plane.
- Names of points, lines, and planes.

Students Will Be Skilled At

- Constructing a segment bisector.
- Constructing an angle bisector.
- Constructing congruent angles.
- Copying a line segment.
- Defining and naming segments and rays.
- Describing a point, a line, and a plane.
- Executing angle relationships involving parallel lines, as well as perpendicular lines.
- Explaining and using the Segment Addition Postulate.
- Finding angle measures.
- Finding angles measures in pairs of angles.
- Finding lengths of segments.
- Finding the midpoint of a segment.
- Identifying complimentary and supplementary angles.
- Identifying linear pairs and vertical angles.
- Measuring a line segment.
- Measuring and classifying angles.
- Sketching intersections of lines and planes.

Evidence/Performance Tasks

Assessments

- Formative: Daily assessments using examples from class notes, NJSLA test bank problems, and/or Albert/AP Classroom assessments
- Summative: Teacher-created assessments, NJSLA test bank problems, Big Ideas Math online platform problems, Albert/AP Classroom and/or Big Ideas Math unit assessments
- Benchmark: DeltaMath or teacher created diagnostic assessments in addition to unit

assessments from Big Ideas Math

- Alternative Assessments: Student-centered activities such as scavenger hunts, various projects involving real world applications, and differentiated learning tasks in Khan Academy, and DeltaMath

- Answer essential questions
- Class discussion of daily topic
- Classwork and homework that assess the essential questions
- Provide alternative means of assessments for certain students
- Teacher Observation
- Tests and quizzes that assess the essential questions
- Written assignments that assess the essential questions that involves providing explanations

Learning Plan

The following list is meant to create a day-to-day plan. Teachers are encouraged to slow down or condense days as appropriate to the student population in the class. Assessment(s) should be given when appropriate.

- Begin by discussing the undefined and defined terms, and sketching various types of intersections.
- Introduce the Ruler Postulate and Segment Addition Postulate. Remind students that previous knowledge of midpoints allows thoughts of congruent segments to be connected. Pass out materials for constructing segments.
- Students will likely need additional time to understand both postulates from yesterday. Weave in as many algebra solving skills as possible, using the postulates and congruent segments.
- Remind students of midpoint and distance formulas. Extend the concept of midpoint to segment bisector.
- Have students recall as much as possible about polygons and specific names for them. Distinguish between convex and concave figures. Discuss on how to find the perimeter of a given shape in a coordinate plane. Discuss how to find the area of given shapes, and how to find the needed information when the given shape is in a coordinate plane.
- Identify the parts of an angle, how to name it, and types of angles. Pass out materials for measuring an angle and constructing one. Connect from segments to congruent angles, as well as the Angles Addition Postulate. This will also be the perfect time to discuss angle bisectors.
- Introduce adjacent angles, complimentary angles, and supplementary angles. Connect concepts to find a linear pair and vertical angles. Encourage students to draw the various angle relationships discussed. Determine what concepts from Chapter 1 you can and cannot assume from a diagram.
- Students will likely need additional time to understand the angle information from both recent lessons. Weave in as many algebra solving skills as possible.

Materials

Core instructional materials: Core Book List including Big Ideas Math Common Core Geometry

Supplemental materials: Khan Academy, Edia, DeltaMath

- District approved textbook
- Khan Academy
- SMART Board
- Teacher created activiites
- Teacher created notes
- Whiteboard tables

Suggested Strategies for Modifications

Possible accommodations/modification for Geometry