Unit 10 Quadrilaterals and Other Polygons

Content Area: **Mathematics**
Course(s):
Time Period: **Marking Period 4**
Length: **2 weeks**
Status: **Published**

Brief Summary of Unit

Students will prove theorems about parallelograms. They will also use coordinates and properties of trapezoids and kites to find measures. Students will derive a formula for the sum of the measures of the interior angles of a polygon and then learn about the sum of the measures of the exterior angles of a polygon. The remaining sections are about special quadrilaterals.

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.

ELA.K-12.2	Adapting Communication: Adapting communication in response to the varying demands of audience, task, purpose, and discipline.
ELA.K-12.4	Building Knowledge: Building strong content knowledge and connecting ideas across disciplines using a variety of text resources and media.
MATH.9-12.G.CO.C.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.
MATH.9-12.G.GMD.A.3	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.
MATH.9-12.G.GPE.B.4	Use coordinates to prove simple geometric theorems algebraically.
CS.K-12.3.a	Identify complex, interdisciplinary, real-world problems that can be solved computationally.
CS.K-12.3.b	Decompose complex real-world problems into manageable sub-problems that could integrate existing solutions or procedures.
TEC.K-12.8.1	All students will use computer applications to gather and organize information and to solve problems.
TEC.K-12.8.2	All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world as they relate to the individual society, and the environment.
WORK.K-12.9.1	All students will develop career awareness and planning, employability skills and foundational knowledge necessary for success in the workplace.
WORK.K-12.9.2	All students will develop career awareness and planning, employability skills and foundational knowledge necessary for success in the workplace.

Essential Questions

- How can you classify quadrilaterals?
- How can you find the sum of the measures of polygon angles?
- How can you use coordinate geometry to prove general relationships?

Enduring Understandings

- A deep understanding of the properties, classifications, and relationships of quadrilaterals and other polygons provides a foundation for solving geometric problems and applying these concepts in real-world contexts such as architecture, engineering, and design.
- Parallelograms and trapezoids have unique properties (or characteristics) that can be derived using congruent triangles.
- You can find the area of a parallelogram or a triangle when you know the length of the base and its height.

Students Will Know

- How to describe the properties of parallelograms.
- How to find angles of polygons.
- How to find the area of quadrilaterals.
- How to identify special quadrilaterals.
- How to use properties of parallelograms.

Students Will Be Skilled At

- Explaining how special parallelograms are related.
- Explaining the hierarchy of quadrilaterals.
- Finding areas of regular polygons.
- Finding areas of rhombuses and kites.
- Finding missing lengths that make a quadrilateral a parallelogram.
- Finding missing measures of special parallelograms.
- Finding the exterior angle measures of polygons.
- Finding the interior angles measures of polygons.
- Finding the sum of the interior angles measures of a polygon.
- Identifing features of a parallelogram.
- Identifying special quadrilaterals.
- Identifying trapezoids and kites.
- Proving properties of parallelograms.
- Proving that a quadrilateral is a parallelogram.
- Showing that a quadrilateral in the coordinate plane is a parallelogram.
- Solving problems involving parallelograms in the coordinate plane.
- Using properties of parallelograms.
- Using properties of trapezoids and kites to solve problems.

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: IXL 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, DeltaMath, and

IXL

- 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

Unit 10: Chapter 7, Quadrilaterals and Other Polygons (1-2 days per topic, 9 days instruction, 2 days practice/review, 1 days assessment for 12 days)

- Angles of Polygons 7.1
    - Interior Angle Theorem, Finding Sum of Angles, Finding the number of sides of a polygon
    - Exterior Angle Theorem
- Properties of Parallelograms 7.2
    - Opposite Sides Theorem
    - Opposite Angles Theorem
    - Consecutive Angles Theorem
    - Diagonals Theorem
- Proving that a Quadrilateral is a Parallelogram 7.3
    - Use converse theorems to prove that a quadrilateral is a parallelogram
    - Summary of ways to prove that a quadrilateral is a parallelogram
- Properties of Special Parallelograms 7.4
    - Define Rhombus, Square and Rectangle (Venn Diagram)
    - Use properties of diagonals
- Properties of Trapezoids and Kites 7.5
    - Identify Trapezoids and properties associated with Trapezoids
    - Identify Kites and properties associated with Kites
- Area of Polygons 11.3

- Formula of area of Rhombuses and Kites using diagonals
- Find angle measure in regular polygons

Materials

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

Supplemental materials: Khan Academy, Edia, DeltaMath

- District approved textbook and ancillary materials
- Online resources: Khan Academy, IXL, Delta Math, Edia, Geogebra
- Teacher created activiites
- Teacher created notes

Suggested Strategies for Modifications

Possible accommodations/modification for Geometry CP.