Unit 05: Inequalities

Content Area: **Mathematics**
Course(s): **Mathematics**
Time Period: **Week 12**
Length: **2 Weeks**
Status: **Published**

Unit Overview

In this unit, students will explore the concept that three segments do not always form a triangle and the relationship that exists between the lengths of the sides of a triangle and the measures of the angles that are opposite those sides. Students will also explore the relationships that can exist between sides and angles of triangles that are not congruent.

Standards

MA.G-CO.C.10	Prove theorems about triangles.
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).

Essential Questions

1) What relationships exist between the side lengths and the angles of a triangle?

2) What relationships exist between the sides and the angles of two triangles?

3) How can algebraic principles be used to solve problems or prove geometric statements?

Application of Knowledge and Skills...

Students will know that...

- 1) the transitive, addition, and multiplication properties can be applied to inequalities as well as the negative multiplication property of inequalities.
- 2) the sum of the lengths of any two sides of a triangle is greater than the length of the third side.
- 3) the angle opposite the longest side of a triangle is the greatest angle in the triangle.
- 4) the side opposite the greatest angle is the longest side of the triangle.
- 5) if two sides of one triangle are congruent to two sides of another triangle and the included angle in the first triangle is greater than that in the second triangle, then the remaining side of the first triangle is

greater than the remaining side in the second triangle.

- 6) if two sides of one triangle are congruent to two sides of another triangle and the third side of the first triangle is greater than the third side of the second triangle, then the angle opposite the third side in the first triangle is greater than the angle opposite the third side in the second triangle.

Students will be skilled at...

Students will be able to:

- a) use algebraic properties of inequality to solve inequalities.
- b) apply the Triangle Inequality Postulate to solve problems.
- c) apply the Exterior-Angle-Inequality Theorem to solve problems.
- c) use the Hinge Theorems to determine the relative measures of sides and angles.

Assessments

- Daily Formative Assessments Formative: Other written assessments Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.
- Pre-Assessment Diagnostic: Other written assessments Students will be assessed on their prior knowledge of the Triangle Inequality Postulate and the relative measures of side lengths and measures of angles in triangles.
- Unit Test Summative: Written Test Students will be assessed on their knowledge of the relationships that exist between the lengths of the sides of a triangle and the measures of the angles that are opposite those sides.

Activities

Communicator Practice

Students will complete differentiated practice problems on SmartPal response boards.

Cooperative Problem-Solving

Students will work cooperatively on challenge problems. This work may be presented by students, discussed as a class, or turned in for grading and comments.

Drawing and Comparing Triangles

Students will draw a variety of triangles and measure the unknown side lengths and angle measures. This will lead to the discovery that the side opposite the largest angle is the longest side in a triangle.

Activities to Differentiate Instruction

Interactive Smartboard Activities will be utilized.

Students will work in mixed-level groups.

Students will be assigned optional and mandatory challenge problems on homework assignments.

Enrichment worksheets will be available for classwork and/or homework.

Guided notes and study guides will be provided accordingly.

Appropriately-leveled problems for students to complete. Proofs can range from having few steps to requiring multiple steps using multiple geometric figures.

Integrated/Cross-Disciplinary Instruction

Students will understand that writing geometry proofs is similar to writing persuasive essays. They must take given information, build supporting details, and draw a conclusion.

Resources

McDougal Littell *Geometry for Enjoyment and Challenge* textbook and resources

Smartboard

Smart Exchange

McDougal Littell *Activity Generator* CD-ROM

Protractors

Rulers

Smart Exchange

21st Century Skills

CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP8.1	Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.
CRP.K-12.CRP11.1	Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.
CRP.K-12.CRP12.1	Career-ready individuals positively contribute to every team, whether formal or informal. They apply an awareness of cultural difference to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.