Unit 03: Congruent Triangles

Content Area: **Mathematics**
Course(s): **Mathematics**
Time Period: **Week 7**
Length: **3 Weeks**
Status: **Published**

Unit Overview

During this unit, students will work with the properties and features of triangles. They will begin their study by identifying congruent figures. They will use previously learned theorems as well as triangle congruence postulates to prove that two triangles are congruent. The students will extend this knowledge, along with the concept that corresponding parts of congruent triangles are congruent (CPCTC), to prove various conclusions. Students will also use theorems about isosceles and equilateral triangles to find missing measurements and to write proofs

Standards

MA.G-CO.B.6	Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.
MA.G-CO.B.7	Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.
MA.G-CO.B.8	Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.
MA.G-CO.C.10	Prove theorems about triangles.
MA.G-SRT.B.5	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Essential Questions

1) Why is proof necessary?

2) How does writing proofs allow us to support claims that we believe to be true?

3) Why do we need multiple postulates to prove that two triangles are congruent?

Application of Knowledge and Skills...

Students will know that...

- 1) two geometric figures are congruent if and only if all corresponding parts are congruent.
- 2) the reflexive property is applicable when a side or an angle is shared by two figures.
- 3) triangles can be proven congruent by using the SSS, SAS, ASA, and HL postulates.
- 4) corresponding parts of congruent triangles are congruent (CPCTC).
- 5) overlapping figures share common angle(s) or side(s).
- 6) isosceles triangles have two congruent sides and congruent base angles.
- 7) equilateral triangles are equiangular.
- 8) right triangles can be proven congruent by using the HL postulate.

Students will be able to...

- a) identify the corresponding parts of congruent figures.
- b) use the reflexive property when proving figures congruent.
- c) prove triangles to be congruent using the triangle congruence postulates.
- d) use CPCTC to prove congruency and draw conclusions.
- e) use overlapping triangles in proofs.
- f) find missing measurements and write proofs involving isosceles and equilateral triangles.
- g) prove right triangles to be congruent using the HL postulate.

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 classification of triangles, the sum of triangles' angles, and congruent figures.
- Unit Quiz Formative: Written Test Students will be assessed on identifying congruent figures and their corresponding parts, proving triangles congruent, and using CPCTC in proofs.
- Unit Test Summative: Written Test Students will be assessed on identifying congruent figures and their corresponding parts, proving triangles congruent, using CPCTC in proofs, using overlapping triangles in proofs, and using properties of isosceles triangles, equilateral triangles, and perpendicular bisectors in proofs.

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 submitted for grading and comments.

Triangle Congruence Postulates Investigations

Students will complete investigations from the *Activity Generator* in which they will either discover or confirm triangle congruence postulates. This includes the SSS, SAS, and ASA postulates. Students will also complete an investigation, which will provide multiple counterexamples that disprove the SSA postulate for proving triangle congruency.

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

Straws and string (for Triangle Congruence SSS Postulate Investigation)

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.