

Unit 2 Title	Estimated Time Frame
Triangles	40 days or 20 block days
Big Idea (s)	
<p>Geometric figures are named precisely, based on their properties. Congruent figures have identical properties but lie in different positions or orientations. Once an essential number of facts are known, figures can be found to be congruent, which means that all corresponding sides and angles are congruent. Proving and applying congruence in triangles provides a basis for modeling more complex problems geometrically.</p>	
Essential Question(s)	
<p>In what ways can congruence be useful? How can relationships between angles be used to solve problems? How can I use rigid motion to prove figures congruent? How can I use the properties of isosceles and equilateral triangles to solve for missing values? How can I determine whether or not 3 side lengths can form a triangle? How can I prove a line is a perpendicular bisector? How can I prove a ray is an angle bisector?</p>	
<p>Standards for Mathematical Practice (MP.) - The practice standards in bold describe expertise to be intentionally developed in this unit.</p>	<p>Kentucky Interdisciplinary Literacy Practices (KILP.) - The practice standards in bold describe expertise to be intentionally developed in Mathematics.</p>
<p>MP.1. Make sense of problems and persevere in solving them. MP.2. Reason abstractly and quantitatively. MP.3. Construct viable arguments and critique the reasoning of others. MP.4. Model with mathematics. MP.5. Use appropriate tools strategically. MP.6. Attend to precision. MP.7. Look for and make use of structure. MP.8. Look for and express regularity in repeated reasoning.</p>	<p>KILP.1 Recognize that text is anything that communicates a message. KILP.2 Employ, develop, and refine schema to understand and create text. KILP.3 View literacy experiences as transactional, interdisciplinary and transformational. KILP.4 Utilize receptive and expressive language arts to better understand self, others, and the world. KILP.5 Apply strategic practices, with scaffolding & then independently, to approach new literacy tasks. KILP.6 Collaborate with others to create new meaning. KILP.7 Utilize digital resources to learn and share with others. KILP.8 Engage in specialized, discipline specific literacy practices. KILP.9 Apply high level cognitive processes to think deeply and critically about text. KILP.10. Develop a literacy identity that promotes lifelong learning.</p>

Common Preconceptions/Misconceptions

Students may have difficulty expressing their thinking in more formal ways. The teacher needs to encourage precision in oral and written communication. Classroom dialogue can also help students see the limitations of their thinking.

Make sure to review the Pythagorean Theorem with Perpendicular Bisector problems.

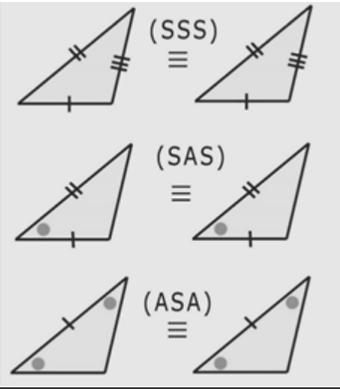
Some students may find it easier to identify the longest side in a triangle by ordering the angles from smallest to largest and using that list to order the sides.

Prerequisites:

- Use reflections, rotations, and translations to determine if an image can be a transformation of a preimage.

Grade Level Skills:

- Show triangles are congruent by mapping one triangle onto another.
- Determine if two triangles are congruent by showing corresponding pairs of sides and if corresponding pairs of angles are congruent.
- Use SSS, SAS, and ASA to determine if two triangles are congruent.
- Use SSS, SAS, and ASA to solve problems with congruent triangles
- Use the definition of congruence in rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.
- Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

KAS Standards	Considerations	Samples of Learning Intentions and Success Criteria
<p>KY.HS.G.5 Know and apply the concepts of triangle congruence:</p> <p>a. 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.</p> <p>b. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.</p> <p>MP.3, MP.6</p>	 <p>Students will use SSS, SAS, and ASA to not only show congruence but also find measures of triangle parts.</p>	<p>We are learning to use and explain triangle congruence (ASA, SAS, and SSS). (Lesson 4-3, 4-4, 4-5)</p> <ul style="list-style-type: none"> • I can relate congruence to rigid motions. • I can demonstrate that two figures are congruent by using one or more rigid motions to map one onto the other. • I can prove triangle congruence by AAS, SAS, ASA, and SSS criteria. Include HL. <p>We are learning to intentionally select and/or calculate measures when determining criteria for triangle congruence. (Lesson 4-6)</p> <ul style="list-style-type: none"> • I can use triangle congruence to solve problems.

KY.HS.G.6 Apply theorems for lines, angles, triangles, and parallelograms.
MP.2, MP.3

Theorems for lines and angles include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent, and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.

Theorems for triangles include: measures of interior angles of a triangle sum to 180° ; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.

We are learning to use previously learned definitions, theorems, postulates, and properties of lines, angles, triangles, and parallelograms to draw conclusions and make inferences.

- I can write congruence statements identifying corresponding parts of congruent figures. **(Lesson 4-1)**
- I can use the properties of isosceles triangles to find missing sides and angles. **(Lesson 4-2)**
- I can use properties of equilateral triangles to find missing sides and angles **(Lesson 4-2)**
- I can prove that two triangles are congruent. **(Lesson 4-3, 4-4)**
- I can determine if three segments can form a triangle. **(Lesson 5-4)**

We are learning to use parts of a triangle to solve problems. **(Lesson 5-1, 5-2, 5-3)**

- I can use the Angle Bisector Theorem to find missing values in triangles.
- I can use the Perpendicular Bisector Theorem to find missing values in triangles.
- I can define the median and altitude of a triangle.
- I can sketch and identify the median and altitude of a triangle.

Supporting Standards

KY.HS.G.21 Use coordinates to justify and prove simple geometric theorems algebraically. **MP.2, MP.6**

KY.HS.G.22 Justify and apply the slope criteria for parallel and perpendicular lines and use them to solve geometric problems. **MP.3, MP.7**

KY.HS.G.24 Use coordinates within the coordinate plane to calculate measurements of two dimensional figures.

- Compute the perimeters of various polygons.
- Compute the areas of triangles, rectangles and other quadrilaterals. ★ **MP.2, MP.4**

KY.HS.G.29 Use geometric shapes, their measures and their properties to describe objects in real world settings. **MP.1, MP.4**

KY.HS.G.31 Apply geometric methods to solve design problems. ★ **MP.1, MP.4**

Essential Vocabulary, Theorems, and Postulates

Essential Vocabulary by Topic	Essential Theorems/Postulates by Topic
acute, obtuse, right, equiangular, equilateral, isosceles, scalene, congruence statement, legs of isosceles triangle, base angles, vertex angle, included angle, included side, non-included side, hypotenuse, legs of right triangle, median, altitude, perpendicular bisector, angle bisector, acute triangle, right triangle, obtuse triangle, equilateral, equiangular, scalene, isosceles, exterior angle of a triangle, interior angle of a triangle, legs of an isosceles triangle, base angles, vertex angle of an isosceles triangle, mid-segment, median, altitude, interior angle, exterior angle, triangle	Triangles: <ul style="list-style-type: none"> • Reflexive Property • Isosceles Triangle Theorem • Converse of Isosceles Triangle Theorem • Side–Side–Side (SSS) • Side–Angle–Side (SAS) • Angle–Side–Angle (ASA) • Angle–Angle–Side (AAS) • Corresponding Parts of Congruent Triangles are Congruent (CPCTC) • Hypotenuse–Leg Theorem (HL) • Perpendicular Bisector Theorem • Pythagorean Theorem

Common Assessment

Common Assessment Unit 2 Geometry

Anchor Resources

enVision Topic 4 - Triangle Congruence	enVision Topic 5 - Relationships in Triangles (11 days)
MILC - MILC Topic 4 resources	MILC - MILC Topic 5 resources
FAL (one per semester): Evaluating Conditions for Congruency	3 Act - 3 Act: Best Triangle
3 Act Math Task - 3 Act: Best Triangle	

*Disclaimer: Success Criteria is the evidence students must produce to demonstrate learning. This example is not comprehensive.

** Mathematical Practices (A.MP.1- 8) should be evidenced at some point throughout each unit, depending on the explored tasks. It is important to note that MP. 2 should support learning in every lesson.

*** Modeling Standards: Modeling is best interpreted not as a collection of isolated topics but rather in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards indicated by a star symbol (★). The star symbol sometimes appears on the heading for a group of standards; in that case, it should be understood to apply to *all* standards in that group.