Unit 2
Transformations, Triangles, and Quadrilaterals

Geometry

Unit Description:

Building upon content studied in 8th grade math, students will further explore transformations, including rotations around points other than the origin. Additionally, students will deepen their understanding of transformations and their connection to the idea of congruence. Students use the properties of triangles and special quadrilaterals to write proofs and solve real-world problems.

Standards for Mathematical Practice

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.

Louisiana Student Standards for Mathematics (LSSM)

Parts of standards that are addressed in later units have been ~~crossed out~~.

G-CO: Congruence	
A. Experiment with transformations in the plane.	
G-CO.A.2	Represent transformations in the plane using, e.g. transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).
G-CO.A.3	Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.
G-CO.A.4	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
G-CO.A.5	Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.
B. Understand congruence in terms of rigid motions.	

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.
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.
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.
C. Prove and apply geometric theorems.	
G-CO.C.9	Prove theorems about lines and angles. Theorems 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.
G-CO.C.10	Prove theorems about triangles. Theorems 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.
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.
D. Make geometric constructions.	
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-SRT: Similarity, Right Triangles, and Trigonometry	
B. Prove and apply theorems involving similarity	
G-SRT.B.5	Use congruence ~~and similarity~~ criteria for triangles to solve problems and to prove relationships in geometric figures

Enduring Understandings:

- Since many geometric figures in the real world are not stationary, transformations provide a way for us to describe their movement.
- The geometric relationships that come from proving triangles congruent may be

Essential Questions:

- What is the significance of symbols and "good definitions" in geometry?
- How are geometric transformations represented as functional relationships?
- How can transformations determine whether figures are congruent?

used to prove relationships between geometric objects. • Communicating mathematically valid arguments are central to the study of mathematics. • Transformations, symmetry, and spatial reasoning can be used to analyze and model mathematical situations.	• How can reasoning be used to establish or refute conjectures? • How does my understanding of algebraic principles help me solve geometric problems?