

# HPISD Geometry Mathematics TEKS Matrix 2011-2012

**Six Weeks:**    **1**    **2**    **3**    **4**    **5**    **6**

The student:

- understands the structure of, and relationships within, an axiomatic system;
- analyzes geometric relationships in order to make and verify conjectures;
- applies logical reasoning to justify and prove mathematical statements.

The student is expected to:

<b>Geometric Structure</b>	Develop an awareness of the structure of a mathematical system, connecting definitions, postulates, logical reasoning, and theorems. <b>G.1A</b>	x	x	x			
	Recognize the historical development of geometric systems and know mathematics is developed for a variety of purposes. <b>G.1B</b>	x				x	
	Compare and contrast the structures and implications of Euclidean and non-Euclidean geometries. <b>G.1C</b>						
	Use constructions to explore attributes of geometric figures and to make conjectures about geometric relationships. <b>G.2A</b>	x	x		x		
	Make conjectures about angles, lines, polygons, circles, and three-dimensional figures and determine the validity of the conjectures, choosing from a variety of approaches such as coordinate, transformational, or axiomatic. <b>G.2B</b>	x	x	x	x	x	x
	Determine the validity of a conditional statement, its converse, inverse, and contrapositive. <b>G.3A</b>	x					
	Construct and justify statements about geometric figures and their properties. <b>G.3B</b>	x	x	x			
	Use logical reasoning to prove statements are true and find counter examples to disprove statements that are false. <b>G.3C</b>	x					
	Use inductive reasoning to formulate a conjecture. <b>G.3D</b>	x					
	Use deductive reasoning to prove a statement. <b>G.3E</b>	x	x	x			

The student uses a variety of representations to describe geometric relationships and solve problems. The student is expected to:

<b>Geometric Patterns and Representations</b>	Select an appropriate representation (concrete, pictorial, graphical, verbal, or symbolic) in order to solve problems. Use symbols to represent unknowns and variables. <b>G.4A</b>						
	Use numeric and geometric patterns to develop algebraic expressions representing geometric properties; <b>G.5A</b>	x	x	x	x	x	x
	Use numeric and geometric patterns to make generalizations about geometric properties, including properties of polygons, ratios in similar figures and solids, and angle relationships in polygons and circles; <b>G.5B</b>	x	x	x	x	x	x
	Use properties of transformations and their compositions to make connections between mathematics and the real world, such as tessellations; <b>G.5C</b>				x		
	Identify and apply patterns from right triangles to solve meaningful problems, including special right triangles (45-				x	x	

	45-90 and 30-60-90) and triangles whose sides are Pythagorean triples. <b>G.5D</b>						
<p>The student:</p> <ul style="list-style-type: none"> <li>analyzes the relationship between three-dimensional geometric figures and related two-dimensional representations and uses these representations to solve problems;</li> <li>understands that coordinate systems provide convenient and efficient ways of representing geometric figures and uses them accordingly.</li> </ul> <p>The student is expected to:</p>							
Dimensionality and the Geometry of Location	Describe and draw the intersection of a given plane with various three-dimensional geometric figures. <b>G.6A</b>		X			X	
	Use nets to represent and construct three-dimensional geometric figures. <b>G.6B</b>					X	
	Use orthographic and isometric views of three-dimensional geometric figures to represent and construct three-dimensional geometric figures and solve problems. <b>G.6C</b>					X	
	Use one- and two-dimensional coordinate systems to represent points, lines, rays, line segments, and figures. <b>G.7A</b>	X		X	X		
	Use slopes and equations of lines to investigate geometric relationships, including parallel lines, perpendicular lines, and special segments of triangles and other polygons. <b>G.7B</b>	X	X	X			
	Derive and use formulas involving length, slope, and midpoint. <b>G.7C</b>	X	X	X	X	X	
<p>The student:</p> <ul style="list-style-type: none"> <li>uses tools to determine measurements of geometric figures and extends measurement concepts to find perimeter, area, and volume in problem situations;</li> <li>analyzes properties and describes relationships in geometric figures;</li> <li>applies the concept of congruence to justify properties of figures and solve problems.</li> </ul> <p>The student is expected to:</p>							
Congruence and the Geometry of Size	Find areas of regular polygons, circles, and composite figures. <b>G.8A</b>				X	X	
	Find areas of sectors and arc lengths of circles using proportional reasoning. <b>G.8B</b>				X	X	
	Derive, extend, and use the Pythagorean Theorem. <b>G.8C</b>			X	X	X	
	Find surface areas and volumes of prisms, pyramids, spheres, cones, cylinders, and composites of these figures in problem situations. <b>G.8D</b>					X	
	Use area models to connect geometry to probability and statistics. <b>G.8E</b>						
	Use conversions between measurement systems to solve problems in real-world situations. <b>G.8F</b>						
	Formulate and test conjectures about the properties of parallel and perpendicular lines based on explorations and concrete models. <b>G.9A</b>	X	X				
	Formulate and test conjectures about the properties and attributes of polygons and their component parts based on explorations and concrete models. <b>G.9B</b>		X	X	X	X	
	Formulate and test conjectures about the properties and attributes of circles and the lines that intersect them based on explorations and concrete models. <b>G.9C</b>						X
Analyze the characteristics of polyhedra and other three-dimensional figures and their component parts based on					X		

	explorations and concrete models. <b>G.9D</b>						
	Use congruence transformations to make conjectures and justify properties of geometric figures including figures represented on a coordinate plane <b>G.10A</b>		<b>X</b>		<b>X</b>		
	Justify and apply triangle congruence relationships. <b>G.10B</b>		<b>X</b>				
The student applies the concepts of similarity to justify properties of figures and solve problems. The student is expected to:							
Similarity and the Geometry of Shape	Use and extend similarity properties and transformations to explore and justify conjectures about geometric figures; <b>G.11A</b>			<b>X</b>	<b>X</b>		
	Use ratios to solve problems involving similar figures; <b>G.11B</b>			<b>X</b>	<b>X</b>	<b>X</b>	
	Develop, apply, and justify triangle similarity relationships, such as right triangle ratios, trigonometric ratios, and Pythagorean triples using a variety of methods <b>G.11C</b>			<b>X</b>	<b>X</b>		
	Describe the effect on perimeter, area, and volume when one or more dimensions of a figure are changed and apply this idea in solving problems. <b>G.11D</b>				<b>X</b>	<b>X</b>	