Module Correlation Chart

TEKS

§111.34. Geometry (One Credit).

(A) Basic understandings.

(1) Foundation concepts for high school mathematics. As presented in Grades K-8, the basic understandings of number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry; measurement; and probability and statistics are essential foundations for all work in high school mathematics. Students continue to build on this foundation as they expand their understanding through other mathematical experiences.

(2) Geometric thinking and spatial reasoning. Spatial reasoning plays a critical role in geometry; shapes and figures provide powerful ways to represent mathematical situations and to express generalizations about space and spatial relationships. Students use geometric thinking to understand mathematical concepts and the relationships among them.

(3) Geometric figures and their properties. Geometry consists of the study of geometric figures of zero, one, two, and three dimensions and the relationships among them. Students study properties and relationships having to do with size, shape, location, direction, and orientation of these figures.

(4) The relationship between geometry, other mathematics, and other disciplines. Geometry can be used to model and represent many mathematical and real-world situations. Students perceive the connection between geometry and the real and mathematical worlds and use geometric ideas, relationships, and properties to solve problems.

(5) Tools for geometric thinking. Techniques for working with spatial figures and their properties are essential in understanding underlying relationships. Students use a variety of representations (concrete, pictorial, algebraic, and coordinate), tools, and technology, including, but not limited to, powerful and accessible hand-held calculators and computers with graphing capabilities to solve meaningful problems by representing figures, transforming figures, analyzing relationships, and proving things about them.

(6) Underlying mathematical processes. Many processes underlie all content areas in mathematics. As they do mathematics, students continually use

problem-solving, computation in problem-solving contexts, language and communication, connections within and outside mathematics, and reasoning, as well as multiple representations, applications and modeling, and justification and proof.

Texas Essential Knowledge and Skills			Modules
(1)	**Geometric structure: The student understands the structure of, and relationships within, an axiomatic system. Following are performance descriptions. The student is expected to:**		
	(A)	develops an awareness of the structure of a mathematical system, connecting definitions, postulates, logical reasoning, and theorems; and	2, 3
	(B)	Through the historical development of geometric systems, the student recognizes that mathematics is developed for a variety of purposes; and	1, 4, 13
	(C)	compares and contrasts the structures and implications of Euclidean and non-Euclidean geometries.	4
(2)	**Geometric structure: The student analyzes geometric relationships in order to make and verify conjectures. Following are performance descriptions. The student is expected to:**		
	(A)	uses constructions to explore attributes of geometric figures and to make conjectures about geometric relationships; and	2, 3
	(B)	makes and verifies conjectures about angles, lines, polygons, circles, and three-dimensional figures, choosing from a variety of approaches such as coordinate, transformational, or axiomatic.	4, 5, 12, 13
(3)	**Geometric structure: The student understands the importance of logical reasoning, justification, and proof in mathematics. Following are performance descriptions. The student is expected to:**		
	(A)	determines if the converse of a conditional statement is true or false; and	2
	(B)	constructs and justifies statements about geometric figures and their properties; and	3
	(C)	demonstrates what it means to prove mathematically that statements are true; and	2
	(D)	uses inductive reasoning to formulate a conjecture; and	2
	(E)	uses deductive reasoning to prove a statement.	2
(4)	**Geometric patterns: The student identifies, analyzes, and describes patterns that emerge from two- and three-dimensional geometric figures. The student is expected to:**		
	(A)	uses 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;	6, 7
	(B)	uses properties of transformations and their compositions to make connections between mathematics and the real world	12

		in applications such as tessellations or fractals; and	
	(C)	identifies and applies patterns from right triangles to solve problems, including special right triangles (45-45-90 and 30-60-90) and triangles whose sides are Pythagorean triples.	8

(5)	**Dimensionality and the geometry of location: The student analyzes the relationship between three-dimensional objects and related two-dimensional representations and uses these representations to solve problems. The student is expected to:**		
	(A)	describes, and draws cross sections and other slices of three-dimensional objects; and	12
	(B)	uses nets to represent and construct three-dimensional objects; and	12
	(C)	uses top, front, side, and corner views of three-dimensional objects to create accurate and complete representations and solve problems	12
(6)	**Dimensionality and the geometry of location: The student understands that coordinate systems provide convenient and efficient ways of representing geometric figures and uses them accordingly. The student is expected to:**		
	(A)	uses one- and two-dimensional coordinate systems to represent points, lines, line segments, and figures; and	13
	(B)	uses slopes and equations of lines to investigate geometric relationships, including parallel lines, perpendicular lines, and special segments of triangles and other polygons; and	13
	(C)	develops and uses formulas including distance and midpoint.	13
(7)	**Congruence and the geometry of size: The student extends measurement concepts to find area, perimeter, and volume in problem situations. The student is expected to:**		
	(A)	finds areas of regular polygons and composite figures; and	10
	(B)	finds areas of sectors and arc lengths of circles using proportional reasoning; and	10
	(C)	develops, extends, and uses the Pythagorean Theorem; and	8
	(D)	finds surface areas and volumes of prisms, pyramids, spheres, cones, and cylinders in problem situations.	11
(8)	**Congruence and the geometry of size: The student analyzes properties and describes relationships in geometric figures. The student is expected to:**		
	(A)	Based on explorations and using concrete models, the student formulates and tests conjectures about the properties of parallel and perpendicular lines; and	13
	(B)	Based on explorations and using concrete models, the student formulates and tests conjectures about the properties and attributes of polygons and their component parts; and	6, 9, 10
	(C)	Based on explorations and using concrete models, the student formulates and tests conjectures about the properties and attributes of circles and the lines that intersect them; and	9

	(D)	The student analyzes the characteristics of three-dimensional figures and their component parts.	11
(9)	**Congruence and the geometry of size: The student applies the concept of congruence to justify properties of figures and solve problems The student is expected to:**		
	(A)	uses congruence transformations to make conjectures and justify properties of geometric figures; and	12
	(B)	justifies and applies triangle congruence relationships.	8

(10)	**Similarity and the geometry of shape: The student applies the concepts of similarity to justify properties of figures and solve problems. The student is expected to:**		
	(A)	The student uses similarity properties and transformations to explore and justify conjectures about geometric figures; and	7
	(B)	uses ratios to solve problems involving similar figures; and	7
	(C)	develops, applies, and justifies triangle similarity relationships, such as right triangle ratios, trigonometric ratios, and Pythagorean triples; and	8
	(D)	describe the effect on perimeter, area, and volume when length, width, or height of a three-dimensional solid is changed and applies this idea in solving problems.	12