Hickman County Curriculum Map

Geometry
First Nine Weeks

Course Level Expectations	Checks for Understanding	Student Performance Indicator(s)
Course Level Expectations **1st half of 1st nine weeks** *(four & one half week section #1):* *#1,2,3,4-1* **CLE 3108.1.1** Use mathematical language, symbols, definitions, proofs and counterexamples correctly and precisely in mathematical reasoning. *#1,2,3,4-1* **CLE 3108.1.2** Apply and adapt a variety of appropriate strategies to problem solving, including testing cases, estimation, and then checking induced errors and the reasonableness of the solution. *#1,2,3,4-1* **CLE 3108.1.3** Develop inductive and deductive reasoning to independently make and evaluate mathematical arguments and	**Checks for Understanding** **(Formative/Summative Assessment)** **1st half of 1st nine weeks** *(four & one half week section #1):* *#1,2,3,4-1* **3108.1.1** Check solutions after making reasonable estimates in appropriate units of quantities encountered in contextual situations. *#1-1* **3108.1.3** Comprehend the concept of length on the number line. *#1-1* **3108.1.4** Recognize that a definition depends on undefined terms and on previous definitions. *#1,2,3,4-1* **3108.1.5** Use technology, hands-on activities, and manipulatives to develop the language and the concepts of geometry, including specialized vocabulary (e.g. graphing calculators, interactive geometry software such as Geometer's Sketchpad and Cabri, algebra tiles, pattern blocks,	**State Performance Indicators** *(four & one half week section #3):* *#1,2,3,4-1* **SPI 3108.1.1** Give precise mathematical descriptions or definitions of geometric shapes in the plane and space. *#1,2,3,4-1* **SPI 3108.1.3** Use geometric understanding and spatial visualization of geometric solids to solve problems and/or create drawings. *#1,2,3,4-1* **SPI 3108.1.4** Use definitions, basic postulates, and theorems about points, lines, angles, and planes to write/complete proofs and/or to solve problems. *#1,2,3,4-1* **SPI 3108.2.1** Analyze, apply, or interpret the relationships between basic number concepts and geometry (e.g. rounding and pattern identification in measurement, the relationship of pi to other rational and irrational numbers) *#1,3-1* **SPI 3108.2.2** Perform operations on vectors in various representations.

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construct appropriate proofs; include various types of reasoning, logic, and intuition.

#1,2,3,4-1
CLE 3108.1.4 Move flexibly between multiple representations (contextual, physical written, verbal, iconic/pictorial, graphical, tabular, and symbolic), to solve problems, to model mathematical ideas, and to communicate solution strategies.

#1,2,3,4-1
CLE 3108.1.5 Recognize and use mathematical ideas and processes that arise in different settings, with an emphasis on formulating a problem in mathematical terms, interpreting the solutions, mathematical ideas, and communication of solution strategies.

#1,2,3,4-1
CLE 3108.1.6 Employ reading

tessellation tiles, MIRAs, mirrors, spinners, geoboards, conic section models, volume demonstration kits, Polydrons, measurement tools, compasses, PentaBlocks, pentominoes, cubes, tangrams).

#1,2,3,4-1
3108.1.6 Use inductive reasoning to write conjectures and/or conditional statements.

#1,2,3,4-1
3108.1.7 Recognize the capabilities and the limitations of calculators and computers in solving problems.

#1,2,3,4-1
3108.1.10 Use visualization, spatial reasoning, and geometric modeling to solve problems.

#1-1
3108.1.12 Connect the study of geometry to the historical development of geometry.

#1,2,3,4-1
3108.1.13 Use proofs to further develop and deepen the understanding of the study of geometry (e.g. two-column, paragraph, flow, indirect, coordinate).

#1,2,3,4-1
SPI 3108.3.1 Use algebra and coordinate geometry to analyze and solve problems about geometric figures (including circles).

#1,2,3,4-1
SPI 3108.3.2 Use coordinate geometry to prove characteristics of polygonal figures.

#1-1
SPI 3108.4.1 Differentiate between Euclidean and non-Euclidean geometries.

#1-1
SPI 3108.4.2 Define, identify, describe, and/or model plane figures using appropriate mathematical symbols (including collinear and non-collinear points, lines, segments, rays, angles, triangles, quadrilaterals, and other polygons).

#1,2,3,4-1
SPI 3108.4.3 Identify, describe and/or apply the relationships and theorems involving different types of triangles, quadrilaterals and other polygons.

#1,2,3,4-1
SPI 3108.4.7 Compute the area and/or perimeter of triangles, quadrilaterals and other polygons when one or more additional steps are required (e.g. find

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and writing to recognize the major themes of mathematical processes, the historical development of mathematics, and the connections between mathematics and the real world. *#1,2,3,4-1* **CLE 3108.1.7** Use technologies appropriately to develop understanding of abstract mathematical ideas, to facilitate problem solving, and to produce accurate and reliable models. *#1,2-1* **CLE3108.2.1** Establish the relationships between the real numbers and geometry; explore the importance of irrational numbers to geometry. *#1-1* **CLE3108.2.2** Explore vectors as a numeric system, focusing on graphic representations and the properties of the operation. *#1,2,3,4-1*	*#1,2,3,4-1* **3108.1.14** Identify and explain the necessity of postulates, theorems, and corollaries in a mathematical system. *#1,2,3,4-1* **3108.2.3** Recognize and apply real number properties to vector operations and geometric proofs (e.g. reflexive, symmetric, transitive, addition, subtraction, multiplication, division, distributive, and substitution properties). *#1,2-1* **3108.3.2** Connect coordinate geometry to geometric figures in the plane (e.g. midpoints, distance formula, slope, and polygons). *#1,2-1* **3108.3.4** Apply the midpoint and distance formulas to points and segments to find midpoints, distances, and missing information in two and three dimensions. *#1-1* **3108.4.1** Recognize that there are geometries, other than Euclidean geometry, in which the parallel postulate is not true and discuss unique properties of each.	missing dimensions given area or perimeter of the figure, using trigonometry). *#1,2,4-1* **SPI 3108.4.8** Solve problems involving area, circumference, area of a sector, and/or arclength of a circle.

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CLE3108.2.3 Establish an ability to estimate, select appropriate units, evaluate accuracy of calculations and approximate error in measurement in geometric settings. *#1-1* **CLE 3108.4.1** Develop the structures of geometry, such as lines, angles, planes, and planar figures, and explore their properties and relationships. *#1,2,3,4-1* **CLE 3108.4.3** Develop an understanding of the tools of logic and proof, including aspects of formal logic as well as construction of proofs. and with technology. *#1,4-1* **CLE 3108.4.6** Generate formulas for perimeter, area, and volume, including their use, dimensional analysis, and applications.	*#1-1* **3108.4.2** Compare and contrast inductive reasoning and deductive reasoning for making predictions and valid conclusions based on contextual situations. *#1-1* **3108.4.3** Solve problems involving betweeness of points and distance between points (including segment addition). *#1,2,3,4-1* **3108.4.4** Describe and recognize minimal conditions necessary to define geometric objects. *#1,2-1* **3108.4.6** Describe the intersection of lines (in the plane and in space), a line and a plane, or of two planes. *#1,2,3,4-1* **3108.4.10** Identify and apply properties and relationships of special figures (e.g., isosceles and equilateral triangles, family of quadrilaterals, polygons, and solids). *#1,2,3,4-1*	

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#1,2,3,4-1 **CLE 3108.5.1** Analyze, interpret, employ and construct accurate statistical graphs.	**3108.4.15** Identify, write, and interpret conditional and bi-conditional statements along with the converse, inverse, and contra-positive of a conditional statement. *#1,2,3,4-1* **3108.4.16** Analyze and create truth tables to evaluate conjunctions, disjunctions, conditionals, inverses, contra-positives, and bi-conditionals. *#1,2,3,4-1* **3108.4.17** Use the Law of Detachment, Law of Syllogism, conditional statements, and bi-conditional statements to draw conclusions. *#1,2,3,4-1* **3108.4.18** Use counterexamples, when appropriate, to disprove a statement. *#1,2,3,4-1* **3108.4.20** Prove key basic theorems in geometry (i.e., Pythagorean Theorem, the sum of the angles of a triangle is 180 degrees, characteristics of quadrilaterals, and the line joining the midpoints of two sides of a triangle is parallel to the third side and half its length). *#1,2-1*	

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3108.4.21 Use properties of and theorems about parallel lines, perpendicular lines, and angles to prove basic theorems in Euclidean geometry (e.g., two lines parallel to a third line are parallel to each other, the perpendicular bisectors of line segments are the set of all points equidistant from the endpoints, and two lines are parallel when the alternate interior angles they make with a transversal are congruent).

#1-1
3108.4.45 Use the converse of the Pythagorean Theorem to classify a triangle by its angles (right, acute, or obtuse).

#1,2-1
3108.4.46 Apply properties of 30° - 60° - 90° and 45° - 45° - 90° to determine side lengths of triangles.

#1,2,3,4-1
3108.5.2 Translate from one representation of data to another (e.g., bar graph to pie graph, pie graph to bar graph, table to pie graph, pie graph to chart) accurately using the area of a sector.

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Course Level Expectations 2nd half 1st nine weeks (four & one half week section #2):	Checks for Understanding (Formative/Summative Assessment) 2nd half 1st nine weeks (four & one half week section #2):	State Performance Indicators (four & one half week section #2):
#1,2,3,4-2 **CLE 3108.1.1** Use mathematical language, symbols, definitions, proofs and counterexamples correctly and precisely in mathematical reasoning.	*#1,2,3,4-2* **3108.1.1** Check solutions after making reasonable estimates in appropriate units of quantities encountered in contextual situations.	*#1,2,3,4-2* **SPI 3108.1.1** Give precise mathematical descriptions or definitions of geometric shapes in the plane and space.
#1,2,3,4-2 **CLE 3108.1.2** Apply and adapt a variety of appropriate strategies to problem solving, including testing cases, estimation, and then checking induced errors and the reasonableness of the solution.	*#1,2,3,4-2* **3108.1.5** Use technology, hands-on activities, and manipulatives to develop the language and the concepts of geometry, including specialized vocabulary (e.g. graphing calculators, interactive geometry software such as Geometer's Sketchpad and Cabri, algebra tiles, pattern blocks, tessellation tiles, MIRAs, mirrors, spinners, geoboards, conic section models, volume demonstration kits, Polydrons, measurement tools, compasses, PentaBlocks, pentominoes, cubes, tangrams).	#1,2,3,4-2 **SPI 3108.1.3** Use geometric understanding and spatial visualization of geometric solids to solve problems and/or create drawings.
#1,2,3,4-2 **CLE 3108.1.3** Develop inductive and deductive reasoning to independently make and evaluate mathematical arguments and construct appropriate proofs; include various types of	*#1,2,3,4-2* **3108.1.6** Use inductive reasoning to write conjectures and/or conditional statements. *#1,2,3,4-2*	#1,2,3,4-2 **SPI 3108.1.4** Use definitions, basic postulates, and theorems about points, lines, angles, and planes to write/complete proofs and/or to solve problems. *#1,2,3,4-2* **SPI 3108.2.1** Analyze, apply, or interpret the relationships between basic number concepts and geometry (e.g. rounding and pattern identification in measurement, the relationship of pi to other rational and irrational numbers) *#1,2,3,4-2* **SPI 3108.3.1** Use algebra and coordinate geometry to analyze and solve problems about geometric figures (including circles).

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reasoning, logic, and intuition. *#1,2,3,4-2* **CLE 3108.1.4** Move flexibly between multiple representations (contextual, physical written, verbal, iconic/pictorial, graphical, tabular, and symbolic), to solve problems, to model mathematical ideas, and to communicate solution strategies. *#1,2,3,4-2* **CLE 3108.1.5** Recognize and use mathematical ideas and processes that arise in different settings, with an emphasis on formulating a problem in mathematical terms, interpreting the solutions, mathematical ideas, and communication of solution strategies. *#1,2,3,4-2* **CLE 3108.1.6** Employ reading and writing to recognize the	**3108.1.7** Recognize the capabilities and the limitations of calculators and computers in solving problems. *#2,3-2* **3108.1.9** Expand analysis of units of measure to include area and volume. *#1,2,3,4-2* **3108.1.10** Use visualization, spatial reasoning, and geometric modeling to solve problems. *#2-2* **3108.1.11** Identify and sketch solids formed by revolving two-dimensional figures around lines. *#1,2,3,4-2* **3108.1.13** Use proofs to further develop and deepen the understanding of the study of geometry (e.g. two-column, paragraph, flow, indirect, coordinate). *#1,2,3,4-2* **3108.1.14** Identify and explain the necessity of postulates, theorems, and corollaries in a mathematical system. *#2-2*	*#1,2,3,4-2* **SPI 3108.3.2** Use coordinate geometry to prove characteristics of polygonal figures. *#2-2* **SPI 3108.3.3** Describe algebraically the effect of a single transformation (reflections in the x- or y-axis, rotations, translations, and dilations) on two-dimensional geometric shapes in the coordinate plane. *#1,2,3,4-2* **SPI 3108.4.2** Define, identify, describe, and/or model plane figures using appropriate mathematical symbols (including collinear and non-collinear points, lines, segments, rays, angles, triangles, quadrilaterals, and other polygons). *#1,2,3,4-2* **SPI 3108.4.3** Identify, describe and/or apply the relationships and theorems involving different types of triangles, quadrilaterals and other polygons. *#1,2,3,4-2* **SPI 3108.4.7** Compute the area and/or perimeter of triangles, quadrilaterals and other polygons when one or more additional steps are required (e.g. find

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major themes of mathematical processes, the historical development of mathematics, and the connections between mathematics and the real world.	**3108.2.1** Analyze properties and aspects of pi (e.g. classical methods of approximating pi, irrational numbers, Buffon's needle, use of dynamic geometry software).	missing dimensions given area or perimeter of the figure, using trigonometry).
#1,2,3,4-2 **CLE 3108.1.7** Use technologies appropriately to develop understanding of abstract mathematical ideas, to facilitate problem solving, and to produce accurate and reliable models.	*#2-2* **3108.2.2** Approximate pi from a table of values for the circumference and diameter of circles using various methods (e.g. line of best fit).	*#1,2,4-2* **SPI 3108.4.8** Solve problems involving area, circumference, area of a sector, and/or arclength of a circle.
#1,2-2 **CLE3108.2.1** Establish the relationships between the real numbers and geometry; explore the importance of irrational numbers to geometry.	*#1,2,3,4-2* **3108.2.3** Recognize and apply real number properties to vector operations and geometric proofs (e.g. reflexive, symmetric, transitive, addition, subtraction, multiplication, division, distributive, and substitution properties).	*#2,3-2* **SPI 3108.4.10** Identify, describe, and/or apply transformations on two and three dimensional geometric shapes. *#2,3-2* **SPI 3108.4.11** Use basic theorems about similar and congruent triangles to solve problems.
#1,2,3,4-2 **CLE3108.2.3** Establish an ability to estimate, select appropriate units, evaluate accuracy of calculations and approximate error in measurement in geometric	*#2,3-2* **3108.2.4** Add vectors graphically and algebraically. *#2,3-2* **3108.2.5** Multiply a vector by a scalar graphically and algebraically. *#2-2*	*#2,3,4-2* **SPI 3108.4.14** Use properties of right triangles to solve problems (such as involving the relationship formed when the altitude to the hypotenuse of a right triangle is drawn).

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settings. *#2-2* **CLE 3108.3.1** Use analytic geometry tools to explore geometric problems involving parallel and perpendicular lines, circles, and special points of polygons. *#2,4-2* **CLE 3108.3.2** Explore the effect of transformations on geometric figures and shapes in the coordinate plane. *#2,3-2* **CLE 3108.4.7** Apply the major concepts of transformation geometry to analyzing geometric objects and symmetry. *#1,2,3,4-2* **CLE 3108.4.8** Establish processes for determining congruence and similarity of figures, especially as related to scale factor, contextual	**3108.3.1** Prove two lines are parallel, perpendicular, or oblique using coordinate geometry. *#1,2-2* **3108.3.2** Connect coordinate geometry to geometric figures in the plane (e.g. midpoints, distance formula, slope, and polygons). *#1,2-2* **3108.3.4** Apply the midpoint and distance formulas to points and segments to find midpoints, distances, and missing information in two and three dimensions. *#2-2* **3108.3.5** Use mapping notation to identify the image of a transformation given the coordinates of the pre-image. *#2-2* **3108.3.6** Identify a transformation given its mapping notation. *#1,2,3,4-2* **3108.4.4** Describe and recognize minimal conditions necessary to define geometric objects.	

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applications, and transformations. *#1,2,3,4-2* **CLE 3108.5.1** Analyze, interpret, employ and construct accurate statistical graphs.	*#1,2-2* **3108.4.6** Describe the intersection of lines (in the plane and in space), a line and a plane, or of two planes. *#2,3-2* **3108.4.7** Identify perpendicular planes, parallel planes, a line parallel to a plane, skew lines, and a line perpendicular to a plane. *#2,3-2* **3108.4.8** Apply properties and theorems about angles associated with parallel and perpendicular lines to solve problems. *#2,3,4-2* **3108.4.10** Identify and apply properties and relationships of special figures (e.g., isosceles and equilateral triangles, family of quadrilaterals, polygons, and solids). *#2,3-2* **3108.4.14** Identify and use medians, midsegments, altitudes, angle bisectors, and perpendicular bisectors of triangles to solve problems (e.g., find segment lengths, angle	

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	measures, points of concurrency). *#1,2,3,4-2* **3108.4.15** Identify, write, and interpret conditional and bi-conditional statements along with the converse, inverse, and contra-positive of a conditional statement. *#1,2,3,4-2* **3108.4.16** Analyze and create truth tables to evaluate conjunctions, disjunctions, conditionals, inverses, contra-positives, and bi-conditionals. *1,2,3,4-2* **3108.4.17** Use the Law of Detachment, Law of Syllogism, conditional statements, and bi-conditional statements to draw conclusions. *#1,2,3,4-2* **3108.4.18** Use counterexamples, when appropriate, to disprove a statement. *#2,3,4-2* **3108.4.19** Use coordinate geometry to prove properties of plane figures. *#1,2,3,4-2*	

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	3108.4.20 Prove key basic theorems in geometry (i.e., Pythagorean Theorem, the sum of the angles of a triangle is 180 degrees, characteristics of quadrilaterals, and the line joining the midpoints of two sides of a triangle is parallel to the third side and half its length). *#1,2-2* **3108.4.21** Use properties of and theorems about parallel lines, perpendicular lines, and angles to prove basic theorems in Euclidean geometry (e.g., two lines parallel to a third line are parallel to each other, the perpendicular bisectors of line segments are the set of all points equidistant from the endpoints, and two lines are parallel when the alternate interior angles they make with a transversal are congruent). *#2,3-2* **3108.4.22** Perform basic geometric constructions using a straight edge and a compass, paper folding, graphing calculator programs, and computer software packages (i.e., bisect and trisect segments, congruent angles, congruent segments, a line parallel to a given line through a point not on the line, angle bisector, and perpendicular bisector).	

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	#2,3-2 **3108.4.31** Use properties of single transformations and compositions of transformations to determine their effect on geometric figures (e.g. reflections across lines of symmetry, rotations, translations, glide reflections, and dilations). *#2-2* **3108.4.35** Prove that two triangles are congruent by applying the SSS, SAS, ASA, AAS, and HL congruence statements. *#2,3-2* **3108.4.36** Use several methods, including AA, SSS, and SAS, to prove that two triangles are similar. *#2,3-2* **3108.4.37** Identify similar figures and use ratios and proportions to solve mathematical and real-world problems (e.g., Golden Ratio). *#2-2* **3108.4.38** Use the principle that corresponding parts of congruent triangles are congruent to solve problems.	

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#2,3-2
3108.4.42 Use geometric mean to solve problems involving relationships that exist when the altitude is drawn to the hypotenuse of a right triangle.

#2-2
3108.4.43 Apply the Pythagorean Theorem and its converse to triangles to solve mathematical and contextual problems in two- or three-dimensional situations.

#2-2
3108.4.44 Identify and use Pythagorean triples in right triangles to find lengths of an unknown side in two- or three-dimensional situations.

#1,2-2
3108.4.46 Apply properties of 30° - 60° - 90° and 45° - 45° - 90° to determine side lengths of triangles.

#1,2,3,4-2
3108.5.2 Translate from one representation of data to another (e.g., bar graph to pie graph, pie graph to bar graph, table to pie graph, pie graph to chart) accurately using the area of a sector.

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