CCC Mathematics |Geometry

CCSS: K.G.2 Correctly name shapes regardless of their orientations or overall size		
CCC:	**K.GM.1a1**	Recognize two- dimensional shapes (e.g., circle, square, triangle, rectangle) regardless of orientation of size
Strand: Geometry	**Family: Recognizing, Describing, Naming and Classifying**	
Progress Indicator: E.GM.1a recognizing, describing (using spatial language) and naming shapes regardless of orientation or size and locating shapes in the environment		
Essential Understandings	**Concrete Understandings:** • Match shapes that are the same in shape and size • Demonstrate the understanding of classes of shapes by matching or categorizing shapes that are the same shape but are different sizes (e.g., match circles even though they are different sizes) •	**Representation:** • **Understand that things have names and can be labeled**
Suggested Instructional Strategies: • **Teach using example, non-example (one shape at a time)** • **Teach using time delay (multiple shapes)** • **Teach rules for identifying shapes/properties of shapes (e.g., circles have no straight lines)** • **Teach using sorting and classifying**		
Supports and Scaffolds: • **2-D shapes with raised edges** • **Interactive whiteboard**		

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CCSS: K.G.6 Compose simple shapes to form larger shapes. *For example, "Can you join these two triangles with full sides touching to make a rectangle?"*			
CCC:	**1.GM.1b1**	Identify shapes as two-dimensional (lying flat) or three dimensional (solid)	
Strand: Geometry		**Family: Recognizing, Describing, Naming and Classifying**	
Progress Indicator: E.GM.1b analyzing and comparing two-- (and later) three--dimensional shapes using informal language (e.g., flat, solid, corners) to describe their differences and similarities, as well as their component parts (number of sides, vertices) and other attributes (e.g., sides of equal length)			
Essential Understandings	**Concrete Understandings:** • Match shapes that are the same dimension • Demonstrate the understanding of classes of shapes by categorizing shapes that are the same dimensions (e.g., classify balls as being 3-D even though they are different sizes)		**Representation:** •
Suggested Instructional Strategies: • **Teach explicit rules for discriminating 2-D from 3-D shapes (e.g., 2-D is flat)** • **Teach using example, non-example** • **Sort and classify 2-D and 3-D shapes**			
Supports and Scaffolds: • **Assistive technology (e.g., voice output)** • **Interactive whiteboard** • **Labeled 2-D and 3-D shape as a model**			

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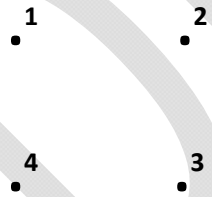
CCSS: 2.G.1 Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes		
CCC:	**2.GM.1e1**	Draw two- dimensional shapes with specific attributes
Strand: Geometry	**Family: Constructing/Building**	
Progress Indicator: E.GM.1e drawing and identifying shapes with specific attributes (e.g., number of sides or equal angles) not determined by direct measuring)		
Essential Understandings	**Concrete Understandings:** • Recognize a 2-D shape (know that this: is not a shape)	**Representation:** •

Suggested Instructional Strategies:

- Task analysis for drawing shapes with straight lines (teacher places prepared (i.e., labeled with progressive numbers)paper or other item to be drawn on in appropriate location for student (e.g., placed on a slant board and taped down). For some student this skill may be more efficiently taught using most to least prompts.
  - Hold writing utensil
  - Put point of utensil on point 1
  - Draw a line from point 1 to point 2
  - Stop, adjust utensil as needed
  - Draw a line from point 2 to point 3
  - Continue with 4th point for quadrilaterals
  - End back at 1st point to complete the shape



- Model drawing shapes; provide a visual model for student to follow

Supports and Scaffolds:

- **Interactive whiteboard**
- **Assistive technology**
- **Tracing templates (e.g., dotted lines, faded lines, wiki sticks, shape cutouts, stencils)**
- **Computer software**
- **Cheat sheet with examples of shapes**
- **Objects for creating shapes (e.g., popsicle sticks, pipe cleaners)**

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CCSS: 2.G.3 Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words *halves, thirds, half of, a third of*, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

CCC:	**2.GM.1f3**	Label a partitioned shape (e.g., one whole rectangle was separated into 2 halves, one whole circle was separated into three thirds)

Strand: Geometry | **Family: Geometric Problems**

Progress Indicator: E.GM.1f partitioning shapes into 2, 3, or 4 equal parts and describing the parts (halves, quarters, fourths, thirds)

Essential Understandings	**Concrete Understandings:**	**Representation:**
	• Understand the concept that a portion is a part of the whole	• Identify and use vocabulary for whole, part, fraction

Suggested Instructional Strategies:

- Task analysis
  - Count the total number of pieces (2, 3, or 4)
  - Write or place the total number of pieces in the lower portion of a fraction template (i.e., for a rectangle separated into 2 halves: /2)
  - Count the number of pieces to be labeled
  - Write or place the number of pieces to be labeled in the upper portion of the fraction template (i.e., for a rectangle separated into 2 halves: 1/2)
- Model labeling partitioned shapes

Supports and Scaffolds:

- Fractional representations without numbers but with raised dots (e.g., Dominos)
- 3-D shapes that can be partitioned
- Shapes with portions labeled with numbers and raised dots

1 .	**2** ..	**3** ...

- Response cards with fractions

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CCSS: 3.G.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as ¼ of the area of the shape.*		
CCC:	3.GM.1i	Partition rectangles into equal parts with equal area
Strand: Geometry	**Family:** Geometric Problems	
Progress Indicator: ***E.GM.1i*** *partitioning shapes into equal parts with equal areas and recognizing that each part is a unit fraction of the whole*		
Essential Understandings	**Concrete Understandings:** • Understand concept of equal parts • Partition with concrete objects • Find the rectangle that is the same or match two congruent rectangles	**Representation:** • Partition rectangles into two, three or four equal shares • Understand concepts and vocabulary: equal, partition, area, rectangle, halves, thirds, half of, a third of
Suggested Instructional Strategies: • Match to same • Tiling • Task analysis (measure length, divide by number of parts, mark each equal part) • Multiple exemplars for equal and not equal • Model, lead, test • Use physical models and a trial and error approach (e.g., give student the "whole" rectangle, then give student various fractional pieces, students use trial and error with fractional pieces to determine the equal pieces that fit on the "whole"		
Supports and Scaffolds: • Computer software • Ruler • Calculator • Paper with pre-determined lines (e.g., black lines, perforated lines)		

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CCSS: 4.G.2 Classify two dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right angles as a category, and identify right angles		
CCC:	4GM.1h2	Classify two-dimensional shapes based on attributes (# of angles)
Strand: Geometry	**Family:** Recognizing, Describing and Naming and Classifying	
Progress Indicator: ***E.GM.1h*** *describing, analyzing, comparing, and classifying two-dimensional figures (triangles, quadrilaterals) using shared attributes*		
Essential Understandings	**Concrete Understandings:** • Identify attributes within a 2-dimensional figure (e.g., rectangles have sides- student identifies sides of rectangle- and angles – student identifies angles in rectangle)	**Representation:** • Understand concepts and vocabulary: face, edge, corner, side, angle
Suggested Instructional Strategies: • Explicit instruction on attributes • Model at least one example of thinking through the attributes • Multiple exemplar (e.g., side, angles, polygons) • Think, pair, share • Match to same to classify shape • Using criteria for classifying each shape as a self check • Examples and non-examples of shapes that fit a particular classification		
Supports and Scaffolds: • Manipulatives • Objects to construct quadrilaterals (toothpicks, paper, wiki-sticks) • Geo board • Graphic organizer for classification • Real world examples (e.g., from classroom) • Assistive technology or voice output devices		

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CCSS: 5.G.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the – on each line and a given point in the plane located by using an ordered pair of numbers called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).		
CCC:	5.GM.1c3	Use order pairs to graph given points
Strand: Geometry	**Family:** Transforming and Graphing	
Progress Indicator: ***M.GM.1c*** *demonstrating the use of a coordinate system by locating/graphing a given point or polygon using ordered pairs*		
Essential Understandings	**Concrete Understandings:** • Identify the x- and y- axis • Identify the point of intersection • Complete concrete graphing of points (e.g., put the straw up on 3 on the x axis, put the next straw across on 2 on the y axis. Put a chip there [for 3,2]) • Understand first coordinate is horizontal, second coordinate vertical	**Representation:** • Understand concepts and vocabulary: coordinates, ordered pair, origin, axis, grid, point
Suggested Instructional Strategies: • Task analysis (identify number to be plotted on x naxis, plot, identify number to be plotted on the y axix, plot) • Use games such as "Battleship" to practice graphing		
Supports and Scaffolds: • Grid paper • Models • Graphic organizer that • Computer websites • Raised graph paper • Raise coordinate plane with raised x and y axis and raised horizontal and vertical lines • Visual representation of task analysis • Maps of local and/or well-known cities • Maps of school or classroom		

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CCSS: 6.G.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems		
CCC:	6.GM.1d1	Find area of quadrilaterals
Strand: Geometry	**Family:** Geometric Problems	
Progress Indicator: ***M.GM.1d*** *solving area, surface area, and volume problems by composing and decomposing figures*		
Essential Understandings	**Concrete Understandings:** • Use manipulatives to measure the area of a rectangle (e.g., tiling).	**Representation:** • Identify symbols within formula • Use formula to find area. • Understand concepts and vocabulary: base, height, area, quadrilateral
Suggested Instructional Strategies: • Explicit instruction on using formula to find area • Task analysis (measure the length, put number in formula, measure height, put number in formula, use calculator to compute area)		
Supports and Scaffolds: • Calculator • Template with formula • Ruler • Labeled figure (with numbers) • Grid or dot paper • Tiling with unit squares of the appropriate unit fraction side lengths		

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CCSS: 7.G.6 Solve real-world and mathematical problems involving area, volume, and surface area of two and three dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.		
CCC:	7.GM.1h2	Find the surface area of three-dimensional figures using nets of rectangles or triangles
Strand: Geometry	**Family:** Geometric Problems	
Progress Indicator: ***M.GM.1h*** *solving real-world area, surface area, and volume problems using different strategies (formulas and decomposing figures)*		
Essential Understandings	**Concrete Understandings:** • Understand the concept of the surface area of a rectangular prism. • Unfold three-dimensional objects	**Representation:** • Use formulas for surface area • Understand symbols from formula • Understand 2- and 3-D deminsionality (2-D is space covered, 3-D is the space within) • Understand concepts and vocabulary: base, height, slant, surface area, prism, net, face
Suggested Instructional Strategies: • Task analysis (identify a face in the figure, find the area of each face in the figure, add all faces together to find the surface area) • Explicit use of the formulas		
Supports and Scaffolds: • Template with formula • Calculator • Computer software • Interactive whiteboard • Numbered cubes • Grid or dot paper • Tiling with unit squares of the appropriate unit fraction side lengths • Squares that can be joined together to develop nets for a cube.		

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CCSS: 8.G.4 Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two dimensional figures, describe a sequence that exhibits the similarity between them.		
CCC:	8.GM.1g	Recognize congruent and similar figures
Strand: Geometry	**Family:** Recognizing, Describing and Naming and Classifying	
Progress Indicator: ***M.GM.1g*** *demonstrating congruence and similarity using a variety of two-dimensional figures*		
Essential Understandings	**Concrete Understandings:** • Understand the meaning of congruent and similar (e.g., Match concrete examples of congruent shapes, match concrete examples of similar shapes).	**Representation:** • Understand concepts and vocabulary: figures, congruent, similar • Describe circles, squares, rectangles, and triangles, by telling about their shape, sides, lines, and angles .
Suggested Instructional Strategies: • Multiple exemplars using objects first then 2-dimensional figures (congruent, similar) • Match to same • Similarities between objects can include shapes, lines, and angles.		
Supports and Scaffolds: • Graphic organizer • Transparent figures • Interactive whiteboard • Create a book or handout showing vocabulary and examples • Tracing paper • Grid or dot paper		

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CCSS: 8.G.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions		
CCC:	H.GM.1a2	Find the missing side lengths of a two-dimensional right triangle (Pythagorean Theorem)
Strand: Geometry	**Family:** Constructing – Establishing a Figure	
Progress Indicator: ***H.GM.1a*** *applying the Pythagorean Theorem*		
Essential Understandings	**Concrete Understandings:** • Identify a right angle triangle • Identify sides and~~/or~~ hypotenuse of a right triangle.	**Representation:** • Understand concepts and vocabulary: hypotenuse, Identify symbol for exponent • Use formula to find missing side • Represent/draw right triangles from given measures. • Recognize meaning of exponents. • Solve for square root.
Suggested Instructional Strategies: • Explicit instruction on the formula (does this triangle have a right angle? Identify the right angle, use sides of right angle to find length, enter answer) • Discuss application in real world situations.		
Supports and Scaffolds: • Calculator • Illustrations • Template for equation • Interactive whiteboard		

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