MATHEMATICS

Measurement and Geometry

Grade 3	Grade 4	Grade 5
1. Students choose and use appropriate units and measurement tools to quantify the properties of objects. 3.1.1 choose appropriate units (metric and U.S. customary) and tools, and estimate and measure length, liquid volume and weight/mass 3.1.2 estimate or determine the area and volume of solid figures by covering them with squares or by counting the number of cubes that would fill them 3.1.3 find the perimeter of a polygon with whole number sides 3.1.4 carry out simple unit conversions within a system of measurement (e.g., centimeters and meters, hours and minutes)	**1. Students understand perimeter and area.** 4.1.1 measure the area of rectangular shapes, using appropriate units square centimeters, square meters, square kilometers, square inches, square yards, square miles 4.1.2 recognize that the rectangles having the same area can have different perimeters 4.1.3 understand that the same number can be the perimeter of different rectangles, each having a different area 4.1.4 understand and use formulas to solve problems involving perimeters and areas of rectangles and squares. Use these formulas to find the areas of more complex figures by dividing them into parts with these basic shapes	**1. Students understand and compute volumes and areas of simple objects.** 5.1.1 derive and use the formula for the area of right triangles and of parallelograms by comparing with the area of rectangles (i.e., two of the same triangles make a rectangle with twice the area; a parallelogram is compared to a rectangle with the same area found by cutting and pasting a right triangle) 5.1.2 construct cube and rectangular boxes from two-dimensional patterns and use this to compute the surface area for these objects 5.1.3 understand the concept of volume and use the appropriate units in common measuring systems (cubic centimeter, cubic meter, cubic inches, cubic yard) to compute the volume of rectangular solids 5.1.4 differentiate between and use appropriate units of measures for, two- and three-dimensional objects (perimeter, area and volume)
2. Students describe and compare the attributes of plane and solid geometric figures and use their understanding to show relationships and solve problems. 3.2.1 identify, describe and classify polygons (including pentagons, hexagons and octagons)	**2. Students use two-dimensional coordinate grids to represent points and graph lines and simple figures.** 4.2.1 draw the points corresponding to linear relationships on graph paper (e.g., draw the first ten points for the equation $y = 3x$ and connect them using a straight line)	**2. Students identify, describe, draw and classify properties of, and relationships between, plane and solid geometric figures.** 5.2.1 identify describe and classify additional solid geometric figures (tetrahedron, octahedron)

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3.2.2 identify attributes of triangles (e.g., two equal sides for the isosceles triangle, three equal sides for the equilateral triangle, right angle for the right triangle) 3.2.3 identify attributes of quadrilaterals (e.g., parallel sides for the parallelogram, right angles for the rectangle, equal sides and right angles for the square) 3.2.4 identify right angles in geometric figures or in appropriate objects and determine whether other angles are greater or less than a right angle 3.2.5 identify, describe, and classify common three-dimensional geometric objects (e.g., cube, rectangular solid, sphere, prism, pyramid, cone, cylinder) 3.2.6 identify the common solid objects that are the component parts needed to make a more complex solid object	4.2.2 understand that the length of a horizontal line segment equals the difference of the x-coordinates 4.2.3 understand that the length of a vertical line segment equals the difference of the y-coordinates **3. Students demonstrate understanding of plane and solid geometric objects. They use this knowledge to show relationships and solve problems.** 4.3.1 identify lines that are parallel and perpendicular 4.3.2 identify the radius and diameter of a circle	5.2.2 measure, identify and draw angles, perpendicular and parallel lines, rectangles and triangles, using appropriate tools (e.g., straight edge, ruler, compass, protractor and drawing software) 5.2.3 know that the sum of the angles of any triangle is 180 and the sum of the angles of any quadrilateral is 360 and use this information to solve problems 5.2.4 visualize and draw two-dimensional views of three-dimensional objects made from rectangular solids 5.2.5 construct circles and identify circumference, diameter, chord and radius

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	4.3.3 identify congruent and similar figures	
	4.3.4 identify figures that have bilateral and rotational symmetry	
	4.3.5 know the definitions of right angle, acute angle and obtuse angle. They understand that 90, 180, 270, and 360 degrees are, respectively, associated with 1/4, 1/2, 3/4 and full turns.	
	4.3.6 visualize, describe and represent geometric solids (e.g., prisms, pyramids, etc.) in terms of the number and shape of faces, edges and vertices; interpret two-dimensional representations of three-dimensional objects; and draw patterns (of faces) for a solid that when folded will make a model of the solid	
	4.3.7 know the definitions of different triangles (e.g., equilateral, isosceles, scalene) and identify their features	
	4.3.8 know the definition of different quadrilaterals (e.g., rhombus, square, rectangle, parallelogram, trapezoid)	