Acceleration Grade 7 – UNIT 4 Creating, Comparing, and Analyzing Geometric Figures

Students continue their work with area from Grade 6, solving problems involving the area and circumference of a circle and surface area of threedimensional objects. In preparation for work on congruence and similarity, they reason about relationships among two-dimensional figures using scale drawings and informal geometric constructions, and they gain familiarity with the relationships between angles formed by intersecting lines. Students work with three-dimensional figures, relating them to two-dimensional figures by examining cross-sections. They solve real-world and mathematical problems involving area, surface area, and volume of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes and right prisms. Students use ideas about distance and angles, how they behave under translations, rotations, reflections, and dilations, and ideas about congruence and similarity to describe and analyze two-dimensional figures and to solve problems. Students show that the sum of the angles in a triangle is the angle formed by a straight line, and that various configurations of lines give rise to similar triangles because of the angles created when a transversal cuts parallel lines. Students complete their work on volume by solving problems involving cones, cylinders, and spheres.

CLUSTERS	COMMON CORE STATE STANDARDS		
Geometry			
Draw, construct, and describe geometrical	7.G.1. Solve problems involving scale drawings of geometric figures, including computing actual		
figures and describe the relationships	lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.		
between them.	7.G.2 . Draw (freehand, with ruler and protractor, and with technology) geometric shapes with		
	given conditions. Focus on constructing triangles from three measures of angles or sides,		
	noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.		
	7.G.3 . Describe the two-dimensional figures that result from slicing three-dimensional figures,		
	as in plane sections of right rectangular prisms and right rectangular pyramids.		
	7.G.3.1 Describe how two or more objects are related in space (e.g., skew lines, the		
	possible ways three planes might intersect).		
Solve real-life and mathematical problems	7.G.4 . Know the formulas for the area and circumference of a circle and use them to solve		
involving angle measure, area, surface area,	asure, area, surface area, problems; give an informal derivation of the relationship between the circumference and area		
and volume.	a circle.		
	7.G.5. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-		
	7 C C Salve real world and methometical problems involving area, volume and surface area of		
	7.3.6. Solve real-world and mainematical problems involving area, volume and surface area of two and three dimensional chiests composed of triangles, guadrilaterals, polygons, subse, and		
	right prisms.		
Understand congruence and similarity using	8.G.1 Verify experimentally the properties of rotations, reflections, and translations:		
physical models, transparencies, or geometry	a. Lines are taken to lines, and line segments to line segments of the same length.		
software.	b. Angles are taken to angles of the same measure.		
	c. Parallel lines are taken to parallel lines.		
	8.G.2 Understand that a two-dimensional figure is congruent to another if the second can be		

Solve real-world and mathematical problem involving volume of cylinders, cones, and spheres.		 obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. 8.G.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. 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. 8.G.5 Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so. 8.G.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
	MATHEMATICAL PRACTICES	LEARNING PROGRESSIONS
1.	Make sense of problems and persevere	http://ime.math.arizona.edu/progressions/#committee.
	in solving them.	
2.	Reason abstractly and quantitatively.	CDE Progress to Algebra continuum K-8
3.	Construct viable arguments and	www.cde.ca.gov/be/cc/cd/documents/updateditem12catt3.doc
_	critique the arguments of others.	
4.	Model with mathematics.	
5.	Use appropriate tools strategically.	
b .	Attend to precision.	
1.	LOOK for and make use of structure.	
ð.	Look for and express regularity in	
	repeated reasoning.	

¹ Major Clusters – area of intensive focus where students need fluent understanding and application of the core concepts. ² Supporting/Additional Clusters – designed to support and strengthen areas of major emphasis/expose students to other subjects.

	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS KEY VOCABULARY	
٠	Solve problems involving the area and	What 2-D figure results from slicing 3-D adjacent	
	circumference of a circle and surface area of	figures? angle, Angle sum	
	three-dimensional objects.	(cones, spheres, or cylinders) argument	
٠	Reason about relationships among two-	How do you find the surface area and complementary	
	dimensional figures using scale drawings and	volume of a 3D figure?	
	informal geometric constructions, which will	congruent	
	lead to gaining familiarity with the relationships	What is the total number of degrees in Construct	
	between angles formed by intersecting lines.	supplementary and complementary coordinate	
	Work with three-dimensional figures, relating	angles? Cylinder	
	them to two- dimensional figures by examining	dilation	
	cross-sections.	What is the relationship between vertical exterior angle	
•	Solve real-world and mathematical problems	and adjacent angles?	
	involving area, surface area, and volume of		
	two- and three-dimensional objects composed	How would the volume and surface area Intersegment parallel	
	or triangles, quadriaterais, polygons, cubes	be affected when dimensions of a figure plane	
	And right prisms.	are doubled and/or triple?	
•	Apply their understanding of the effect of	How are the (angles), (lengths), or rectangular figures	
	shape	(figures) changing?	
	Shape.	How are they staying the same? I reflection	
•	congruent or similar	How is related to? rotation	
	Croate or identify a sequence of	What happens when an object is scale	
•	transformations that lead to congruent or	dilated?	
	similar figures	How could an object be transformed to similar/similarity	
•	Analyze the relationship between angles	enlarge or reduce its size? skew	
•	measures (triangle sum: narallel lines cut by a	How can you determine the distance sphere	
	transversal impact of a geometric	between two points in a coordinate supplementary	
	transformation)	plane? surface area	
•	Prove the Pythagorean Theorem use to	three-dimensional (3-D)	
-	determine the distance between two coordinate	translation	
	points, and apply to real world situations.	transversal	
		two-dimensional (2-D)	
		vertical	

RESOURCES	INSTRUCTIONAL STRATEGIES	ASSESSMENT
NLVM http://nlvm.usu.edu/	 Journal writing prompts (link) 	SBAC - http://www.smarterbalanced.org/
	 Technology to show visual 	
NCTM Illuminations activities	representations of geometric figures:	PARCC -
7.G.1 - Floor Plan -	Geometry sketchpad	http://parcconline.org/samples/mathemati
http://illustrativemathematics.org/illustrations/107	Use visuals to illustrate multiple	cs/grade-6-slider-ruler
http://illustrativemathematics.org/illustrations/107 California Draft Mathematics Framework: http://www.cde.ca.gov/be/cc/cd/draftmathfwchapters.asp. 8.G.9: LAUSD Concept Lesson, "The Chocolate Factory," http://www.lausd.net/lausd/offices/iss/Math/HS/27_The%20 Choc olate%20Factory_2008%20-%202009.pdf 8.G.6: LAUSD Concept Lesson, "Squaring Triangles," http://www.lausd.net/lausd/offices/issMath/HS/09_Unit %202_Concept_Task_Aquaring_Triangles.pdf	 Use visuals to illustrate multiple representations of rate of change Real-world connections Structured instructional conversations (Think-Pair-Share) Provide explanations with examples of Reflection, Rotation, Translation, and Dilation 	<u>cs/grade-6-slider-ruler</u>
LAUSD Adopted Textbooks:		
California Mathematics: Concepts Skills and Problem		
Solving, Glencoe McGraw-Hill		
7.1 Circumference and Area of Circles		
7.2 Problem Solving Investigation		
7.5 Area or complex Figures		
7.5 Volume of Prisms and Cylinders		
7.6 Volume of Pyramids and Cones		
7.7 Surface Area of Prisms and Cylinders		
7.8 Surface Area of Pyramids		
7.9 Similar Solids		
California Math: Course 2 - McDougal Littell		
8.5 Triangles and Their Areas		
8.7 Quadrilaterals and Their Areas		
8.8 Circumferences and Areas of Circles		
9.2Translations in the Coordinate Plane		

 9.3 Reflections in the Coordinate Plane 9.4 Dilations in the Coordinate Plane 10.1 Lines and planes 10.2 Three-Dimensional Figures 10.3 Surface Areas of Prisms and Cylinders 10.4 Surface Areas of Pyramids and Cones 10.5 Volumes of Prisms and Cylinders 10.6 Volumes of Pyramids and Cones 10.7 Similar Solids 		
Grade 8 Module 2 - The Concept of Congruence		
	LANGUAGE GOALS	
 Students will understand that some verbs have different r 	neanings in different mathematical situation	s. (draw)
Students will be able to interpret the characteristics of 2D	and 3D figures in order to manipulate them	
<i>Example</i> : The difference between 2D figure and 3D figur	e is	
Students will be able to select the appropriate formulas no	eeded to solve real-world and mathematical	problems.
Example: I can compare the formulas for computing area	, surface area, and volume of figures and or	Djects, by
Students will be able to justify steps taken to arrive at a log Exemple: If the situation is	igical conclusion.	
Example. If the situation is, then i can conclude a students will understand prime potation to describe an important of the situation in the situation in the situation is	and after a translation reflection or relation	
• Students will understand prime notation to describe an image after a translation, reflection, or rotation.		
 Students will use physical models, transparencies, or dec 	metry software to verify the properties of ro	tations reflections and translations
 Students will use physical models, transparencies, or geometry software to verify the properties or rotations, reflections, and translations. Students will explain a proof of the Pythagorean Theorem and its converse. 		
 Students will apply the Pythagorean Theorem to determine 	e unknown side lengths in right triangles in	real-world and mathematical problems in
two and three dimensions.		
• The unknown side lengths of a right can	be determined by using .	
	, , , , , , , , , , , , , , , , , , , ,	
PERFORMANCE TASKS		
MATHEMATICS ASSESSMENT PROJECT		
 7.G.6 Maximizing Area: Gold Rush <u>http://map.mathshell.c</u> 	org/materials/lessons.php?taskid=415#task4	<u>115</u>
 7.G.4 and 7.G.6 Using Dimensions: Designing a Sports Bag http://map.mathshell.org/materials/lessons.php?taskid=416#task416 		
 7.G.4 and 7.G.6 Drawing to Scale: Designing a Garden <u>http://map.mathshell.org/materials/lessons.php?taskid=494#task494</u> 		
7.G.6 Estimations and Approximations: The Money Munc	hers http://map.mathshell.org/materials/less	sons.php?taskid=220#task220
8.G.9: Problem Solving Lesson, "Modeling Making Match	sticks, <u>http://map.mathshell.org/materials/le</u>	essons.php?taskid=410&subpage=problem

FRONT LOADING	ACCELERATION	INTERVENTION	
 Geometry: Students work on problems involving areas and volumes. Students understand multiple algorithms for the volume of prisms Students apply visualization skills connected to solve the area of 3D shapes. Students can construct 3d models from 2d models. 	Provide students with opportunities to be recognized for their previous knowledge and to be allowed to avoid redundant learning by being encouraged to learn the sophisticated and advanced information and skills of the curriculum at their own rate. This also includes the opportunity for students to make personal meeting of the lesson. Geometry: Extension of standard 7G.3 - Students describe or define the features or characteristics of 2-D geometric figures that result when 3d figures are sliced horizontally, vertically or diagonally.	Use Physical objects to demonstrate the math. In geometry : Such as cones, squares, sphere, etc.	

References:

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