

HPISD CURRICULUM
(MATH, GRADE 8)

EST. NUMBER OF DAYS: 10

UNIT NAME	UNIT 11: SURFACE AREA AND VOLUME OF 3D FIGURES	
Unit Overview	Address surface area and volume, including proportional changes with scale factor of prisms, cones and spheres.	
Generalizations/Enduring Understandings	<ul style="list-style-type: none"> • Geometry is used to model and describe the physical world. • Transformations generate congruent and similar figures and help develop spatial sense. • Changes in dimensions affect linear, area, and volume measures of 2- and 3-dimensional figures. 	
Concepts	Surface Area - The sum of the areas of all of its surfaces. Volume - The number of cubic units needed to fill the space taken up by the 3D figure Proportional Change - A 3D figure can be changed by a scale factor that must be applied to all dimensions	
Guiding/Essential Questions	<ul style="list-style-type: none"> • How does the surface area of a 3-dimensional figure connect to the areas of related 2-dimensional figures? • What is the effect of a proportional change in dimensions on surface area? • How can proportional reductions and enlargements of geometric figures be described mathematically? • How can geometric relationships be used perform indirect measurements? • How are perimeter, circumference, and surface area affected by proportional changes in a figure's dimensions? • How can proportional reductions and enlargements of 3-dimensional geometric figures be described mathematically? • How does the volume of a 3-dimensional figure connect to its dimensions? • What is the effect of a proportional change in dimensions on volume? 	
	<i>Performance Levels</i>	<i>Learning Progression (***) Decision Point)</i>
Learning Targets	LEVEL 4: <u>LEVEL 3:</u> LEVEL 2:	Students will use geometric characteristics and properties to solve problems.
	LEVEL 4: <u>LEVEL 3:</u> LEVEL 2:	
Formative Assessments	<i>Title</i>	
Summative Assessments	<i>Title</i>	
	TEKS	<i>Specifications</i>

<p>TEKS (Grade Level) / Specifications</p>	<p>8.7A solve problems involving the volume of cylinders, cones, and spheres 8.7B use previous knowledge of surface area to make connections to the formulas for lateral and total surface area and determine solutions for problems involving rectangular prisms, triangular prisms, and cylinders 8.6A describe the volume formula $V=Bh$ of a cylinder in terms of its base area and its height 8.1(A) apply mathematics to problems arising in everyday life, society, and the workplace 8.1(B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution 8.1(C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems 8.1(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate 8.1(E) create and use representations to organize, record, and communicate mathematical ideas 8.1(F) analyze mathematical relationships to connect and communicate mathematical ideas 8.1(G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication</p>	
<p>Processes and Skills</p>	<p><u>What students should be able to DO</u></p> <ul style="list-style-type: none"> • Find surface area of prisms, cylinders, cones, and pyramids. • Draw and identify the nets of 3-dimensional figures. • Find surface area of 3-dimensional figures given their nets. • Use information about an object's surface area to determine a missing dimension of the object. • Use scale factor to find the proportional changes between 3-dimensional figures. • Dilate a 3-D figure using a given scale factor. • Determine the scale factor used for a given dilation. • Estimate surface area. • Determine the effects of proportional changes to dimensions on volume. • Use scale factor to find the proportional changes between 3-dimensional figures. • Find the volume of three-dimensional figures, including composite figures. • Compare the volumes of similar figures to determine scale factors. Find missing 	<p><u>What students should KNOW</u></p> <ul style="list-style-type: none"> • Formula for circumference of a circle. • Common estimations of pi. • Area formulas for rectangles, triangles, circles, parallelograms, etc. • The surface area of a 3-dimensional figure is the sum of areas of all surfaces on the figure. • The volume formulas for many geometric figures can be generalized as the area of the figure's base multiplied by the figure's height. • In a volume formula the symbol B represents the area of the object's base. • The volume of a cone is equal to one-third the volume of a cylinder with the same radius and height. • The volume of a pyramid is equal to one-third the volume of a prism with the same base (shape and size) and height. • Volume formulas for fundamental three-dimensional figures..

	measurements given proportional relationships between similar figures.	
Topics	Dilation Proportional Change Scale Factor Surface Area Volume	
Language of Instruction	area base circumference cone cubic units cylinder dilation dimension edge face height length	net perimeter prism proportional change pyramid ratio scale factor solids square units surface area width
State Assessment Connections		
National Assessment Connections		
Resources		