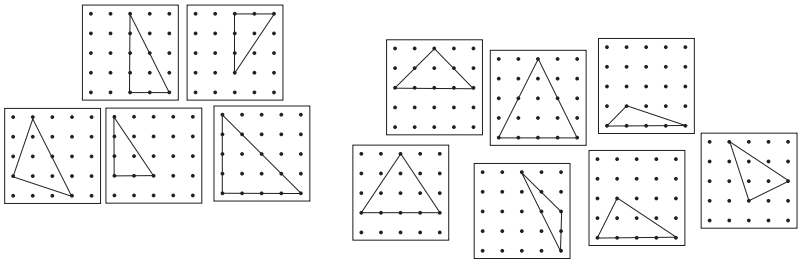
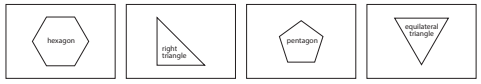
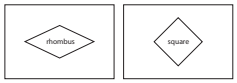
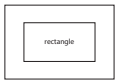
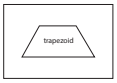
Bridges in Mathematics, Grade 2

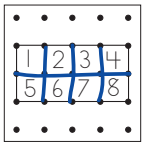
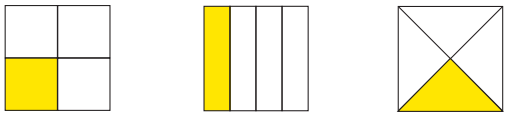
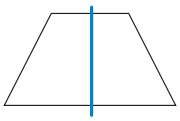
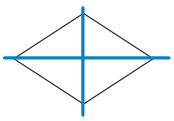
Unit 6: Geometry

In this unit, your child will:

- Identify, describe, draw, and create 2-D shapes based on their defining features
- Explore the area of shapes, especially rectangles
- Split whole shapes into 2, 3, or 4 equal parts called halves, thirds, or fourths/quarters
- Recognize that equal parts of identical wholes do not need to be the same shape

Your child will practice these skills by solving problems like those shown below.

PROBLEM	COMMENTS
How can we sort the geoboard triangles?  *"The triangles on the left all have square corners or right angles. The triangles on the right do not."*	Students build different shapes by stretching rubber bands around pegs on a geoboard. In this example, they experiment with making different triangles by changing the lengths of the sides and the size of the angles. They sort the triangles by their attributes. These activities help students focus on specific properties (or attributes) of shapes. While all of the shapes are triangles, the ones on the left are called right triangles because they all have one 90-degree angle.
Shape Riddles Which shape is it? 1. The shape has 4 corners or vertices. *eliminated*  2. The sides of the shape are not all the same length. *eliminated*  3. The shape has only 2 parallel sides. *eliminated*  4. The shape has exactly 1 line of symmetry. *"It has to be the trapezoid!"* 	Riddles are an engaging way for students to become fluent with geometric vocabulary. They also provide lots of practice thinking about a variety of shapes and their defining attributes. To solve the riddles, students identify shapes based on clues that include precise geometric terms. The example at left shows how a student would eliminate 8 out of 9 possible shapes to determine which one matches all of the clues. Each time, the student must understand the terms used and think carefully about the shapes to determine whether they meet the criteria or should be eliminated.

PROBLEM	COMMENTS
Find the area of the shape. Write an equation to show how you found your answer.  2+2+2+2=8 4+4=8 area = 8 units *"I saw 4 columns of 2: 2 + 2 + 2 + 2 = 8"*	To solve this problem, students must understand that the area of any shape is the total number of square units it takes to fill in the shape. In this case, the rectangle shape is filled with 8 square units. These units could be described as 2 rows of 4 (going across) or 4 columns of 2 (going up and down). This repeated addition with an area model is preparing students for later work in multiplication.
Write the fraction for each shaded part.  ¼ ¼ ¼ *"They're all one-fourth even though they look different."* Circle the shapes that show two halves.  *"The shapes I circled are split in 2 equal parts, so they're in half."*	Students explore ways to split shapes into equal parts or shares. This sets a foundation for understanding fractions. Students learn that there is often more than one way to split a shape into equal parts, as shown. They discuss whether each piece is the same size even though it is not the same shape. Students learn to describe the parts as halves, thirds, fourths, and quarters and to read and write the fraction notation (½, ⅓, ¼).
What is the name of each shape, and how many lines of symmetry does it have?  This is a trapezoid It has 1 line(s) of symmetry. *"The shape is a trapezoid. If I fold it in half, each half is an exact match. The fold line is the line of symmetry."*  This is a rhombus It has 2 line(s) of symmetry.	A line of symmetry is a line that divides a figure into two parts that are the same size and same shape. When a figure that is folded along the line produces two halves that match exactly, the figure is said to be symmetrical. Unit 6 introduces and develops the concept of symmetry as a way of supporting an understanding of congruence and fractions.

FREQUENTLY ASKED QUESTIONS ABOUT UNIT 6

Q: I can't remember what so many of the geometry words mean. Where can I go for help?

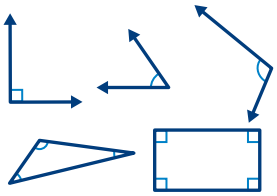
A: These geometry words let us name shapes and talk about them in precise ways. See the attached Geometry Vocabulary Terms for a refresher.

Q: Why is geometry important?

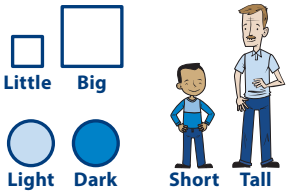
A: Studying geometry gives students ways to analyze the physical world. The skills students develop now—including the vocabulary that they will come to understand and use with confidence—will help them in high school geometry, trigonometry, physics, and calculus. An additional benefit of studying geometry is that many students with a strong spatial sense—for example, the ability to visualize and manipulate shapes in their minds—blossom when they are engaged in the kind of spatial problem solving featured in this unit.

GEOMETRY VOCABULARY TERMS *page 1 of 2*

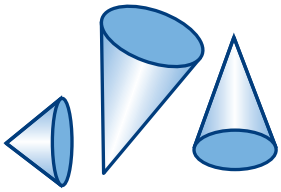
angle the shape formed by two rays or line segments that share an endpoint; angles are measured in degrees



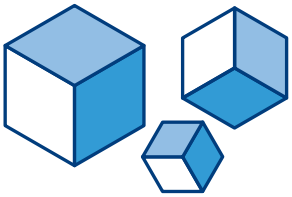
attribute a characteristic such as color, shape, size, etc.



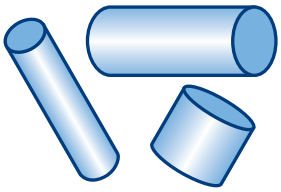
cone a three-dimensional shape (solid) with a circular or elliptical base and a curved surface that tapers to the vertex



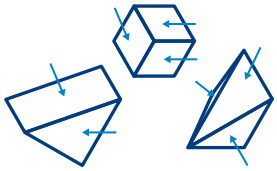
cube a three-dimensional shape (solid) whose 6 faces are all squares



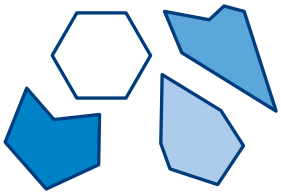
cylinder a three-dimensional shape (solid) with one curved surface and two congruent flat ends that are circular or elliptical



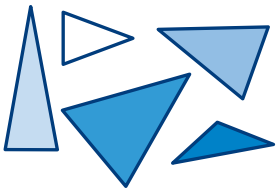
face a flat surface of a three-dimensional shape (solid)



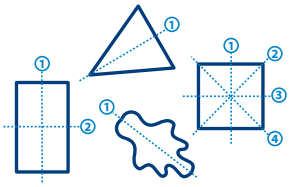
hexagon a two-dimensional (flat) shape with 6 sides



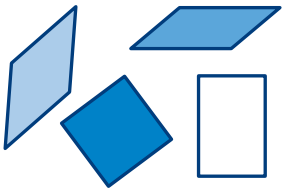
isosceles triangle a triangle with exactly two congruent sides



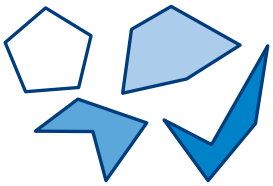
line of symmetry a real or imaginary line that divides a shape into two mirror images



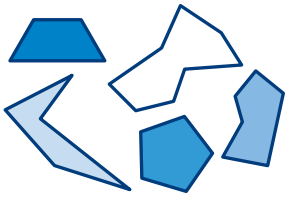
parallelogram a two-dimensional (flat) shape with 4 sides, with both pairs of opposite sides parallel



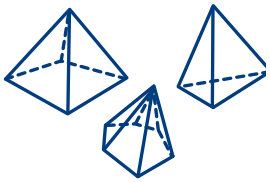
pentagon a two-dimensional (flat) shape with 5 sides



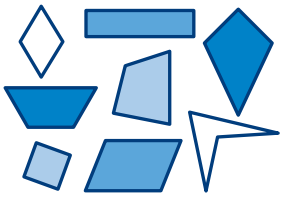
polygon a two-dimensional (flat) shape with 3 or more sides



pyramid a three-dimensional shape (solid) that has a base with 3 or more sides, and has triangular faces that meet at a point

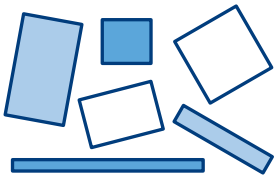


quadrilateral a two-dimensional (flat) shape with 4 sides

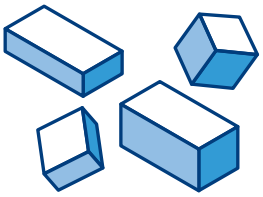


GEOMETRY VOCABULARY TERMS *page 2 of 2*

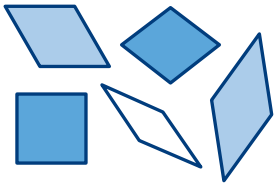
rectangle
a two-dimensional (flat) shape with 2 pairs of parallel sides (4 sides total) and 4 right angles



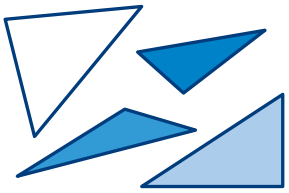
rectangular prism
a three-dimensional shape (solid) whose 6 faces are all rectangles



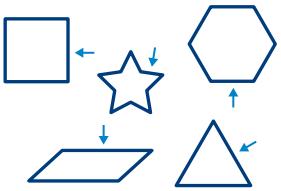
rhombus a two-dimensional (flat) shape with 4 congruent sides



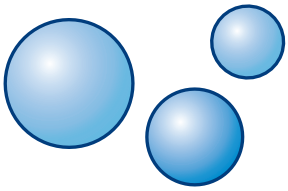
scalene triangle
a triangle whose sides are all of different lengths



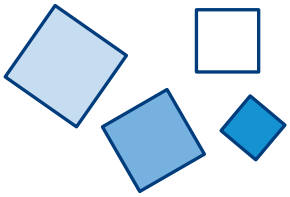
side a line segment that, with other line segments, form a two-dimensional (flat) shape



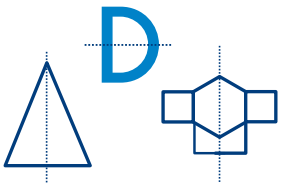
sphere a three-dimensional shape (solid) constructed so that every point of the surface is the same distance from a point called the center



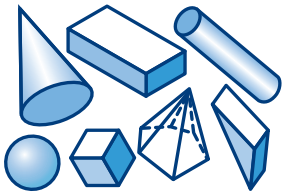
square a two-dimensional (flat) shape with 4 congruent sides and 4 right angles



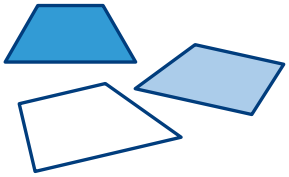
symmetry the property of a shape that can be folded so that the two halves match exactly



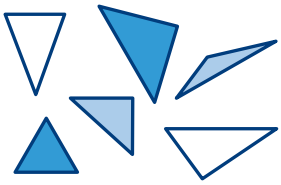
three-dimensional (3-D) shape a solid shape with depth, width, and height; a shape that has volume



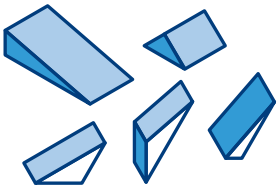
trapezoid a two-dimensional (flat) shape with 4 sides, exactly 1 pair of which are parallel



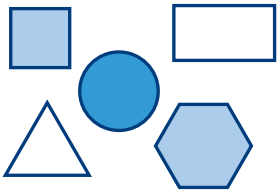
triangle a two-dimensional (flat) shape with 3 sides



triangular prism
a three-dimensional shape (solid) with 2 triangular bases and 3 rectangular faces



two-dimensional (2-D) shape a flat shape with length and width; a shape that has area but not volume



vertex or corner
the point at which the sides of a two-dimensional (flat) shape or the edges of a three-dimensional shape (solid) intersect