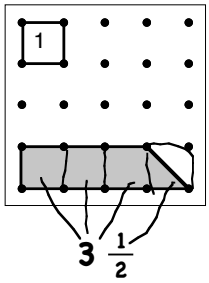
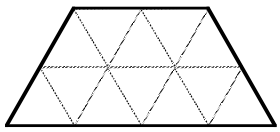
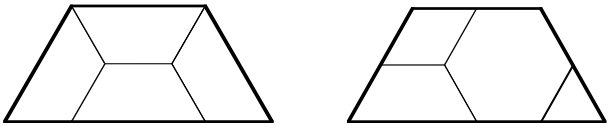
Grade 2, Unit Four: Exploring Shapes, Symmetry, Area & Number

In this unit your child will:

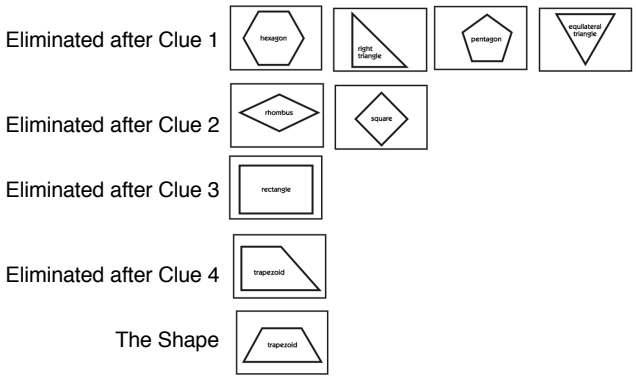
- recognize, describe, and compare a variety of 2- and 3-dimensional shapes
- measure the area of a variety of shapes
- use proportional and spatial reasoning to put shapes together and break them apart (e.g., form a hexagon by putting together 6 equilateral triangles)

Your child will learn and practice these skills by solving problems like those shown below. Keep this sheet for reference when you're helping with homework.

Problem	Comments
The area of the small square is 1 unit. What is the area of the gray shape? 	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 gray shape is filled by 3 full squares, plus a triangle at the end. The student has correctly identified the area of the triangular part of the shape as ½ (half of 1 square unit), making the total area 3 ½ square units.
Fill in this shape with the fewest pattern blocks possible.  solution 1 solution 2 	The student could use many different combinations of hexagons, trapezoids, rhombuses, or triangles to fill in the shape. However, 4 is the smallest number of pattern blocks it takes to fill the shape, as shown in the two solutions at left. Students must reason spatially, and probably intuitively, to fit the pattern blocks together and use the fewest blocks they can to fill the shape.

1. The shape has 4 corners.
2. The sides of the shape are not all the same length.
3. The shape has only 2 parallel sides.
4. The shape has exactly 1 line of symmetry.

Which shape is it?

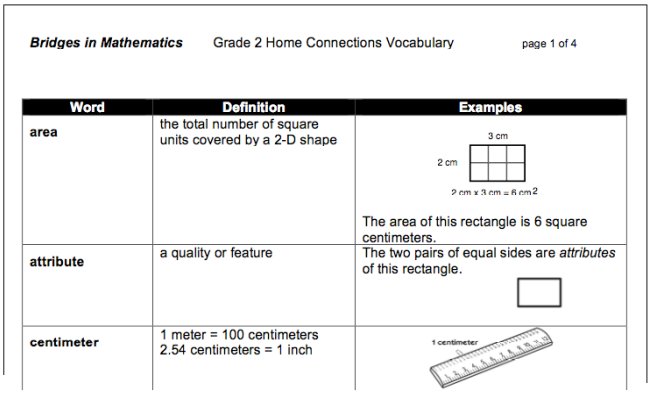


Riddles are an engaging way for students to become fluent with geometric vocabulary. They also provide students with a lot of practice analyzing a variety of shapes in terms of their geometric attributes.

To solve the riddles, students identify shapes based on clues that include many important 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 be able to analyze the shapes to determine whether they meet the criteria or should be eliminated.

Frequently Asked Questions about Unit Four

Q: I can't remember what so many of the geometry words mean. Where can I go for help?
A: There are many words that we use almost only in geometry class. These words are important because they let us name shapes and talk about them in precise ways. You can go to www.mathlearningcenter.org/resources/materials/parents/parents2.asp to find a PDF of vocabulary words for Grade 2 Bridges students. (See the picture below.) On this Web page, there is also a link to a helpful online math dictionary for students. The PDF and the online dictionary both show pictures and examples of all vocabulary words: these visual aids are especially helpful for geometry words.


Bridges in Mathematics Grade 2 Home Connections Vocabulary page 1 of 4

Word	Definition	Examples
area	the total number of square units covered by a 2-D shape	3 cm, 2 cm, 2 cm x 3 cm = 6 cm2. The area of this rectangle is 6 square centimeters.
attribute	a quality or feature	The two pairs of equal sides are *attributes* of this rectangle.
centimeter	1 meter = 100 centimeters 2.54 centimeters = 1 inch	1 centimeter

Q: Why is geometry important?
A: Studying geometry provides ways for students 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.