Kenmore-Town of Tonawanda UFSD

We educate, prepare, and inspire all students to achieve their highest potential

Grade K Module 6
Parent Handbook

The materials contained within this packet have been taken from the Great Minds curriculum Eureka Math.

Eureka Math™ Tips for Parents

Grade K
Module 6

Analyzing, Comparing, and Composing Shapes

Our kindergarten mathematics work comes to a close with another opportunity for students to explore geometry. In Module 6, students build on their previous experience with two- and three-dimensional shapes and expand their spatial reasoning skills. They lay the groundwork for understanding area by composing various geometric figures.

A student-made cube of sticks and clay

What Came Before this Module:

We took our first steps toward understanding place value. We composed and decomposed teen numbers as "10 ones and some ones" and practiced counting to 100 by ones and tens.

New Terms and Strategies in this Module:

Ordinal Numbers: first, second, third, fourth, fifth, sixth, seventh, eighth, ninth, tenth

Familiar Terms and Strategies in this Module:

Position Words: above, below, beside, in front of, next to, behind

Two-Dimensional (Flat) Shape Words:

Circle
Triangle
Rectangle
Square
Hexagon
Face—a two-dimensional side of a three-dimensional shape

Three-Dimensional (Solid) Shape Words:

Sphere
Cube
Cylinder
Cone

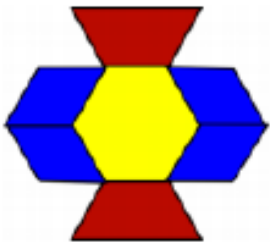
+ How You Can Help at Home:

- Continue to review and practice counting numbers up to 100 or as high as possible.
- Ask your student to use position words (see key terms box) to describe object locations relative to each other, e.g., "that pen is beside the glass of water on the table."

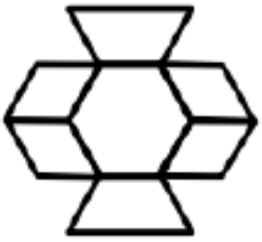
Key Common Core Standards:

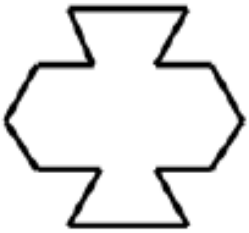
- ***Count to tell the number of objects.***
  - Understand the relationship between numbers and quantities; connect counting to cardinality.
    - Develop understanding of ordinal numbers (first through tenth) to describe the relative position and magnitude of whole numbers.
- ***Analyze, compare, create, and compose shapes.***
  - Model shapes in the world by building shapes from components; draw shapes.
  - Compose simple shapes to form larger shapes.

Prepared by Erin Schweng, Math Coach



Simple





Complex

Students will work with pattern blocks such as the ones above to create more complex shapes out of the shapes they already know. Activities can begin with matching pattern blocks to a color picture, then move to filling in the outlined shapes, and eventually require students to develop their own combinations and ideas to fill a larger shape.

Spotlight on Math Strategies:

Pattern Blocks

Students will use these blocks to compose shapes in this module of *A Story of Units*.

A Story of Units has several key mathematical strategies that will be used throughout a student's elementary years.

This module challenges students to use their basic understanding about shapes to combine and create the shapes they know into new, composite shapes. For example, a student may combine 4 small triangle blocks to make a larger triangle (see image below). Pattern blocks are not exclusive to *A Story of Units*. They are tools that have been used to support math learning for many generations of students.

As students use the pattern blocks to create new, larger shapes, we reinforce a central idea of *A Story of Units*: smaller units combine to make larger units. This is true in our work with shapes and area, but it also supports our work with the base ten number system, building a strong foundation for Grade 1.

Sample Problem from Module 6:

Trace to show two ways to make each shape. How many shapes did you use?

(Students will have several large shapes to fill with different pattern blocks of their choice.)

Sample taken from Module 6, Lesson 6

I used 3 shapes.

I used 4 shapes.

Grade K • Module 6

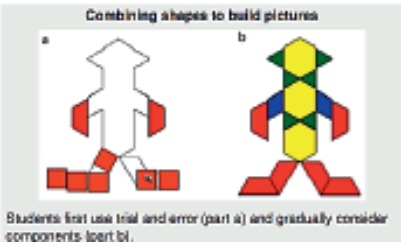
Analyzing, Comparing, and Composing Shapes

OVERVIEW

The kindergarten chapter of *A Story of Units* comes to a close with another opportunity for students to explore geometry. Throughout the year, students have built an intuitive understanding of two- and three-dimensional figures by examining exemplars, variants, and non-examples. They have used geometry as a context for exploring numerals as well as comparing attributes and quantities. To wrap up the year, students further develop their spatial reasoning skills and begin laying the groundwork for an understanding of area through composition of geometric figures.

Topic A begins with students applying their knowledge of attributes to analyze two- and three-dimensional shapes from the real world and to construct models using straws and clay (**K.G.5**). "Let's use the straws to make the sides of the rectangle, and we'll stick the straws together at each corner using clay!" Students use their understanding of ordination to thirds to share and communicate the systematic construction of flats and solids. "First, I cut four straws to be the same length. Second, I made a square by placing the four straws so they look like a frame. Third, I connected the sides at the corners with four little clay balls" (**K.CC.4d**)
.
As in Module 2, students explore the relationship between flats and solids, this time using flats to build solids. "I made my square into a cube. First, I made another square the same size. Second, I attached the two squares with four straws the same length." They also apply their knowledge of ordinal numbers to describe the relative position of shapes within a set (**K.CC.4d**). "The yellow circle is first, and the red square is tenth." The lessons of Topic B focus on composition and decomposition of flat shapes (**K.G.6**). Students begin by using flats to compose geometric shapes. "I put two triangles together to make a square." They then decompose shapes by covering part of a larger shape with a smaller shape and analyzing the remaining space. "When I cover part of my square with this triangle, I can see another triangle in the empty space.

As they build competence in combining and composing shapes, students build toward more complex pictures and designs. Students progress through stages as they build competence in combining shapes to form pictures, beginning with trial and error and gradually considering the systematic combination of components. "This square fits here because the corners match the puzzle." The culminating task of this module is set up as a Math Olympics, a celebration of student learning from the whole year. Students complete tasks related to number, measurement, operations, and geometry.



Composition and decomposition of geometric figures reinforce the idea that smaller units can combine to form larger units. This concept, central to *A Story of Units*, underlies not only area concepts but also the base ten number system. Students leave this module and the kindergarten year prepared to tackle the mathematical concepts of Grade 1 and beyond.

Terminology

New or Recently Introduced Terms

- First, second, third, fourth, fifth, sixth, seventh, eighth, ninth, tenth (ordinal numbers)

Familiar Terms and Symbols

- Above, below, beside, in front of, next to, behind (position words)
- Circle
- Cone (three-dimensional shape)
- Cube (three-dimensional shape)
- Cylinder (three-dimensional shape)
- Face (two-dimensional side of a three-dimensional shape)
- Flat (two-dimensional shape)
- Hexagon (flat figure enclosed by six straight sides)

Suggested Tools and Representations

- Pattern block activity cards or attribute block activity cards

- Three-dimensional shapes: cone, sphere, cylinder, and cube
- Two-dimensional shapes: circle, hexagon, rectangle, square, and triangle

Grade K Module 6 Topic A

Building and Drawing Flat and Solid Shapes

Focus Standards:

K.CC.4	Understand the relationship between numbers and quantities; connect counting to cardinality. d. Develop understanding of ordinal numbers (first through tenth) to describe the relative position and magnitude of whole numbers.
K.G.5	Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.

Instructional Days Recommended: 4

In this final kindergarten module, students extend and build upon their learning about two- and three-dimensional shapes from Module 2. Students use their knowledge about common features of flats and solids to create, construct, and compose shapes by building and drawing. Throughout, they use ordinal numbers to describe the systematic construction of their flats (**K.CC.4d**).

Lesson 1 asks students to apply their knowledge of shape attributes (number and type of sides and corners) by constructing flat shapes using straws and clay (**K.G.5**). For example, when constructing a triangle, the student uses three equal, unconnected straws and connects the endpoints to form a three-sided, closed figure. This represents a departure from viewing the figure as being inclusive of the interior to now considering the shape as represented only by the outline, a perspective that eventually develops into formal definitions of triangles, quadrilaterals, and polygons (e.g., a triangle is formally defined in Grade 4 as consisting of three non-collinear points together with the three segments joining them). Students use ordination to thirds to tell the steps they take to build their flat shapes (**K.CC.4d**).

In Lesson 2, students investigate whether varied side length affects their ability to construct a shape. “What happens if I use two long straws and one short straw to build my triangle?”

3 equal straws

3 unequal straws

Lessons 3 and 4 build upon the comparisons students made between two- and three-dimensional shapes in Module 2 (**K.G.4**). In Lesson 3, students use the flats created from straws and clay in Lesson 1 as the foundation for composing solids that model real-world shapes and figures (**K.G.5**). They use these solids to count faces, edges, and corners. In Lesson 4, they relate spatial understanding (relative position) and number (magnitude) by using ordinal numbers to describe the position of flat shapes within a set of 10 (**K.CC.4d**).

**The sample homework responses contained in this manual are intended to provide insight into the skills expected of students and instructional strategies used in Eureka Math.*

Lesson 1

Objective: Describe the systematic construction of flat shapes using ordinal numbers.

Homework Key

Line drawn to finish triangle; triangle colored green; bigger triangle drawn
2 lines drawn to finish rectangle; corners circled in red; X's placed on longer sides
Line drawn to finish hexagon; hexagon colored blue; 6
3 shapes drawn on back of paper: 1 with 3 straight sides; 1 with 4 straight sides; 1 with 6 straight sides

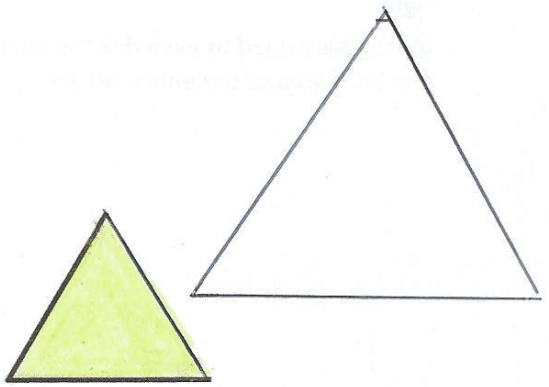
Homework Samples

Follow the directions.

First, use your ruler to draw a line finishing the triangle.

Second, color the triangle green.

Third, use your ruler to draw a bigger triangle next to the green triangle.



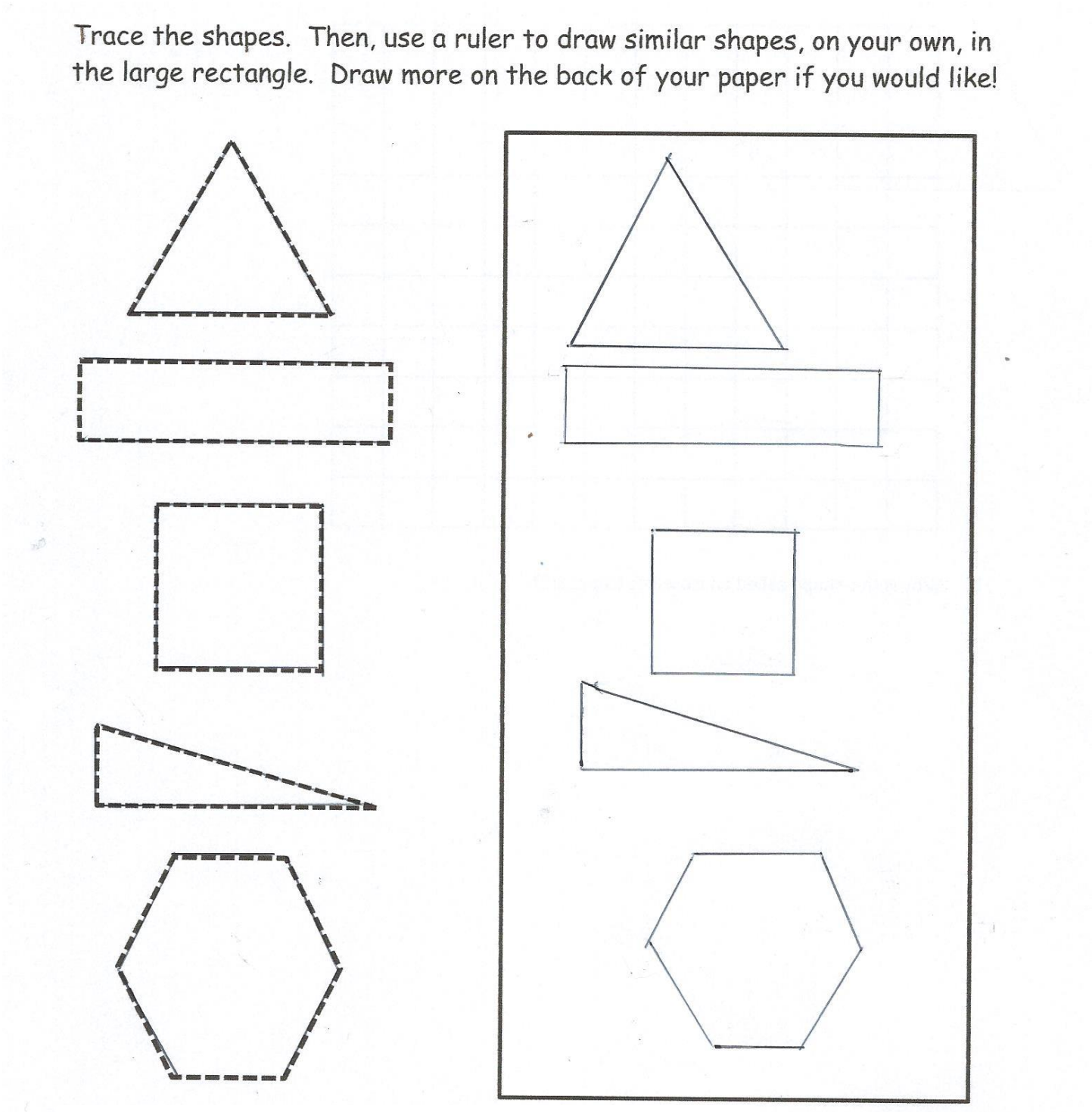
Lesson 2

Objective: Build flat shapes with varying side lengths and record with drawings.

Homework Key

Triangle, rectangle, square, triangle, and hexagon traced; related shapes drawn in the box

Homework Samples



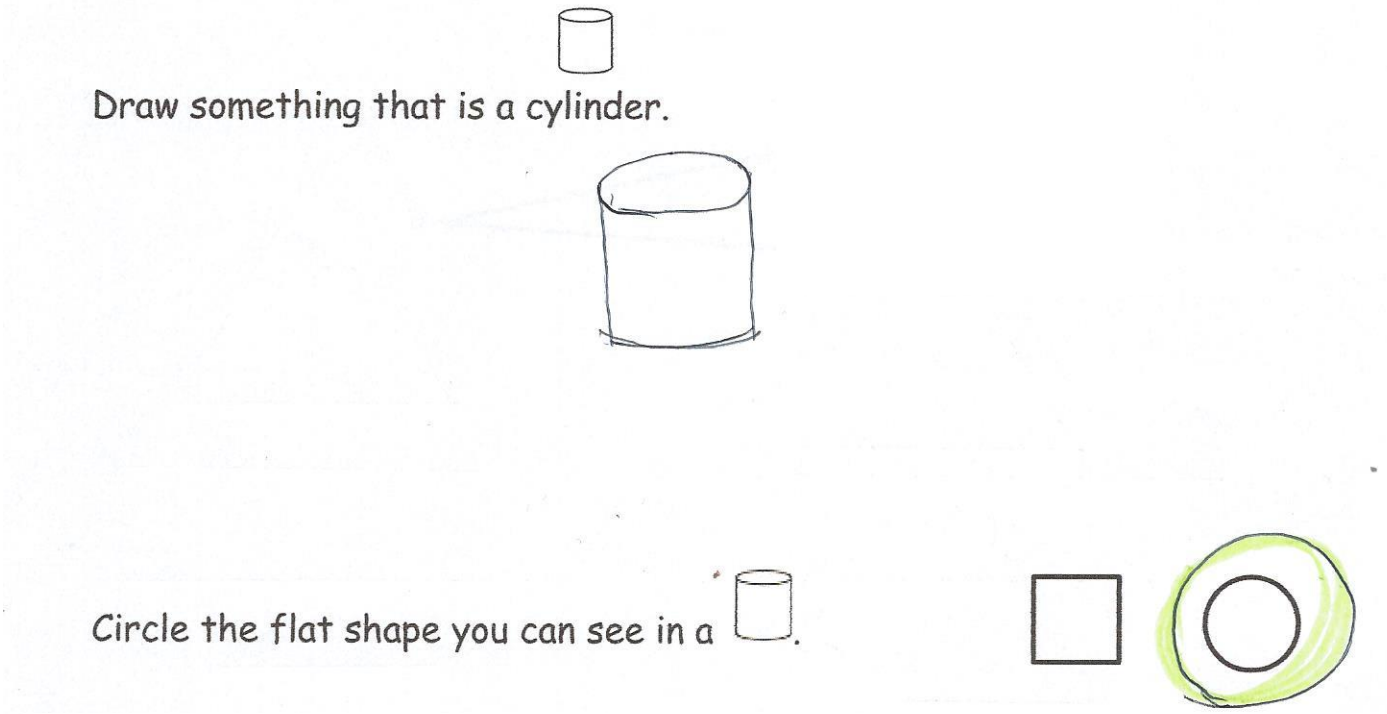
Lesson 3

Objective: Compose solids using flat shapes as a foundation.

Homework Key

Object shaped like cylinder drawn; circle
Object shaped like cube drawn; square
Object shaped like cone drawn; circle
Answers will vary.

Homework Sample



Lesson 4

Objective: Describe the relative position of shapes using ordinal numbers.

Homework Key

1st star colored red; 3rd star colored blue; 5th star colored green; 8th star colored purple
X placed on 2nd shape; triangle drawn in 4th shape; circle drawn around 6th shape; square drawn in 9th shape
Circle drawn in 7th shape; X placed on 1st shape; square drawn in 5th shape; triangle drawn in 3rd shape
Line drawn from the lion to "first"; line drawn from the grey-striped cat to "second"; line drawn from the zebra to "third"; line drawn from the yellow-striped cat to "fourth"; line drawn from the snake to "fifth"; line drawn from the snail to "sixth"

Homework Sample

Composing and Decomposing Shapes

Focus Standard:

K.G.6 Compose simple shapes to form larger shapes. *For example, "Can you join these two triangles with full sides touching to make a rectangle?"*

Instructional Days Recommended: 4

Thus far, students have considered shapes independently, rather than in conjunction with other shapes. Topic B expands students' thinking about shapes by introducing the notion that simple shapes can be combined to compose larger shapes (**K.G.6**). This supports *A Story of Units'* overarching theme that smaller units can be used to make a larger unit. "These two triangles make a square! These two squares make a rectangle!"

In Lesson 5, students use pattern blocks as templates to compose other shapes and pictures. For example, they make a rectangle from two squares and use a square and a triangle to make a pentagon or *house* shape. Lesson 6 has students explore how to decompose a flat shape into two or more flat shapes. For example, students find that their rectangle can be decomposed into two triangles, two squares, or even a square and two smaller rectangles. Students record their explorations by drawing the hidden shapes within a larger shape. The Problem Set extends puzzle work as students combine shapes to complete pattern block templates of increasing complexity (see Geometry progressions document, p. 7).

Lesson 6's work leads into Lesson 7, where students cut a square to form simple three-piece puzzles and to intuitively use geometric motions such as flips, turns, and slides as they work to solve one another's puzzles. Lesson 8 hosts the Math Olympics, a culminating task that celebrates student learning from the whole year. Students complete tasks related to measurement, operations, and geometry.

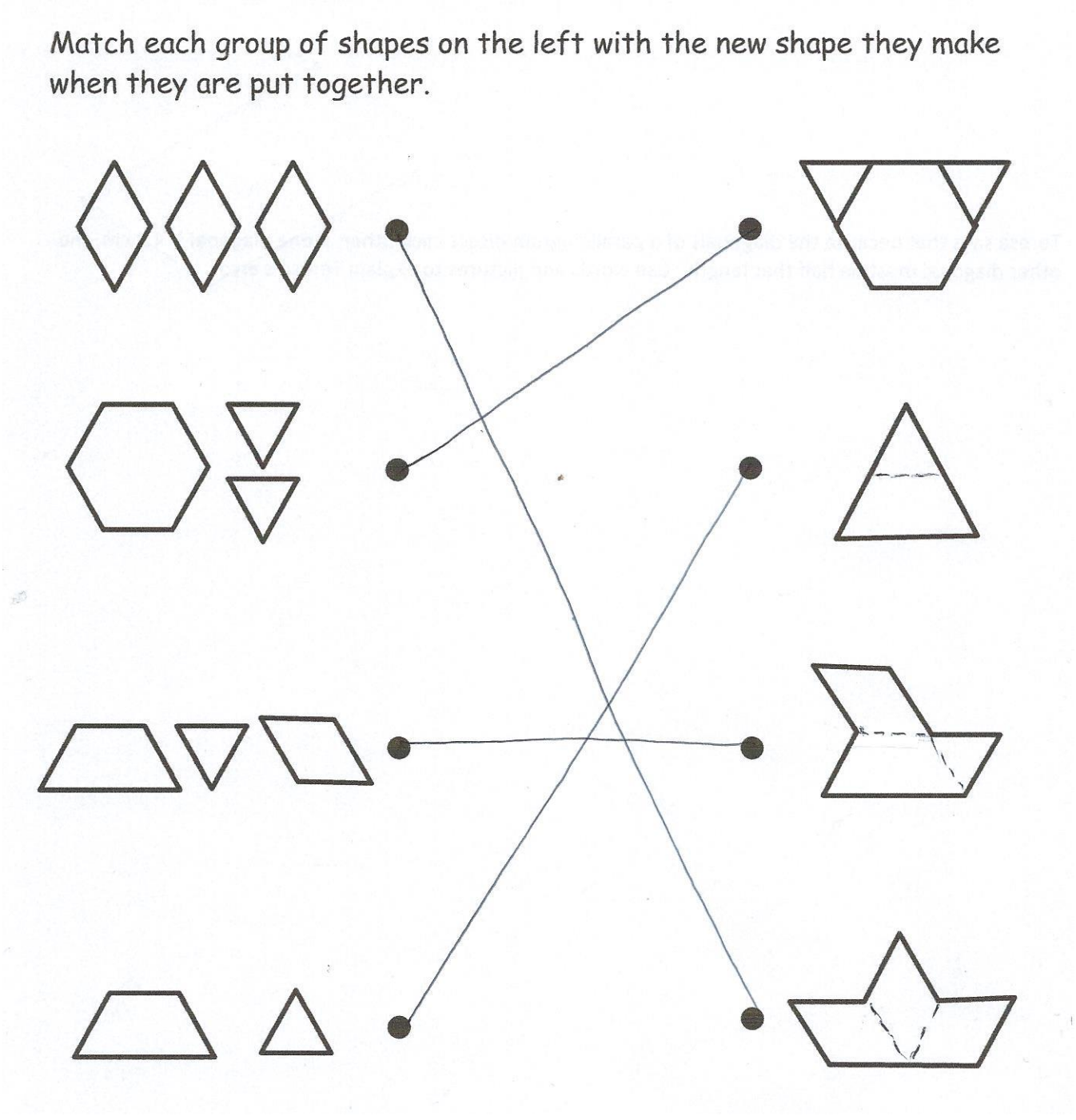
Lesson 5

Objective: Compose flat shapes using pattern blocks and drawings.

Homework Key

First bullet in the left column matched to the third bullet in the right column
Second bullet in the left column matched to the first bullet in the right column
Third bullet in the left column matched to the fourth bullet in the right column
Fourth bullet in the left column matched to the second bullet in the right column

Homework Samples



Lesson 6

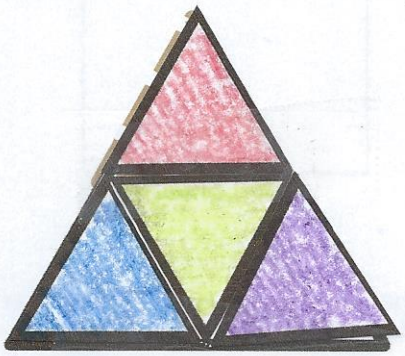
Objective: Decompose flat shapes into two or more shapes.

Homework Key

Drawing shows how 4 small triangles can be used to compose a large triangle; 4
Drawing shows how 6 triangles can be used to compose a hexagon; 6

Homework Samples

Cut out the triangles at the bottom of the paper. Use the small triangles to make the big shapes. Draw lines to show where the triangles fit. Count how many small triangles you used to make the big shapes.



This big triangle is made with 4 small triangles.

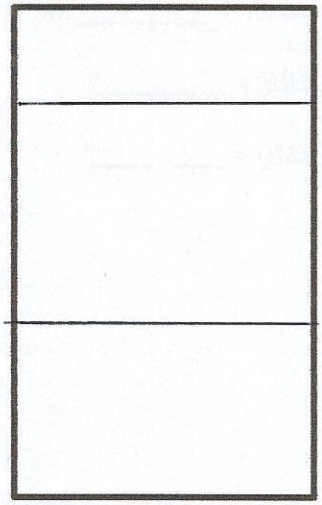
Lesson 7

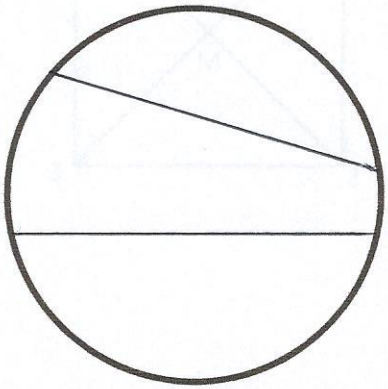
Objective: Compose simple shapes to form a larger shape described by an outl

Homework Key
Answers will vary.

Homework Samples

Using your ruler, draw 2 straight lines from side to side through each shape. The first one has been started for you. Describe to an adult the new shapes you made.





Lesson 8

Objective: Culminating task – review selected topics to create a cumulative year-end project.

Culminating Activities

Answers will vary.