

Topic B

Attributes of Two-Dimensional Figures

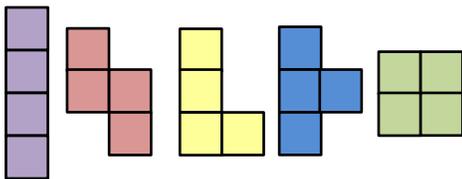
3.G.1

Focus Standard:	3.G.1	Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.
Instructional Days:	6	
Coherence		
-Links from:	G2–M8	Time, Shapes, and Fractions as Equal Parts of Shapes
-Links to:	G4–M4	Addition and Subtraction of Angle Measurements of Planar Figures

In Topic B, students use their understanding of geometry from Grade 2 to explore quadrilaterals. In Lesson 4, they learn that different shapes (e.g., squares, rectangles, and rhombuses) have shared attributes that can fall within a larger category (parallelograms, quadrilaterals, and trapezoids). They explore these new, larger categories and understand, for example, that any quadrilateral can be decomposed into two triangles. As they learn which attributes are shared, the process of comparing shapes also leads to discussion about the differences between shapes; students learn, for example, that not all rectangles and rhombuses are squares.

Students use their understandings of the attributes of quadrilaterals to compare other polygons in Lesson 5. They look for shared attributes and learn to recognize polygons with sides that are equal—regular polygons—which helps lay a foundation for problem solving with perimeter in later topics.

While students analyze the attributes of given shapes in Lessons 4 and 5, in Lesson 6 they draw shapes based on given attributes. For example, students may be asked to draw a quadrilateral with at least two right angles and talk about which shapes are possibilities. They also draw quadrilaterals that do not fit any subcategories. Prompts such as “draw a polygon with only two sides and two angles” spark investigative discussion through which students determine the impossibility of such a shape. This lesson helps students solidify their intuitive understanding of polygons.

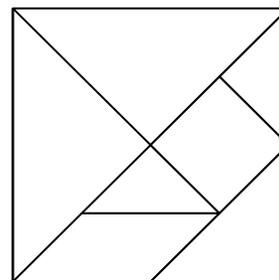


Tetrominoes

In Lesson 7, students work with tetrominoes. They use grid paper to construct a set, then reason about how to create larger shapes, such as rectangles, using them. This develops spatial structuring skills by way of manipulating and composing shapes.

Students use their experience with composing shapes to help them *decompose* a square to create a tangram puzzle (pictured to the right). Lesson 8 guides students through the process of decomposing, and then reconstructing, the original square using the seven puzzle pieces.

In Lesson 9, students learn to analyze relationships between tangram pieces. For example, students might discover that the two largest triangles compose one larger triangle, or that the two smallest triangles can be manipulated to compose the small square, parallelogram, and medium triangle.



Tangram



Students solve tangram puzzles using their pieces and discuss whether or not there is more than one way to compose a given polygon. Describing their strategies provides engaging context for using the vocabulary of attributes: “I found that the right angle of the small triangle forms the top of the duck’s head.” Students may create their own interesting polygons and trade with partners to see if a peer can use their tangram pieces to complete the outline.

A Teaching Sequence Towards Mastery of Attributes of Two-Dimensional Figures

Objective 1: Compare and classify quadrilaterals.
(Lesson 4)

Objective 2: Compare and classify other polygons.
(Lesson 5)

Objective 3: Draw polygons with specified attributes to solve problems.
(Lesson 6)

Objective 4: Reason about composing and decomposing polygons using tetrominoes.
(Lesson 7)

Objective 5: Create a tangram puzzle and observe relationships among the shapes.
(Lesson 8)

Objective 6: Reason about composing and decomposing polygons using tangrams.
(Lesson 9)