ACTIVITY: ANGLES IN PLANE FIGURES

We're going to use pattern blocks to explore sums of interior angles in polygons. You may use physical, printed, or virtual pattern blocks. Record your work.
(Activity expanded from Mathematics for Elementary Teachers: A Conceptual Approach, McGraw Hill Higher Education, 2016.)

1. First, determine the angles in each of the pattern block pieces. Note that if you place 6 triangles together with a common point, you make an interior circle. That means each corner is 360°/6 = 60°. By using a similar approach and/or comparing to known values, determine the measure of the vertices of each of the six pattern block pieces.
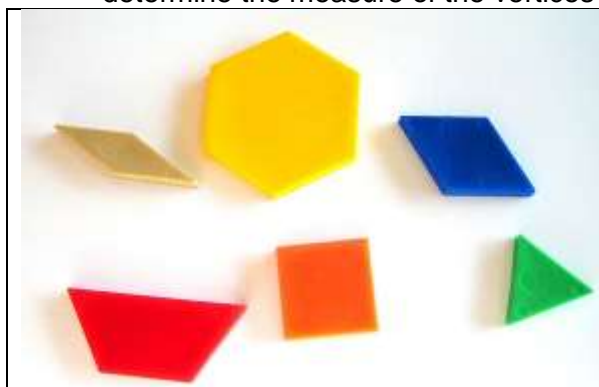

Figure 1: Pattern Blocks
https://commons.wikimedia.org/wiki/File:Plastic_pattern_blocks.JPG
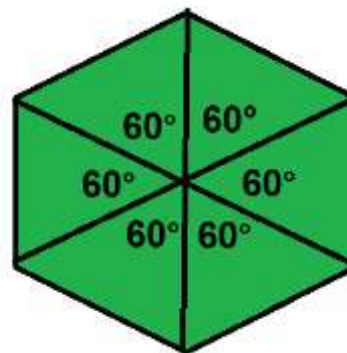CC BY-SA 3.0

Figure 2: Angles in Triangles

2. What is the sum of the interior angles of a triangle? Is that true for any triangle?

3. Four of the pattern block shapes are **quadrilaterals**, with four sides and four angles. What is the sum of their interior angles?

4. Each of the following pattern block figures is a **hexagon**, with six sides and six interior angles. Find the measure of each interior angle, and computer the sum of all the interior angles of each polygon below. Form a conjecture (educated guess) about the sum of the measures of the interior angles of a hexagon.

Figure 3: 3 Hexagons
https://mathsbot.com/manipulatives/patternBlocks

5. This figure is also a hexagon. Be careful to only count the interior angles of the outline, not all the angles of the blocks that make it up (the sides that make straight lines aren't separate, and the yellow hexagon vertex that meets the corners of the two blue rhombuses doesn't count since it's inside the figure). Does the sum of these angles support your conclusion in part 2?
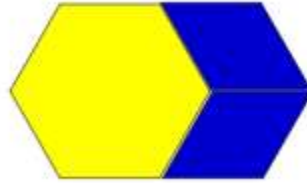

Figure 3: Another hexagon
https://mathsbot.com/manipulatives/patternBlocks

6. This figure is a **pentagon**, with five sides and five interior angles. Find the sum of the interior angles. Use your pattern blocks to find at least two other figures with five sides, and determine the sums of the measure of their interior angles. Form a conjecture about the sum of the measure of the interior angles of a pentagon.

Figure 4: Pentagon
https://mathsbot.com/manipulatives/patternBlocks

7. This figure is an **octagon**, with eight sides and eight angles. What is the sum of the interior angles? Use your pattern blocks to find other figures with eight sides. Form a conjecture about the sum of the interior angles of an octagon.
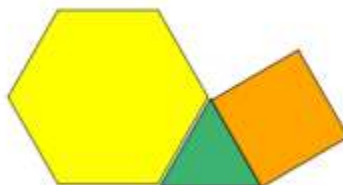

Figure 5: Octagon
https://mathsbot.com/manipulatives/patternBlocks

8. Use your pattern blocks to find figures with various numbers of sides. Form a conjecture about the sum of the measures of interior angle of a polygon, given the number of sides.

Number of Sides	Sum of Angles	Number of Sides	Sum of Angles
3		8	
4			
5			
6		n	