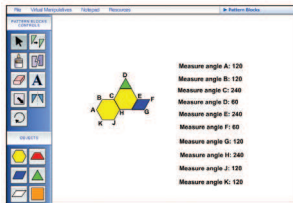


# MATH ACTIVITY 9.1

## Angles in Pattern Block Figures

### Virtual Manipulatives



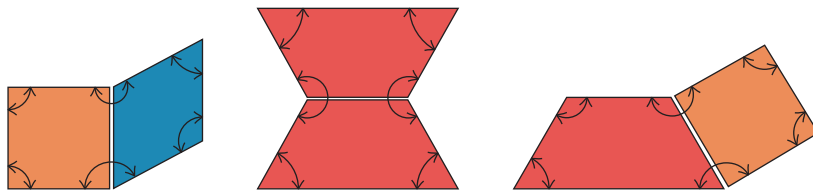
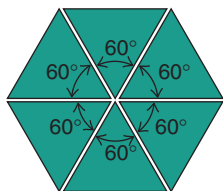
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**Purpose:** Use pattern blocks to determine sums of interior angles in polygons.

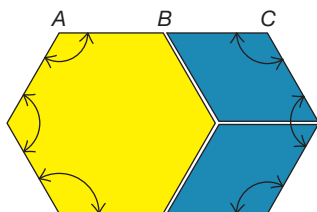
**Materials:** Pattern Blocks in the Manipulative Kit or Virtual Manipulatives.

\*1. Each of the three angles of a pattern block triangle has a measure of  $60^\circ$ . This can be shown by placing the *vertices* (corners) of six triangles at a point and using the fact that there are  $360^\circ$  in a circle (see figure at left below). Since 6 angles meet at a point, there are  $360 \div 6 = 60$  degrees in each angle. Determine the measures of the different interior angles of each of the pattern blocks, and draw sketches or trace pattern blocks to explain your reasoning.

2. Each of the following pattern block figures has six sides (**hexagon**) and six interior angles.

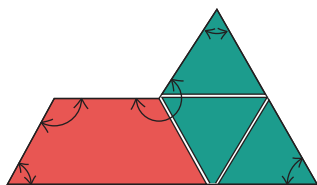


a. Find the measure of each interior angle, and compute the sum of the measures of all the interior angles of each polygon above. Form a conjecture about the sum of the measures of the interior angles of a hexagon.



b. The figure at the left that is formed with a hexagon and two parallelograms also has six sides. These sides meet in six interior angles which have been marked. Notice that the edges of the pattern blocks from A to C lie on a straight line, so these edges are counted as only one side. Also, point B is not the vertex of an interior angle of the hexagon, because it is not the intersection of two sides. Find the measures of the interior angles of this figure. Does the sum of the measures of these angles support your conclusion in part a?

3. The figure at the left that is formed with a trapezoid and three triangles has five sides (**pentagon**) and five interior angles. Find the sum of the measures of the interior angles.



a. Use your pattern blocks to form other figures with five sides, and determine the sums of the measures of their interior angles. (*Suggestion:* It may help you to outline the five sides with bold lines as was done for the figure.)

b. Form a conjecture about the sum of the measures of the interior angles of a pentagon.

4. The figure at the left that is formed with a hexagon, triangle, and square has eight sides and eight interior angles. Use arcs to mark these eight angles. What is the sum of their measures? Use your pattern blocks to form other figures with various numbers of sides. Form a conjecture about the sum of the measures of the interior angles of a polygon, given the number of sides.

