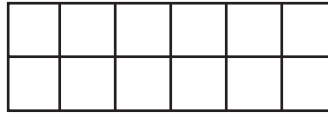
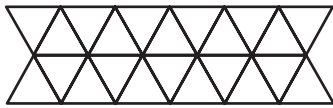


ENRICHMENT ACTIVITY I-7

Mosaics

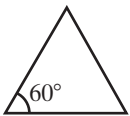
In art, large surfaces are often covered with decorative patterns of tiles that fit together exactly. Such creations are called mosaics. Some mosaics, notably those found in Islamic art and architecture, exclusively use geometric patterns. This activity will focus on geometric patterns made with tiles that are **regular polygons**, that is, polygons that have all sides congruent and all angles congruent. The five most common regular polygons are shown at the bottom of the page.

For example, triangular tiles or rectangular tiles can be arranged as shown below. Note that the sum of the measures of the angles about a point must be 360° .

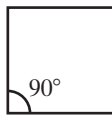


Trace the regular polygons shown at the bottom of the page, and make several copies of each. Use the polygons to complete the following exercises.

1. Is it possible to arrange regular pentagons to completely cover a surface? Justify your answer.
2. Is it possible to arrange regular hexagons to completely cover a surface? Justify your answer.
3. Is it possible to arrange regular octagons to completely cover a surface? Justify your answer.
4. Arrangements different from the examples shown above can be made using triangles.
 - a. Arrange equilateral triangles to form a regular hexagon.
 - b. Arrange these hexagons to cover a surface.
5. Some methods of tiling use two different polygons.
 - a. Place four regular octagons so that each touches two others along one edge.
 - b. What other regular polygon could be used to fill the space between the octagons?
6. Make patterns with the following combinations of regular polygons:
 - a. Squares and triangles
 - b. Hexagons and triangles
 - c. Hexagons, squares, and triangles



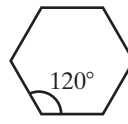
Triangle
3 sides



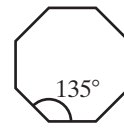
Square
4 sides



Pentagon
5 sides



Hexagon
6 sides



Octagon
8 sides