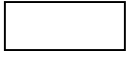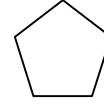Handout 3
Practice Making Your Own Zillij

1. On the line below the figures (polygons), write whether the shape is **symmetric** or **asymmetric**.
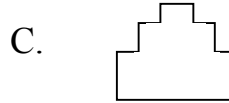
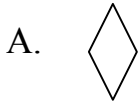_____   _____   _____   _____

2. Tiling means that the artist covers a flat surface with shapes that fit together without any gaps. Symmetric figures cover a space better than others because of transformations that can be performed on them, such as translations, reflections (line of symmetry) or rotations. Which figure below is asymmetric?   _____

A.   B.   C.

3. Moroccan zillij artists usually start their tiling with one basic symmetric polygon shape. They spread their design outward from that shape. On isometric grid paper, repeat a pattern using one or more of these shapes.
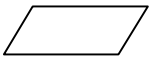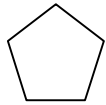
parallelogram   equilateral   equilateral   equilateral
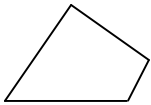   pentagon   hexagon   triangle

4. Explain why the polygon below is asymmetric.

5. Cut out several copies of the figure in question 4. On your grid paper, test whether you can use an asymmetric figure in a zillij tiling pattern.

6. Summarize what you know about tiling a surface using the concepts of symmetry, rotation, reflection, and translation of shapes.

Handout 4

Assessment: Make Your Own Moroccan Mosaics (25 points)

Questions 1-3 are 1 point each
1. From what you have learned about Morocco and zillij which **statement** is true?
    A. Because of its boring landscape and culture, tourists rarely visit Morocco.
    B. Most of the population in Morocco practices the Jewish religion.
    C. If you could visit Morocco, you'd see decorative zillij tile in a few places.
    D. Morocco has both very modern and old characteristics.

2. As it is used in the article, "Western world" means
    A. People who live in Europe and America.
    B. People who practice the Islamic religion.
    C. Zillij artists who make the tile work.
    D. People in the old American West.

3. Why do Islamic and Moroccan artists create tessellating patterns in zillij?
    A. Islam discourages artists from painting people and animals.
    B. Morocco doesn't have many natural resources.
    C. The tiling strengthens their buildings to withstand many earthquakes.
    D. The people in Morocco do not have other jobs.

4. What way would you design a zillij pattern, or tessellation, in which all the tiles are the same shape? Are your shapes asymmetric or symmetric? Draw your pattern on grid paper. Color your design. (7 points)

5. What way would you design a zillij pattern, or tessellation, that combines two or more different tile shapes? Are your shapes asymmetric or symmetric? Draw your pattern on grid paper. Color your design. Write a statement to explain how you used translation, rotation, reflection, and line of symmetry.   (15 Pts)

Answer Keys
Handout 3
1. A. symmetric B. symmetric C. asymmetric D. symmetric
2. B.
3. Patterns will vary, but students' patterns must make use of one or more of the shapes given. Patterns will not have any gaps between the figures.
4. The figure is asymmetric. It does not have line of symmetry nor does it have rotational or reflectional symmetry.
5. The figure cannot be used to create a tiling pattern without gaps.

Handout 4
Questions 1-3 are 1 point each
1. D
2. A
3. A
4. Patterns will vary, but the shapes must be symmetric.(7 points)
5. In order to design a tiling pattern with only one shape, that figure must have translational symmetry, reflectional symmetry, or rotational symmetry. Asymmetric shapes will not work for tiling patterns. (15 points)