Tessellations and Transformations Learning Strategies

What should students be able to do within this interactive?

- Select a polygon from a set of regular and irregular polygons.
- Understand that a tessellation occurs when a figure repeats itself in a plane without gaps or overlaps.
- Recognize a successful tessellation.
- Identify polygons that will form a successful tessellation.
- Identify polygons that will not form a successful tessellation.
- Understand that a transformation of a figure occurs when a polygon is moved in a plane by following a specified condition.
- Understand that line symmetry, rotation symmetry and translation are types of transformations.
- Understand that line symmetry occurs when a figure can be reflected or flipped over a line without changing its size or shape.
- Understand that rotation symmetry occurs when a figure can be rotated around a point without changing its size or shape.
- Understand that a translation occurs when a figure can be moved along a line without turning or changing in size or shape.
- Identify examples of line symmetry, rotation symmetry or translation.

Common mistakes made by students:

- Not understanding that a tessellation has no gaps or overlaps.
- Not understanding that a figure can be transformed in more than one way.
- Not recognizing the difference between line symmetry, rotation symmetry and translation.
- Not being able to distinguish between the transformations.

Curriculum Connections:

- Please note all of the following correlations match outcomes in the new Mathematics Kindergarten to Grade 9 Program of Studies (2007).

Grade 6 Shape and Space SO6: Perform a combination of translations, rotations and/or reflections on a single 2-D shape, with and without technology, and draw and describe the image.

Grade 6 Shape and Space SO7: Perform a combination of successive transformations of 2-D shapes to create a design, and identify and describe the transformation.

Grade 7 Shape and Space SO5: Perform and describe transformations (translations, rotations, or reflections) of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral numbers and vertices).
Grade 9 Shape and Space General Outcome: Describe and analyze position and motion of objects and shapes.

Grade 9 Shape and Space SO5: Demonstrate an understanding of line and rotation symmetry.

**Print Activity notes:**
*Note: The Print Activity is not intended to be an assessment piece*

It is necessary for students to use the “Explore It” mode to work through the Print Activity. They will be expected to select a regular or irregular polygon to tessellate. The student will be expected to recognize when a tessellation has been successful. They will be expected to identify which of the polygons will form successful tessellations and which will not. The student will be expected to understand that the transformation of a polygon can occur in different ways. They will be expected to understand and identify line symmetry, rotation symmetry, and translations from a pattern of polygons.

The Print Activity may be opened in Word Format instead of PDF so that changes to questions can be made.

<table>
<thead>
<tr>
<th>Tessellations and Transformations Print Activity Key</th>
</tr>
</thead>
</table>

**Use the “Explore It” mode to answer the following questions.**

1. A **Tessellation** is created when a shape is ___repeated___ over and over again covering a plane without any ___gaps___ or ___overlaps____.

2. a. All are examples of ___irregular___ polygons.

   ![Polygon Example](image1)

   b. All examples of ___regular___ polygons.

   ![Polygon Example](image2)

3. State if each of the following patterns below are tessellations.
   a. _Yes_ (Yes/No)

   ![Pattern Example](image3)
4. Use the following to answer the questions below:

a. Which of the polygons will form a successful tessellation? i, ii, iv.

b. Which polygon was used in the pattern below? __iv__.

c. Which polygon was used in the pattern below? ___i__.
5. Use the following to answer the questions below:

   ![Tessellation Polygons]

   a. Which of the polygons will form a successful tessellation? i, ii, iii.
   b. Which polygon was used in the pattern below? iv.

   ![Pattern A]

   c. Which polygon was used in the pattern below? i.

   ![Pattern B]

6. **Line Symmetry** occurs when a figure can be flipped or reflected over a line and it appears **unchanged**.

   (changed/unchanged)

7. Draw the transformed shape(s) that show **line symmetry** on each of the patterns below:

   a. ![Symmetry Example A]

   b. ![Symmetry Example B]
8. **Rotation Symmetry** occurs when a figure can be rotated around a ___point___ and it appears unchanged.

9. Draw the transformed shape(s) that show **rotation symmetry** on each of the patterns below:

   a. 
   
   b. 
   
   c. 
10. Complete the definition with the correct choice below:

a. in a straight line
b. around a point

A **translation** occurs when an object is moved _______ a. ______ without turning or changing in size or shape.

11. Draw the transformed shape(s) that shows a **translation** of the figure moving along the given line on each of the patterns below:

a. 

b. 

c. 
12. Fill in the box beneath each diagram with the letter(s) that correctly describes what is being shown in the pattern. (Please note there may be more than one correct answer for each)

A. Successful Tessellation
B. Unsuccessful Tessellation
C. Line Symmetry
D. Rotation Symmetry
E. Translation

A, C
B, E
A

Junior High Math Interacts
©2007 Alberta Education (www.LearnAlberta.ca)

Shape and Space/ Transformations / Object Interactive / Learning Strategies