Math by Design
Lesson Plan: Transformations – Translations

National Standard: **Geometry**: Apply transformations…/describe sizes, positions, and orientations of shapes under informal transformations such as flips, turns, slides, and scaling
MD Standard 2: Knowledge of Geometry
MD Topic E: Transformations
MD Indicator 1: Analyze a transformation on a coordinate plane
MD Objective a: Identify, describe, and plot the results of multiple transformations on a coordinate plane
Materials and/or Set Up: Graph paper, rulers, *Interactive Resource 1*
Relevant Vocabulary: Coordinate plane, coordinates, transformation, translation, image, slide
Note to Teacher: This lesson is designed to be used in conjunction with the online interactive activity at http://mathbydesign.thinkport.org.
Suggested Activities: ▪ Show the students a triangle on a coordinate plane. Then show the same triangle after it has been translated. Ask the students to describe the transformation that results in the new position. Introduce the word *translation* to describe this transformation. ▪ Lead a discussion about ways to describe the transformation of a figure. Encourage descriptions that include up/down and right/left movement on the coordinate plane. ▪ Use a cut-out figure of the triangle to demonstrate the motions that result in the desired transformation. Be sure to discuss sliding the figure and compare it to the two-step explanation necessary to describe the translation. ▪ Use *Interactive Resource 1* to provide practice with translations.
Differentiation Suggestions: ▪ Provide tracing paper so that students can trace a figure and slide it to locate the image of the translated figure. ▪ Use puzzle pieces (e.g. jigsaw puzzle or tangram pieces) that students can manipulate to demonstrate the translation.
Assessment: ▪ On a coordinate plane, a point P located at coordinates (a, b) is translated 5 units to the left. What are the coordinates of the translated point? *Answer: (a-5, b)*
Follow Up: ▪ Provide students with a copy of the geometric figure and ask them to explain how

translations are used in the pattern.
http://etc.usf.edu/clipart/37300/37302/pattern_24_37302.htm

- Other figures are available at:
  http://etc.usf.edu/clipart/galleries/math/geometric_blocks.php

- If the students have already learned other types of transformations, use the figures from *Interactive Resource 1* to provide practice in applying several transformations.

- Ask students to bring pictures that show examples of translations being used in designs such as wall paper, floor tiles, art work, etc.

- Work with the art teacher to design a project involving geometric transformations.

Interactive Resource 1