

**Math by Design**  
**Lesson Plan: Transformations – Translations**

<b>National Standard:</b> <a href="#">Geometry</a> : Apply transformations.../describe sizes, positions, and orientations of shapes under informal transformations such as flips, turns, slides, and scaling
<b>MD Standard 2:</b> <a href="#">Knowledge of Geometry</a>
<b>MD Topic E:</b> Transformations
<b>MD Indicator 1:</b> Analyze a transformation on a coordinate plane
<b>MD Objective a:</b> Identify, describe, and plot the results of multiple transformations on a coordinate plane
<b>Materials and/or Set Up:</b> Graph paper, rulers, <i>Interactive Resource 1</i>
<b>Relevant Vocabulary:</b> Coordinate plane, coordinates, transformation, translation, image, slide
<b>Note to Teacher:</b> This lesson is designed to be used in conjunction with the online interactive activity at <a href="http://mathbydesign.thinkport.org">http://mathbydesign.thinkport.org</a> .
<b>Suggested Activities:</b> <ul style="list-style-type: none"><li>▪ 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 <i>translation</i> to describe this transformation.</li><li>▪ 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.</li><li>▪ 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.</li><li>▪ Use <i>Interactive Resource 1</i> to provide practice with translations.</li></ul>
<b>Differentiation Suggestions:</b> <ul style="list-style-type: none"><li>▪ Provide tracing paper so that students can trace a figure and slide it to locate the image of the translated figure.</li><li>▪ Use puzzle pieces (e.g. jigsaw puzzle or tangram pieces) that students can manipulate to demonstrate the translation.</li></ul>
<b>Assessment:</b> <ul style="list-style-type: none"><li>▪ On a coordinate plane, a point P located at coordinates <math>(a, b)</math> is translated 5 units to the left. What are the coordinates of the translated point? <i>Answer: <math>(a-5, b)</math></i></li></ul>
<b>Follow Up:</b> <ul style="list-style-type: none"><li>▪ Provide students with a copy of the geometric figure and ask them to explain how</li></ul>

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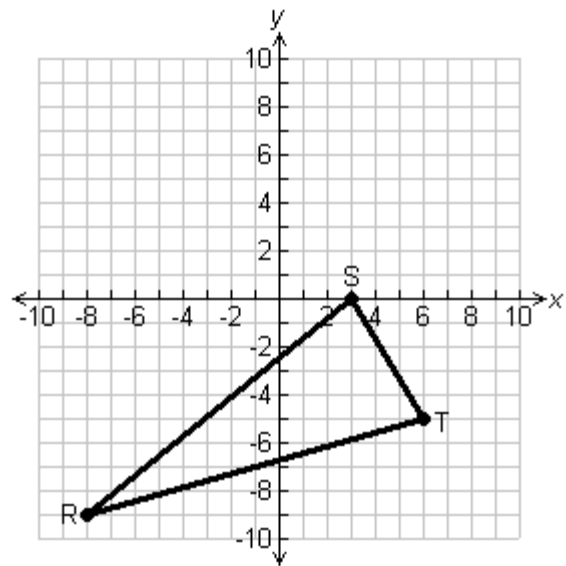
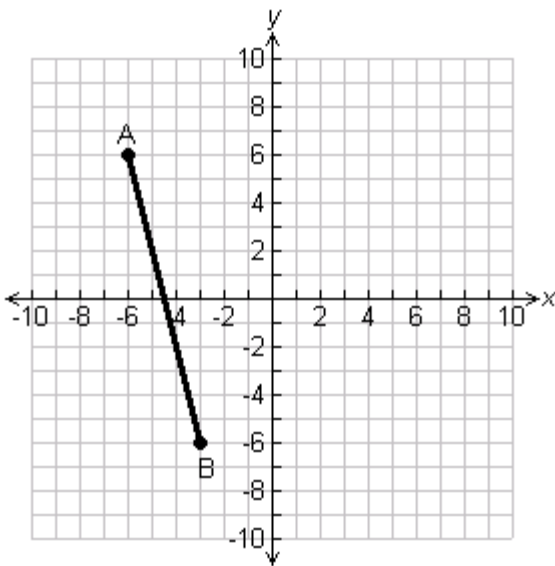
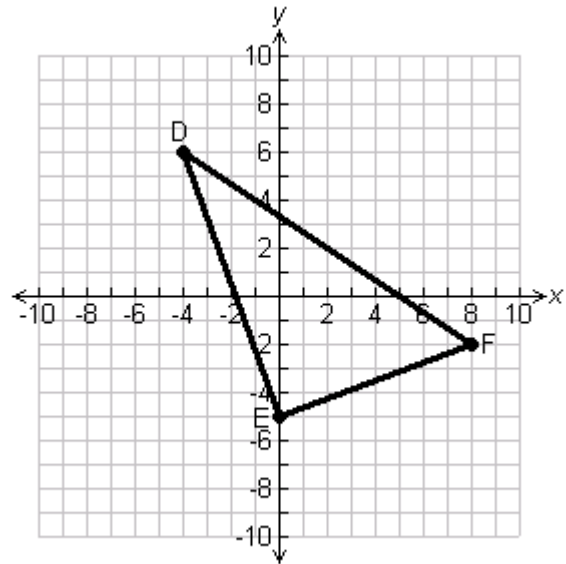
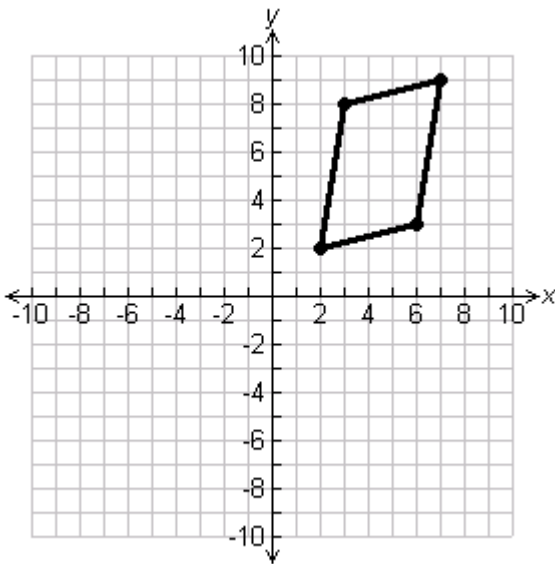
translations are used in the pattern.

[http://etc.usf.edu/clipart/37300/37302/pattern\\_24\\_37302.htm](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](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.

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***Interactive Resource 1***



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