

BUTTERFLIES, PINWHEELS, AND WALLPAPER Symmetry and Transformations

<p>Instructional Time and Investigations</p>	<p>18 days</p>	<ul style="list-style-type: none"> • Inv. 1: Symmetry and Transformations (4 Problems) • Inv. 2: Transformations and Congruence (3 Problems) • Inv. 3: Transforming Coordinates (5 Problems) • Inv. 4: Dilations and Similar Figures (4 Problems)
<p>Goals</p>	<p>Transformations: Describe types of transformations that relate points by the motions of reflections, rotations, and translations; and describe methods for identifying and creating symmetric plane figures.</p> <ul style="list-style-type: none"> • Various transformations affect distances and angles of figures differently. These effects help you compare figures and determine the similarity or congruence between figures. 	<p>Congruence and Similarity: Understand congruence and similarity and explore necessary and sufficient conditions for establishing congruent and similar shapes.</p> <ul style="list-style-type: none"> • Two shapes are congruent if a specific sequence of rigid transformations will transform one shape to the other. Two figures are similar if a specific sequence of rigid transformations and dilation will transform one shape to the other. • Properties of transformations, congruence, and similarity can be used to solve problems about shapes and measurements.
<p>Common Core Standards</p>	<p>Common Core Standards for Mathematical Practice</p> <p>MP.1: Make sense of problems and persevere in solving them.</p> <p>MP.2: Reason abstractly and quantitatively.</p> <p>MP.3: Construct viable arguments and critique the reasoning of others.</p> <p>MP.4: Model with mathematics.</p> <p>MP.5: Use appropriate tools strategically.</p> <p>MP.6: Attend to precision.</p> <p>MP.7: Look for and make use of structure.</p> <p>MP.8: Look for and express regularity in repeated reasoning.</p>	<p>Common Core Content Standards</p> <p>8.G.A.1: Verify experimentally the properties of rotations, reflections, and translations.</p> <p>8.G.A.2: Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.</p> <p>8.G.A.3: Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.</p> <p>8.G.A.4: Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.</p> <p>Also: 8.EE.B.6, 8.G.A.1a–c, 8.G.A.5</p>

BUTTERFLIES, PINWHEELS, AND WALLPAPER Symmetry and Transformations

Content Connections to Other Units

Goals of the Unit	Prior Work	Future Work
<p>Transformations: Describe types of transformations that relate points by the motions of reflections, rotations, and translations; and describe methods for identifying and creating symmetric plane figures.</p>	<ul style="list-style-type: none"> • Recognizing and completing mirror reflections (<i>Shapes and Designs</i>) • Recognizing and completing designs with rotation symmetry (<i>Shapes and Designs</i>) • Recognizing, analyzing, and producing tessellations (<i>Shapes and Designs; Stretching and Shrinking</i>) 	<ul style="list-style-type: none"> • Recognizing symmetry in graphs of functions (<i>Say It With Symbols; Function Junction; High School</i>) • Applying the ideas of symmetry to other subjects, such as graphic design and architecture (<i>High School</i>)
<p>Congruence and Similarity: Understand congruence and similarity and explore necessary and sufficient conditions for establishing congruent and similar shapes.</p>	<ul style="list-style-type: none"> • Looking for regularity and using patterns to make predictions (<i>all Connected Mathematics Units</i>) • Relating similarity transformations to the concept of similarity (<i>Stretching and Shrinking</i>) • Performing and analyzing similarity transformations (<i>Stretching and Shrinking</i>) • Describing similarity transformations in words and with coordinate rules (<i>Stretching and Shrinking</i>) • Reasoning about angles formed by parallel lines and transversals (<i>Shapes and Designs</i>) 	<ul style="list-style-type: none"> • Making inferences and predictions based on observation, and proving predictions (<i>High School</i>) • Describing symmetry in graphs, such as graphs of quadratic functions, periodic functions, and power functions (<i>Say It With Symbols; Function Junction; High School</i>) • Reasoning about congruence theorems in geometry (<i>High School</i>) • Finding equations for similar and congruent circles (<i>High School</i>) • Using matrices to represent transformations (<i>High School</i>) • Proving theorems about lines and angles (<i>High School</i>)