# Scope and Sequence for CMP3  

## Grade 8/Algebra 1

### BUTTERFLIES, PINWHEELS, AND WALLPAPER  
**Symmetry and Transformations**

<table>
<thead>
<tr>
<th>Instructional Time and Investigations</th>
<th>18 days</th>
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#### Goals

**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.

- Various transformations affect distances and angles of figures differently. These effects help you compare figures and determine the similarity or congruence between figures.

**Congruence and Similarity:** Understand congruence and similarity and explore necessary and sufficient conditions for establishing congruent and similar shapes.

- 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.

#### Common Core Standards

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#### Common Core Standards for Mathematical Practice

- **MP.1:** Make sense of problems and persevere in solving them.
- **MP.2:** Reason abstractly and quantitatively.
- **MP.3:** Construct viable arguments and critique the reasoning of others.
- **MP.4:** Model with mathematics.
- **MP.5:** Use appropriate tools strategically.
- **MP.6:** Attend to precision.
- **MP.7:** Look for and make use of structure.
- **MP.8:** Look for and express regularity in repeated reasoning.

#### Common Core Content Standards

- **8.G.A.1:** Verify experimentally the properties of rotations, reflections, and translations.
- **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.
- **8.G.A.3:** Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
- **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.

Also: 8.EE.B.6, 8.G.A.1a–c, 8.G.A.5
## BUTTERFLIES, PINWHEELS, AND WALLPAPER  Symmetry and Transformations

### Content Connections to Other Units

<table>
<thead>
<tr>
<th>Goals of the Unit</th>
<th>Prior Work</th>
<th>Future Work</th>
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| **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. | • Recognizing and completing mirror reflections (Shapes and Designs)  
• Recognizing and completing designs with rotation symmetry (Shapes and Designs)  
• Recognizing, analyzing, and producing tessellations (Shapes and Designs; Stretching and Shrinking) | • Recognizing symmetry in graphs of functions (Say It With Symbols; Function Junction; High School)  
• Applying the ideas of symmetry to other subjects, such as graphic design and architecture (High School) |
| **Congruence and Similarity:** Understand congruence and similarity and explore necessary and sufficient conditions for establishing congruent and similar shapes. | • Looking for regularity and using patterns to make predictions (all Connected Mathematics Units)  
• Relating similarity transformations to the concept of similarity (Stretching and Shrinking)  
• Performing and analyzing similarity transformations (Stretching and Shrinking)  
• Describing similarity transformations in words and with coordinate rules (Stretching and Shrinking)  
• Reasoning about angles formed by parallel lines and transversals (Shapes and Designs) | • Making inferences and predictions based on observation, and proving predictions (High School)  
• Describing symmetry in graphs, such as graphs of quadratic functions, periodic functions, and power functions (Say It With Symbols; Function Junction; High School)  
• Reasoning about congruence theorems in geometry (High School)  
• Finding equations for similar and congruent circles (High School)  
• Using matrices to represent transformations (High School)  
• Proving theorems about lines and angles (High School) |