

## MATH MCS MYP UNIT PLANNER

<b>Teacher(s)</b>	Schumacher, Hull	<b>Subject group and discipline</b>	Geometry - Honors		
<b>Unit Title</b>	Transformations	<b>MYP year</b>	5	<b>Unit duration (hrs.)</b>	12 hours (3 weeks)

### Inquiry: establishing the purpose of the unit

Key Concept	Related concepts	Global context
Relationships	Space and Patterns	Personal and Cultural Expression
<b>Statement of inquiry</b>		
Investigation of relationships in terms of space and patterns as it relates to personal and cultural expression through design.		
<b>Inquiry questions</b>		
<p><b>Factual:</b>            What is the relationship between reflections, translations and rotations in design?            What visual effects do transformations have on geometric figures?            Can a transformation change a pattern on a quilt by position, orientation, and / or size?            Which transformations create isometries?            What patterns are followed in order to complete compound transformations?</p> <p><b>Conceptual:</b>            When looking at a quilt or pattern how do you determine the type of transformation that has occurred?            How do transformations of geometric figures on a quilt and transformations of mathematical functions compare?</p>		

How do we know which transformations have created the mapping of an image or object?  
 How do we translate geometric figures in the coordinate plane using quilts as an example?  
 How do we reflect points in a coordinate plane in terms of locations on a quilt or design?  
 How are reflections and rotations similar and different when used in design?  
 How can we describe a transformation (or series of transformations) that take place in the coordinate plane using quilts?  
 How can a map help me understand properties of reflections, translations and rotations in the coordinate plane?

**Debatable:**

Which transformation is most useful in designing patterns on quilts and why?

Objectives	Summative assessment	
	<p><b>Outline of summative assessment tasks(s) including assessment criteria:</b>            Unit 1 Test: covers vocabulary, transformations, sequences of transformations</p>	<p><b>Relationship between summative assessment task(s) and statement of inquiry:</b>             DOK 1 and 2 questions on quiz relating to basic geometry terms and transformations in terms of quilts and patterns..            DOK 2 and 3 questions on quiz relating to compound transformations.</p>

**Approaches to learning**

- In order for students to be able to manage their state of mind, students must practice focus and concentration.
- In order for students to be reflective, students must focus on the process of creating by imitating the work of others.
- In order for students to be creative, students must create original works and ideas; use existing works and ideas in new ways.

**Content Standards**

**MGSE9–12.G.CO.1** Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

**MGSE9–12.G.CO.2** Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not.

**MGSE9–12.G.CO.3** Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

**MGSE9–12.G.CO.4** Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

**MGSE9–12.G.CO.5** Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

**Action: Teaching and learning through inquiry**

Content	Learning process		
<p>Transformations CO. 1, CO.2, CO.3, CO.4, CO.5</p>	<p><b>Learning experiences and teaching strategies</b></p>	<p><b>Formative Assessment:</b></p>	<p><b>Differentiation</b></p>
	<p><b>3-1 Reflections</b> <b>Pearson enVision pg. 105 – 112</b></p> <ul style="list-style-type: none"> <li>● Find a reflected image and write a rule for a reflection.</li> <li>● Define a reflection as a transformation across a line of reflection with given properties and perform reflections on and off a coordinate grid.</li> <li>● Intro to reflections using city examples</li> <li>● DESMOS: Shifting shapes activity</li> </ul>	<ul style="list-style-type: none"> <li>● TOD Pearson 3-1 Lesson Quiz</li> <li>● Suggested Practice: Mirrored Mappings (DOE Task) Pearson 3-1 Enrichment</li> </ul>	<p><b>Affirm identity:</b> students select image or word to reflect in order to demonstrate mastery</p> <p><b>Scaffold learning:</b> students are fill out a graphic organizer to summarize algebraic rules of reflections and notation</p> <p><b>Extend learning:</b> students use lines of reflection that do not intersect with the origin</p>
	<p><b>3-2 Translation</b> <b>Pearson enVision pg. 113 – 120</b></p> <ul style="list-style-type: none"> <li>● Translate a figure and write a rule for a translation</li> <li>● Find the image of a figure after a composition of rigid motions.</li> <li>● Prove that a translation is a composition of two reflections.</li> <li>● Intro to translations using direction examples from Marietta maps</li> </ul>	<ul style="list-style-type: none"> <li>● TOD Pearson 3-2 Lesson Quiz</li> <li>● Suggested Practice: Pearson 3-2 Enrichment Coordinating Translations (DOE Task)</li> </ul>	<p><b>Affirm identity:</b> students identify the translated route from their desk to the teachers desk</p> <p><b>Scaffold learning:</b> students are fill out a graphic organizer to summarize translations and notation</p> <p><b>Extend learning:</b> students are given complicated figures to translate and only vector notation</p>
<p><b>3-3 Rotations</b> <b>Pearson enVision pg. 121 – 128</b></p> <ul style="list-style-type: none"> <li>● Rotate a figure and write a rule for a rotation.</li> <li>● Prove that a rotation can be written as the composition of two reflections.</li> <li>● DESMOS: Connecting the Dots activity</li> </ul>	<ul style="list-style-type: none"> <li>● TOD Pearson 3-3 Lesson Quiz</li> <li>● Suggested Practice: Pearson 3-3 Enrichment Rotations (DOE Guided Notes)</li> </ul>	<p><b>Affirm identity:</b> students submit a picture to be used in a Geometer’s Sketchpad rotation simulation</p> <p><b>Scaffold learning:</b> students are fill out a graphic organizer to summarize rotations and notation</p> <p><b>Extend learning:</b> students create their own GSP rotation with their pictures following step by step directions</p>	

	<p><b>3-4 Classification of Rigid Motion</b>  <b>Pearson enVision pg. 129 – 135</b></p> <ul style="list-style-type: none"> <li>Specify a sequence of transformations that will carry a given figure onto another.</li> <li>Use geometric descriptions of rigid motions to transform figures</li> <li>DESMOS: Rigid Transformations Polygraph activity</li> </ul>	<ul style="list-style-type: none"> <li>TOD Pearson 3-4 Lesson Quiz</li> <li>Suggested Practice:          Pearson 3-4 Enrichment Programming Transformations (DOE Task)          Representing and Combining Transformations (DOE Task)</li> </ul>	<p><b>Scaffold learning:</b> students are given step by step transformations to trace each step of the process, progression to error analysis on sequence identification</p> <p><b>Extend learning:</b> students come up with their own error analysis problem on transformation sequence identification</p>
<p><b>Additional Resources:</b></p> <p><b>DOE Framework Tasks</b>          Reflections Practice          Transforming Shapes          Transformations in the Coordinate Plane</p> <p><b>Illustrative Mathematics</b>          Defining Reflections          Defining Rotations          Showing a Triangle Congruent</p> <p><b>Desmos</b>          Blue Point Rule</p>			