***INTRODUCTION:***  This unit explores geometric transformations and applies these concepts to congruency and similarity between geometric figures. Proofs of the Pythagorean theorem are also investigated and students learn to apply the Pythagorean theorem to find distance.

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| **Grade 8 Math: Geometry** |
| **Duration: 6 - 8 weeks****Topics covered: Transformations, Interior/Exterior Angle Sum theorem of a triangle, Angle Relationships, Interior Angle sum of Polygons, Angles in isosceles triangles, Equations to find missing angle measures, similarity or triangles.** |
| **Common Core Learning Standards:*** 8.G.1. Verify experimentally the properties of rotations, reflections, and translations:

*a. Lines are taken to lines, and line segments to line segments of the same length.**b. Angles are taken to angles of the same measure.**c. Parallel lines are taken to parallel lines.** 8.G.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.3. Describe the effect of dilations, translations, rotations and reflections on 2 dimensional figures using coordinates.
* 8.G.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, reflection, translations and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
* 8.G.5. Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.
* 8.G.6. Explain a proof of the Pythagorean Theorem and its converse. (Covered later in year)
* 8.G.7. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. (Covered later in year)
* 8.G.8. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system (Covered later in year)
* 8.G.9. Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
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| **BIG IDEAS/ENDURING UNDERSTANDINGS:*** *Figures and their images after transformations (****reflection, rotation, translation****) are congruent.*
* *Figures and their images after transformation (reflection****, rotation, translation, AND DILATION****) are similar.*
* *Angle relationships (alternate interior/exterior, complimentary, supplementary, vertical, angles formed by transversals, Sum of angles in triangle, angles in isosceles triangles, interior angle sum of polygons, similarity of triangles.)*
* *The Pythagorean theorem can be used to find missing sides of right triangles, to determine if a triangle is a right triangle, and to find the distance between two points.*
 | **ESSENTIAL QUESTIONS:*** How do geometric figures and the coordinates of their points change after various types of transformations?

 * How do we use angle relationships to missing angle measures?
* How do we determine if two triangles are similar?

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| **CONTENT:** |
| *Subunit*: **Transformations*** Rotations
* Reflections
* Translations
* Dilations
* Congruency
* Similarity
 | *Subunit*: **Angle relationships: Missing angle measures.*** Complimentary
* Supplementary
* Vertical
* Alternate Interior/Exterior (with equations)
* Angle sum theorem triangles/polygons (with equations)
 | *Subunit*: **Similarity of Triangles*** Similarity of triangles based on their interior angles.
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| **SKILLS AND PRACTICES:** * Identify a translation and review the effects of a translation on and off a coordinate plane.
* Identify a reflection and review the effects of a translation on and off a coordinate plane.
* Identify a rotation and review the effects of a rotation on and off a coordinate plane.
* Identify a dilation and review the effects of a dilation on and off a coordinate plane.
* Identify the differences between similar and congruent shapes on and off a coordinate plane.
* Investigate angle relationships of complimentary angles.
* Investigate angle relationships of supplementary angles.
* Investigate angle relationships of vertical angles.
* Investigate angle relationships of alternate interior/exterior angles using equations.
* Apply angle sum theorem to find missing angle measures of triangles/polygons.
* Determine if two triangles are similar based on their interior angles.

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| **VOCABULARY / KEY TERMS:** Transformation, Dilation, Reflection, Rotation, Translation, Complimentary, Supplementary, Vertical, Alternate Interior, Alternate Exterior, Similar, Congruent, Angle Sum Theorem  |
| **ASSESSMENT EVIDENCE AND ACTIVITIES** |
|  |  | Grade 8 Geometry Performance Task |
| **LEARNING PLAN AND ACTIVITIES** |
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| **Resources:** |