|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Unit Title** | Transformations | | | **Length of Unit** | 11 days |
| **Focusing Lens(es)** | Students will understand translations, reflections, rotations, dilations and congruence transformations. In addition, transformations will be explored as functions. | **North Carolina State Standards** | ***Cluster:*** *Understand the concept of a function and use function notation*  **F-IF.1, F-IF.2**  ***Cluster:*** *Experiment with transformations in the plane*  **G-CO.2, G-CO.3, G-CO.4**, **G-CO.5**  ***Cluster:*** *Understand congruence in terms of rigid motions*  **G-CO.6**  ***Cluster:*** *Understand similarity in terms of similarity transformations*  **G-SRT.1a, G-SRT.1b, G-SRT.1c, G-SRT.1d** | | |
| **Inquiry Questions (Engaging- Debatable):** | 1. How might functions be used to model transformations?  2. How can you interpret and justify transformations?  3. What kinds of transformations are rigid motions?  4. How might functions in relation to domain and range be used to evaluate transformations? | | | | |
| **Unit Strands** | Transformations and Functions | | | | |
| **Concepts** | Translations, reflections, rotations, dilations, congruence transformations | | | | |

|  |  |  |
| --- | --- | --- |
| **Generalizations**  **My students will Understand that…** | **Guiding Questions**  **Factual Conceptual** | |
| Translations are vertical and horizontal shifts on the coordinate plane.  **G-CO.2, G-CO.3, G-CO.4**, **G-CO.5, G-CO.6** | What happens to coordinates when they are translated? | What circumstances create a translation? |
| Reflections are equidistant from preimage and image.  **G-CO.2, G-CO.3, G-CO.4**, **G-CO.5, G-CO.6** | How do you know where to place your line of reflection? | How are x and y axis rotations similar? How are they different? |
| Rotations depend on the angle of rotation and which way it turns.  **G-CO.2, G-CO.3, G-CO.4**, **G-CO.5, G-CO.6** | What is a rotation? | Compare and contrast clockwise and counterclockwise rotations. |
| Geometric figures do not persevere distance and angle measure with dilations.  **G-SRT.1a, G-SRT.1b, G-SRT.1c, G-SRT.1d** | What determines whether an image shrinks or enlarges? | How can you describe dilations about the origin? |
| Congruence transformations persevere distance and angle measure.  **G-CO.2, G-CO.3, G-CO.4**, **G-CO.5, G-CO.6, F-IF.1, F-IF.2** | What are the three types of congruence transformations? | Describe the major difference between rigid and non-rigid motion transformations. Create a sample problem to justify your reasoning. |

|  |  |
| --- | --- |
| **Key Knowledge and Skills:**  **My students will…** | *What students will know and be able to do are so closely linked in the concept-based discipline of mathematics. Therefore, in the mathematics samples what students should know and do are combined.* |
| I can translate, rotate, reflect, and dilate geometric figures on the coordinate plane.  I can determine coordinates for a translated, rotated, reflected, or dilated figure without graphing.  I can determine types of transformations, given two geometric figures.  I can determine side length, distance from origin, and area of closed figure after a dilation.  I can identify corresponding sides and corresponding angles of the two triangles, given a triangle and its image after being transformed.  I can identify and use transformations to create new images.  I can identify and write rules for transformations that will map an object back onto itself OR map one object onto another.  I can write transformations in coordinate notation.  I can determine the angle measures created by a transversal and two parallel lines. | |

|  |  |  |
| --- | --- | --- |
| **Critical Language:** includes the Academic and Technical vocabulary, semantics, and discourse which are particular to and necessary for accessing a given discipline.  EXAMPLE: A student in Language Arts can demonstrate the ability to apply and comprehend critical language through the following statement: *“Mark Twain exposes the hypocrisy of slavery through the use of satire.”* | | |
| **A student in \_\_\_\_\_\_\_\_\_\_\_\_\_\_ can demonstrate the ability to apply and comprehend critical language through the following statement(s):** | | 1. Interpret and justify transformations given multiple representations 2. Manipulate and evaluate geometric figures to identify transformations 3. Graph and identify coordinates of preimage and image using function notation |
| **Academic Vocabulary:** | angle of rotation, compression, congruency transformation, congruent, corresponding angles, corresponding sides, dilation, domain, image, isometry, line, line of reflection, non-rigid motion, point, point of rotation, preimage, quadrants, range, ray, reflection, regular polygons, relation, rigid motion, rotation, scale, factor, transformation | |