| | **SHAPES AND DESIGNS** Two Dimensional Geometry | | |
|---|---|---|---|
| **Instructional Time and Investigations** | 21 days | • Inv. 1: The Family of Polygons (5 Problems)<br>• Inv. 2: Designing Polygons: The Angle Connection (4 Problems)<br>• Inv. 3: Designing Triangles and Quadrilaterals (5 Problems) | |
| **Goals** | **Properties of Polygons:** Understand the properties of polygons that affect their shape.<br>• The shape of a polygon is determined by its sides and angles. Polygons can be sorted into families according to the number and lengths of their sides and the measures of their angles.<br>• Patterns exist among interior and exterior angles in polygons. For example, the sum of the interior angles of a polygon relates to the number of triangles that are formed by drawing diagonals from one vertex. | **Relationships Among Angles:** Understand special relationships among angles.<br>• Angles can be classified by their size, their location in relation to each other in a figure or design, and their combined angle measure. Angle classification by location or combined angle measure can help you write equations to find unknown angle measures. | **Constructing Polygons:** Understand the properties needed to construct polygons.<br>• Triangles have 3 sides, but not every combination of 3 side lengths will make a triangle.<br>• As with triangles, specific combinations of side lengths and angle measures of a polygon can produce congruent copies of the polygon.<br>• Special properties of polygons, such as angle sum, side-length relationships, and symmetry, make them useful in building, design, and nature. |
| **Common Core Standards** | **Common Core Standards for Mathematical Practice**<br>**MP.1:** Make sense of problems and persevere in solving them.<br>**MP.2:** Reason abstractly and quantitatively.<br>**MP.3:** Construct viable arguments and critique the reasoning of others.<br>**MP.4:** Model with mathematics.<br>**MP.5:** Use appropriate tools strategically.<br>**MP.6:** Attend to precision.<br>**MP.7:** Look for and make use of structure.<br>**MP.8:** Look for and express regularity in repeated reasoning. | **Common Core Content Standards**<br>**7.EE.B.4:** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.<br>**7.G.A.2:** Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.<br>**7.G.B.5:** Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.<br>**Also 7.EE.A.2** | |

| | **SHAPES AND DESIGNS** Two Dimensional Geometry | |
|---|---|---|
| | **Content Connections to Other Units** | |
| **Goals of the Unit** | **Prior Work** | **Future Work** |
| **Properties of Polygons:** Understand the properties of polygons that affect their shape. | • Developing mathematical reasoning by analyzing integers and data (*Prime Time*)<br>• Developing shape recognition skills (*Elementary School*)<br>• Finding area and perimeter of 2-D figures (*Covering and Surrounding*)<br>• Developing classification skills through classifying integers (e.g., even, odd, abundant, deficient) (*Prime Time*)<br>• Developing shape recognition skills (*Elementary School*)<br>• Learning important properties of rectangles, triangles, and parallelograms (*Covering and Surrounding*) | • Exploring similarity of 2-D figures (*Stretching and Shrinking*)<br>• Finding surface area and volume of 3-D figures (*Filling and Wrapping; Say It With Symbols*)<br>• Enlarging, shrinking, and distorting 2-D shapes (*Stretching and Shrinking*)<br>• Learning properties of 3-D figures (*Filling and Wrapping*)<br>• Learning and applying the Pythagorean Theorem (*Looking for Pythagoras*)<br>• Enlarging, shrinking, flipping, and translating graphs of functions (*Function Junction*) |
| **Relationships Among Angles:** Understand special relationships among angles. | • *Developing angle recognition skills (Elementary School)*<br>• *Understanding degrees as the unit of angle measure (Elementary School)* | • Enlarging, shrinking, and distorting 2-D shapes (*Stretching and Shrinking*)<br>• Understanding congruence (*Butterflies, Pinwheels, and Wallpaper*) |
| **Constructing Polygons:** Understand the properties needed to construct polygons. | • Understanding area as the exact number of square units needed to cover a 2-D figure (*Covering and Surrounding*)<br>• Exploring how 2-D shapes fit together (*Elementary School*) | • Subdividing figures into similar figures (*Stretching and Shrinking*)<br>• Connecting tessellations to isometries (*Butterflies, Pinwheels, and Wallpaper*)<br>• Connecting symmetry to isometries (*Butterflies, Pinwheels, and Wallpaper; Function Junction*) |