Title: The Greedy Triangle

Learning Objectives:

Students will discover the relationship between the sides of a polygon and total angle degrees.

Materials:

* *The Greedy Triangle* by Marilyn Burns

Instructional Plan:

The teacher will begin the class by reading the book *The Greedy Triangle* by Marilyn Burns to the class. The students are to listen for enjoyment and consider why the teacher chose to read this book in class. Once the story is over, the teacher should engage in a class discussion, asking students to share how and why the book relates to what they have been discussing in class over the past few days.

Next the teacher will explain that the class will break up into pairs and examine the changes that occurred to the Greedy Triangle. Students are free to use paper, dry erase boards, the chalk board and anything around the classroom to create the various polygons that the Greedy Triangle changed into. Once they’ve made those shapes, each pair must see how many triangles encompass each polygon. The goal of the assignment is to use their knowledge of triangles to determine how many degrees are in the interior angles of each polygon. The Greedy Triangle originally consisted of 180ᵒ, however that changed as the Shape Shifter added sides to him. Without using a protractor, pairs must hypothesize about the degrees that encompass each type of polygon (triangle, quadrilateral, pentagon, and hexagon) and test their findings. Groups should be encouraged to try to come up with a general formula that can be applied to a polygon with *n* number of sides.

At the end of the lesson, the teacher should gather the students together and have them share their findings. Allow students to explain their thought processes, and problem solving strategies when finding a salutation to the problem. Did their hypothesis change as they broke up polygons with more sides? What changes did they make as they gained more information?

Assessment:

The teacher will formatively assess the students by observing their group work, and questioning them at the end of the lesson.

NYS Common Core Standards:

8.G Geometry

Students will:

* Understand congruence and similarity using physical models, transparencies, or geometric software.

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.

* Prove geometric theorems

10. Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180.

NCTM Standards:

*Problem Solving Standard:* instructional programs from kindergarten through grade 12 should enable all students to:

* Apply and adapt a variety of appropriate strategies to solve problems
* Monitor and reflect on the process of mathematical problem solving

*Communication Standard:* instructional programs from kindergarten through grade 12 should enable all students to:

* Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.

**Content Strand:**

*Geometry:* instructional programs from kindergarten through grade 12 should enable all students to:

• Understand relationships among the angles, side lengths, perimeters, areas, and volumes of similar objects.