Amazing Amanda

Amanda claims to have an amazing talent.

"Draw any polygon. Don't show it to me. Just tell me the number of sides it has and I can tell you the sum of its interior angles!"

Is Amanda's claim legitimate? Does she really have an amazing gift? Or is it possible for anyone to do the same thing? In this lesson, you will investigate what predictions are possible.

Getting Started: Triangles

1) Is the sum of the interior angles of a triangle the same for every triangle, or is the sum different for different types of triangles (e.g., equilateral, isosceles, scalene?)

2) Complete the table:

Polygon name	# of sides	Sketch	Sum of interior angles
Triangle	3		

Next Step: Investigating Polygons

In your groups investigate the sum of the interior angles of polygons with 4, 5, 6 and 7 sides:

- Divide the workload among group members. Each group member should find the sum of the interior angles of one of the new polygons.
- Use a straight-edge to draw your polygons. *(Hint: Subdivide each polygon into non-overlapping triangles so you can use what you know about the sum of the angle measures of triangles to compute the sum of the interior angles of your polygon.)*

Record your individual result in the table below:

Polygon name	# of sides	Sketch of polygon	# of triangles inside	Sum of interior angles

Now as a group, combine your results on the "group recording sheet" and answer questions 3, 4 and 5 and 6

Group Recording Sheet

Polygon name	Sketch of polygon	# of sides	# of triangles inside	Sum of interior angles
Triangle		3		
		4		
		5		
		6		
		7		

Questions:

3) What patterns do you notice in the table? Use complete sentences in your answer.

4) Is there a relationship between the number of sides of the polygon and the number of triangles inside the polygon? Explain using a complete sentence.

5) Is there a relationship between the number of sides of the polygon and the sum of the interior angles? Explain using a complete sentence

6) If so, **write an algebraic formula** to describe this relationship.

Sum of the interior angles of a polygon with n sides = ☐

Extension Questions: (Answer in full sentences and explain your reasoning for each question)

7) How many sides does a polygon have if the sum of its interior angles is $1980°$?

8) Is it possible for the sum of the interior angles of a polygon to be $3000°$? If so, how many sides would the polygon have?

9) What is the sum of the interior angles of a polygon with 100 sides?