

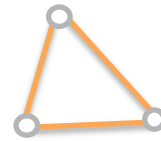
Spaghetti Triangle Exploration: A Geometry Math Lab

Warm Up Activity: Angle Guessing

Build an angle using two pieces of spaghetti and one marshmallow. Have your partner estimate the angle measurement. Then use a protractor to measure the angle. How was the estimate? Fill in the chart below. Trade roles and repeat three more times.

Estimated Angle Measure (in degrees)	Actual Angle Measure (in degrees)	Type of Angle (obtuse, acute, right)

Part 1: Triangle Angle Sums



Build a triangle using spaghetti and marshmallows.

(Tip: You can break or cut the spaghetti to make pieces of different lengths.)

Measure each of the angles and record the measurements in the chart below. Be as precise as possible!

Add up the sum of the three angles.

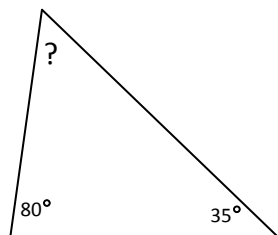
Build 2 different triangles and repeat all of the steps above.

	Angle A in degrees:	Angle B in degrees:	Angle C in degrees:	Total: ($A^\circ + B^\circ + C^\circ$)
Triangle 1:				
Triangle 2:				
Triangle 3:				

What do you notice about the sum of all three angles in a triangle? _____

This is called the "**TRIANGLE ANGLE SUM THEOREM**". Use it to label the missing angle measurement:

(Show your thinking.)

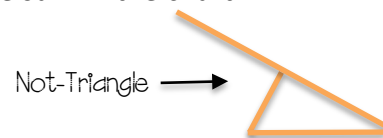


Part 2: Triangle Side Sums

Break or cut three different lengths of spaghetti. Use the three pieces to make a triangle. Measure each of the pieces to the nearest half-centimeter and record the measurements in the chart below. Add up the shortest and medium lengths of spaghetti and record the sum in the chart. Repeat to make two more triangles.

	Shortest Side <i>(length in cm)</i>	Medium Side <i>(length in cm)</i>	Longest Side <i>(length in cm)</i>	Sum <i>(Shortest + Medium in cm)</i>
Triangle 1:				
Triangle 2:				
Triangle 3:				

Now use three pieces of spaghetti that will not form a triangle. Measure each of the pieces to the nearest half-centimeter and record the measurements in the chart below. Add up the shortest and medium lengths of spaghetti and record the sum in the chart. Repeat to make two more NOT-triangles.



	Shortest Piece <i>(length in cm)</i>	Medium Piece <i>(length in cm)</i>	Longest Piece <i>(length in cm)</i>	Sum <i>(Shortest + Medium in cm)</i>
Not-Triangle 1:				
Not-Triangle 2:				
Not-Triangle 3:				

Using scissors, cut spaghetti to each of the lengths in the chart below and try to build a triangle using those pieces of spaghetti. Record whether you can build a triangle or not.

Piece 1	Piece 2	Piece 3	Sum of Piece 1 & 2:	Triangle or Not?
7 cm	10 cm	11 cm		
4 cm	9 cm	15 cm		
6 cm	8 cm	14 cm		

What do you notice about the spaghetti pieces that can form triangles and those that can't?

Write your theory about the relationship between the sum of the short and medium sides versus the length of the long side.

When the sum of the short and medium sides equals the length of the long side, can you build a triangle? Why or why not? (*Write AND draw your answer.*)

You just discovered a math “rule” for triangles – the “**TRIANGLE INEQUALITY THEOREM**”.

So, for any triangle, the sum of the length of two sides is _____ than the length of the third side.

Use this theorem to figure out whether each shape will be a triangle or not:

Sides:	Triangle or Not:	Sides:	Triangle or Not:
4 cm, 8 cm, 5 cm		9 cm, 14 cm, 2 cm	
20 cm, 13 cm, 5 cm		3 cm, 10 cm, 12 cm	

(Tear off and use for the Warm Up and Activity 1.)

