Math 9 – Unit 5: Measurement Name: _____

Lesson #5: Optimization Date: _____

Learning Goal: We are learning to optimize various shapes.

Have you ever heard of watermelons in the shape of a cube?

It is true, they exists, but why? What advantages do they have?

Optimization is the ability to make best use of a situation or a resource. In this unit, we will look how to **maximize** area/volume or **minimize** perimeter/surface area. Optimization is something that every company strives for. Every company wants to maximize profit or efficiency while minimizing cost or time. To do this, companies are hiring mathematicians! Go us!

Example 1: Tom has 32m of fencing. What are the dimensions of a rectangular pen that would give the maximum area?

Complete the table to find the maximum area:

Width (m)	Length (m)	Perimeter (m)	Area (m^2)
2		32	
4		32	
6		32	
8		32	

Example 2: Tracy has 100m of fencing. What are the dimensions of a rectangle with the maximum area?

Example 3: Igor wants to make a garden. The garden will be along the back of his house. He wants to put a fence around the garden to keep little critters out. If he has 32m of fencing, what is the maximum area of the garden he can make?

First, let's draw this situation to get a better idea where the fencing will go.

Width (m)	Length (m)	Fencing Used (m)	Area (m^2)
6		32	
7		32	
8		32	
9		32	
10		32	

Example 4: Judy needs to make a box that hold $16m^{3.}$ What are the dimensions of the box that would use the minimum amount of cardboard?

Width (m)	Length (m)	Height (m)	Volume	Surface Area (m^2)
1	1	16	16	

Success Criteria:

- I can understand why optimization is important.
- I can use the method of investigation to determine the optimum value in a given scenario.
- I can recognize that the optimum shape is as close to a square or cube as one can be.