

The Garden LAB

Summer is in the air! Your family has decided to plant vegetables this summer for some wholesome produce. Your family has a budget for building a chicken wire fence. It will be held together using stakes in the ground surrounding your soon to be garden. You find that the budget allows for 20 feet of fencing such that the stakes must be placed one foot apart from each other.

Question/Problem:

Which dimensions should be used in order to **maximize** the size of your garden, thus producing the largest quantity of vegetables?

THE TABLE

Create a table using the following exemplar.

| Length | Width | Area = lw | |
|--------|-------|-----------|--|
| | | | |

THE CALCULATIONS

Using the last column on the right, determine if the system is linear. Use Area as the dependent variable and either the length or the width (your choice) as the independent variable.

What do you notice? Show at least three calculations.

THE GRAPH

Make a graph of Area against either length or width. Be sure to label your axes appropriately. Write a brief summary of your findings.

WHAT IF?

What would happen if the shape was not rectangular? Would there be a better shape to maximize the area? State your conclusions and answer the question/problem.

THE PRESENTATION

When you have completed the rough portion of the lab, get a poster sheet. You will include a title, identify the problem and include ALL labelled information from Tasks 1 through 4. Be sure to identify the names of your group members. They will be displayed in class.

RUBRIC

| Task / Level | Level 1 | Level 2 | Level 3 | Level 4 |
|---------------------|--|---|---|---|
| TABLE | Student struggles to make an accurate table and struggles to properly identify the dependent and/or the independent variables. | Student makes a somewhat accurate table and somewhat identifies the dependent and/or the independent variables. | Student makes a somewhat accurate table and/or properly identifies either the dependent and/or the independent variables. | Student makes an accurate table and properly identifies the dependent and independent variables. |
| Task #2 | Student shows the solution without showing calculations. | Student accurately calculates some of the first differences between area and either length or width. | Student calculates most of the first differences between area and either length or width accurately. | Student accurately calculates the first difference between area and either length or width. |
| Task #3 | Student struggles to make a graph with proper labels. | Student makes a somewhat accurate graph perhaps with proper labels. | Student makes a somewhat accurate parabolic graph with proper labels. | Student makes an accurate parabolic graph with proper labels. |
| Task #4 | The student identifies that one of the bigger rectangles is the better case. | The student clearly identifies that the answer is when you have a square but a better case is either a pentagon or an hexagon or etc. | The student clearly identifies that the answer is a square or states that the better case is when you have a circle. | The student clearly identifies that the answer is when you have a square but the best case is when you have a circle. |