DESERT RAIN GAUGE RAINIER HIGH SCHOOL
MATH MANIPULATIVE APPLIED MATH Mr. Lybecker

Unit 18 Nonlinear Equations

Materials needed: 4" funnel, 3" funnel, 2" funnel
1" clear tube x 24" long
Wooden base plate
Poster Board, felt marker

Statement of Problem:
In the desert rain does not fall enough to measure using traditional methods. So in this lab we make the collected rain rise faster in the measurement cylinder than it builds up on the surrounding ground. As the diameter of the collecting funnel increases the rate of the measurement of rain in the cylinder also increases but not in a linear manner. Note the relationship of diameter of the top of the funnel and the height of the water in the column.

Proceedure:
Place the rain gauge in the lawn under a sprinkler for **10 minutes** for each situation. Along side the rain gauge, place a small can or beaker that you can use as a control for the amount of water falling on the ground. Make sure the control container has vertical sides so you can use a ruler to measure the height of the water in the container. Place the rain gauge and the control container side by side so each gets an equal amount of water. Don't place one container in the "rain shadow" of the other.
Cut the poster board in to four strips that measure 2" x 24" to hold along side the clear collection tube and be used as a place to make the scale for each diameter of funnel..

Funnel Dia	Distance from the sprinkler	height in rain gauge	height in control container
4"	_____	_____	_____
3"	_____	_____	_____
2"	_____	_____	_____
No Funnel	_____	_____	_____

Group Name _____
Student Name _____
Date _____

a. Run each test run of the sprinkler's output using the different funnel sizes. Record your answers on this sheet.
b. Measure the depth of water in the control container to determine the amount of water that fell on the area.
c. Make a scale on the 2" wide poster board strip that matches up to the water level in the gauge for each funnel diameter used.

Example: If ½" of water fell in the control container, find the height of water in the clear 1" tube and mark this height on the poster board strip and note that it is ½" of rain collected. Measure twice that height and make a mark for 1" of rain. Measure exactly ½ of the original collection measurement and make a mark for ¼" of rain fall. Continue to fill out the rain gauge scale for each funnel size by dividing the scale into tenths. This is the way the weather service reports the rain fall amounts.

d. Make a graph of the results with the unit of rain fall in tenths of an inch.

e. Write an equation that represents the graph. _____

Reflections:

1. Does the distance from the sprinkler matter? _____
Explain… _____
2. Why is it important to beware of the "rain shadow" for the sake of accuracy?

3. How accurate do you think this set-up would be?

4. Would evaporation have any effect on the relults?