

Title: WHAT DO YOU NEED TO REMEMBER ABOUT THE WORD EXPONENTIAL?

Project member(s): Chokri Cherif

Describe the problem, issue, or area of interest and the context.

When dealing with exponential growth, students usually confuse it with quadratic growth or linear growth. For example, there is no significant difference between x^2 and 2 to the power of x , when x is relatively small. To make a quick comparison between quadratic growth and exponential growth students usually choose a small value for “ x ”, such as 1, 2, or 3 and arrive at a wrong conclusion.

Define your desired goals, or “outcomes.”

The goal here is to demonstrate to the students the meaning of exponential growth by giving them a real life scenario. As a result of the scenario, which is in the form of a math problem, I showed them that numbers don’t lie when using the appropriate mathematical model to arrive at a solution. I also clearly conveyed to them, using this example, that when they deal with exponential growth, the resulting numbers can be unbelievably astronomical.

Describe your “indicators” of success.

Unfortunately, many of the students thought that this was a favorable proposal and expressed interest in accepting the proposal. They may have been more focused on the monetary reward offered rather than the monetary input required to be considered for the reward.

Describe your project.

The students will learn how misleading some proposals can be, if they don’t understand the underlying mathematical model involved and therefore cannot make an educated decision whether to accept or reject the proposal.

This is a hypothetical proposal offered by the BMCC Math Department to all the students in Mat 301-081. However, it is presented to the students as a valid, realistic proposal.

The Math Department is willing to do the following for any student enrolled in Mat 301-081 in exchange for a very modest donation from each participating student.

- 1) Complete payment of your tuition, for four years, in any CUNY College.
- 2) Complete payment of your rent, for four years, up to \$1,800 per month.
- 3) Payment of up to \$15,000 per year, for four years, for other living expenses.

You must donate the following to the Math Department in order for you to be considered for this reward.

You must collect the following amount throughout the month of January and make your total donation on February 1st:

On Jan. 1st, you must set aside one penny for donation. On Jan. 2nd, you must set aside two pennies. On Jan. 3rd, you must set aside four pennies. On Jan. 4th, you must set aside eight pennies. On Jan. 5th you must set aside sixteen pennies and so on and so on. That is, basically, each day of the month you must set aside the

double of the previous day until the last day of the month. The modest amounts that you set aside on a daily basis must be in pennies, no other denominations.

Please note that in order to be considered for this reward you must place the total number of pennies that you have set aside in a container with your name on it and bring it to my office in Room N532 during my office hours.

Very important:

Only the first ten students who submit the total donation, in accordance with the above rules, will be granted the reward.

Describe your results.

Some students' reactions a few minutes after I gave the assignment were as follows:

- > Professor, I can give you \$50 right now and you can keep the change.
- > Why do I have to bring my total donation in pennies only?
- > Obviously the Math Department is trying to trick us. They know how to count and they wouldn't give us anything for free.
- > When is the deadline, again, to submit the total donation?
- > This is not a good deal since the total donation could be millions of dollars. I heard about a similar proposal before.
- > Can I give you my donation on a daily basis?

The main result of this project was that even after providing the students with the mathematical explanation and the formula used to arrive at the solution, many of them still could not believe the final outcome of this proposal.

Describe your evaluation methods.

My evaluation was limited, given that the problem has no realistically achievable solution in relation to the students since no one can come up with and donate that huge sum of money. The students learned that the best course of action is to reject the proposal.